By Adam Cort

Electronic Charts

Hardware and software choices often dictate chart format

Perhaps no aspect of modern sailing is as confusing as the world of electronic charts—and the myriad programs and equipment that use them. Do you want a vector chart or a raster chart? Do you want something that can work offshore on a chartplotter, or something you can play with at home on your PC? Or do you want both?

The good news is that this is now a mature technology. And it continues to improve each year, if not each month, becoming both more powerful and easier to use. All the electronic chart providers out there do a good job of creating a solid product—electronic versions of the paper charts that make position finding and routing a snap when used in conjunction with the proper navigation software. Not only that, thanks to advances in digital technology, the differences are blurring these days so that choosing one style doesn't mean having to give up the advantages of the other.

Still, you have to be careful. Electronic charts can be differentiated according to a few basic types. Not all charts work in all settings.

Chartplotters provide a platform for viewing digital charts from the helm. Billy Black photo

Start with hardware

First and foremost, you need to keep in mind the type of hardware you plan on using. There are three basic ways of displaying electronic charts, and they largely determine what kinds of charts you can buy. They also have distinct advantages and disadvantages in terms of life offshore.

The first category consists of dedicated GPS and chartplotter units. These are generally rugged and specifically designed for use offshore. If not waterproof, they are at least water resistant. Their screens are often small, but are intended for use in challenging light conditions, especially direct sunlight. In fact, this is another area in which the technology is improving with each passing year. The same goes for the second category: combination electronic displays like radar or sonar units that double as GPS receivers and chartplotters.

In contrast, the third category—comprised of laptops and PCs combined with a separate GPS—is notoriously vulnerable to the rigors of life afloat, even in those cases where the units have been weatherized. Their screens, though large, can also be difficult to read in direct sunlight. Perhaps most importantly, finding room for them in a cramped navigation station can be a challenge on all but the largest boats.

On the plus side, with a PC or laptop the field is pretty much wide open in terms of the electronic charts that you can buy. If your computer is powerful enough there are any number of different navigation programs out there that make it possible to go with pretty much any chart you want. This is especially the case since many PC navigation programs allow you to use charts of a number of different formats.

MaxSea maritime software, for example, uses all the popular electronic chart formats, including everything from Maptech, C-Map, Softchart and MaxSea's own MapMedia charts to British Admiralty ARCS. The Nobeltec Visual Navigation Suite is capable of operating with a number of different electronic charting formats in addition to its own Passport line. The Capn software by Nautical Technologies uses a number of formats including Softchart and Maptech.

For Mac users running OS X as their operating system, there is GPSNavX. Compatible with most industry-standard electronic charts, including Maptech,

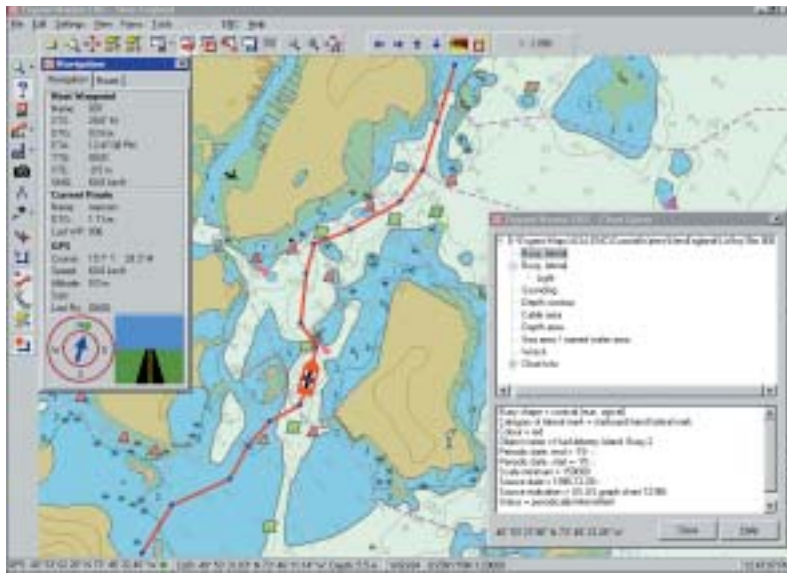
Maptech's Digital Chart Kit

Softchart, MarinePlanner and the National Oceanic and Atmospheric Administration's new electronic nautical charts, GPSNavX allows detailed color charts to be viewed on a Mac platform. Plug in a NMEA-standard GPS and the software provides real-time navigation plotting and tracking.

No matter what software you elect to use, it's important to check with the software manufacturer's specifications to be sure an electronic chart is compatible with the system you're using. All software is not equal in terms of its adaptability. Fugawi software, for example, is extremely accommodating. It can run everything from scanned images of paper charts to NOAA's digital charts, or ENCs, which can be downloaded off the Web for free. Transas navigation software, however, only works with the organization's own Transas electronic charts.

With chartplotters, on the other hand, you will inevitably be limited in your flexibility. Like the Transas software, chartplotters pretty much only run on a specific type of electronic charting. The Garmin line, for example, runs on its own BlueChart files. Raymarine and Standard Horizon, on the other hand, use C-Map's NT or NT+ charts for their chartplotters. Furuno uses the Navionics format.

Billy Black photo



Laptop computers let navigators take their charts anywhere, top. PC-based Fugawi software will set waypoints and track course, above.

Vector vs. raster

Because of their historically small size in terms of computing power (historically, since every year chartplotters are becoming more and more powerful) chartplotters run almost exclusively on vector charts. These are electronic charts on which the various features are entered in a file as bits of code—as opposed to raster charts, much larger files that are basically scanned versions of traditional paper charts.

In the past, vector charts have received some criticism due to the fact that they look slightly different from traditional paper charts. But this is changing as vector charts become better and better. Vector charts were also more limited in terms of their coverage area—it's much easier to simply scan a British Admiralty chart of, say, the Falklands, than to create a whole new one using computer code. But that is also changing.

On the plus side, because each chart characteristic on a vector

Hose jobs

Water systems—with all those hoses, fittings, valves and seacocks—can sometimes give you a sinking feeling. How many times have you fitted a hose, being so very careful everything is water tight, then come back to check on it again and again, unsure of your own handiwork. Fortunately, two new tools that are designed to take a little of the worry out of fitting and securing hoses have recently become widely available.

The ClampTite is a handy little tool that looks like it belongs on a surgeon's instrument tray but rather is used for making hose clamps—or most any other seizing clamps, for that matter—out of plain spool wire. With the simple tool and a short length of wire it's possible to make hose clamps of almost any size, eliminating the need to keep on hand multiple clamps of varying sizes. Hands-on sailors are bound to find other uses for the ClampTite tool as well—including attaching hardware fixtures to seizing eye splices to splinting broken tillers or spars.

The ClampTite comes in a number of sizes that sell for between $30 and $60. For more information, call (888) 860-8060 or visit the company's Web site at **www.nauticalpromotions.com**.

ClampTite tool

Turncouple

Meanwhile, the new Turncouple assembly from Vergennes, Vermont-based Good Turns, allows hoses to be easily connected and disconnected using a set of turnbuckle-type fittings. Two threaded adapters tighten on a coupler simultaneously by rotating the coupler. The tapered threads provide a firm mechanical seal that the company says has been tested to hold up to 100 psi of water pressure when tightened by hand. The barbed ends of the adapters are designed to fit into marine hoses and have space for two standard hose clamps for a secure fit.

The 1.5-inch Turncouple assembly was designed specifically for marine use and is made with Isoplast, a glass-reinforced, impact-resistant material that exceeds the standards for plastics used in seacocks and through-hull fittings. Use the couplers for upgrading hose systems, disconnecting and reconnecting lines for winterization or repair, improving access to pumps and equipment, or as a quick and easy way to make your boat's head legal in a no-discharge zone.

The Turncouple assembly sells for $49.50 and the company says it plans on introducing different sizes soon. More information is available at **www.turncouple.com** or by calling (802) 877-1001.

map is represented by a unique bit of code—as opposed to the whole thing being one big, flat picture file—the data can be more effectively manipulated, and more importantly, scaled, making it a more powerful navigational tool.

That's because vector chart images are comprised of dozens of superimposed "layers" that make up features like depth contours and bottom characteristics. As the user zooms in and out these layers compensate for the scale by either adding resolution or eliminating details to reduce clutter and keep the image from becoming confusing. Similarly, the size of the text on a vector chart remains constant, as opposed to the text on a raster chart, which shrinks or expands with the rest of the chart as you zoom in and out.

The coded nature of a vector chart also has an advantage as you move across a chart surface. Because of their individually scanned nature, scrolling over the "edge" of one raster chart to another can result in disconcerting jumps (although, the transitional technology has improved dramatically in recent years). With vector charts this isn't an issue.

Examples of popular raster charts include British Admiralty ARCs, SoftCharts and those made by Maptech. Popular vector charts include the Transas charts, Bluecharts, Navionics charts, Nobeltec's Passport charts, C-Map's NT+ line and NOAA's ENCs.

In the case of both raster and vector charts, manufacturers can include a wealth of subsidiary data, either as part of the basic chart or as an add-on. This can include everything from aerial photographs that can be juxtaposed against the digital charts—like those marketed by Softchart and Maptech—to tidal information and bathymetric data that makes it possible to create three-dimensional images of the bottom.

There may also be a wealth of harbor data available with many programs. With Maptech, for example, you can find out everything from whether there is a gas dock at a given port to the availability of scuba equipment. C-Map also offers a wide range of port information, making it easier to plan ahead when coastal cruising and in search of a place to spend the night.

Note that a number of the previously mentioned navigation programs for PCs and laptops can accommodate both raster and vector charts. Also note that when making the chartplotter vs. PC decision, the lines are not so abrupt as they once were. Specifically, chartplotters and land-based PCs can now be used in tandem, so that you can transfer information between the two. Specifically, the C-Map PC-Planner software program is designed so that you can plan a trip in the comfort of home, plugging in waypoints and figuring out things like bearings and distances. Then, when you are finished, you can transfer what you've done to a C-Map cartridge, which can in turn be used to download the information into the chartplotter that you take sailing.

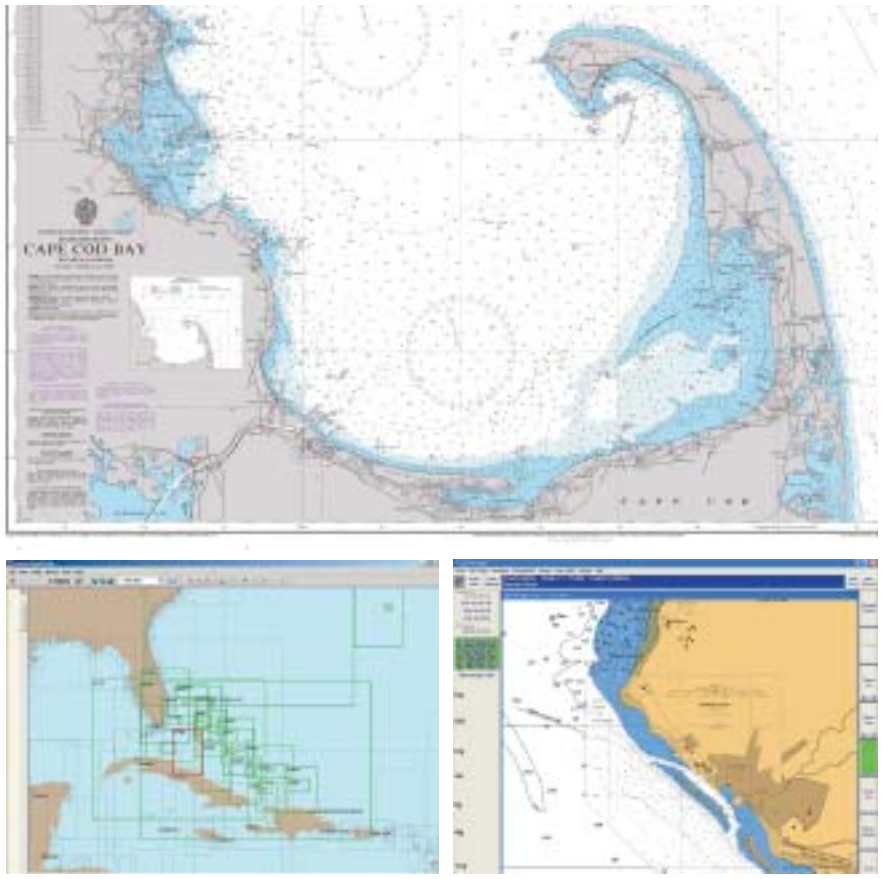
Beyond that, there are now a variety of different means of downloading charting information, which offer increasing flexibility in terms of acquiring new electronic charts. In the past, charts intended for use in dedicated chartplotters, like the BlueChart line, came in special cartridges or "chips" like C-Map's C-cards. Basically, buying a new chart meant buying another chip. Charts designed for use in PCs or laptops, on the other hand, were generally delivered on CD-ROM.

Garmin's BlueCharts, however, are now available on CD-ROM, which can then be electronically unlocked for a fee and downloaded onto memory cards or directly into a chartplotter. Similarly, Transas charts all come on a single CD. You then purchase a key to unlock the ones that you need. Note that this Transas data can then be transferred from one computer to another, but can only be used on one machine at a time. The reason for this is a "dongle," a plug-in adapter that needs to be plugged in to your computer's parallel printer socket if the program is to run.

Be aware that when ordering electronic charts for use in a dedicated chartplotter it's extremely important that you obtain not only the correct charting format but the correct type of chip, or card. Different brands of chartplotters come with different slot configurations. In contrast to much in the high-tech world, while compatibility exists between some brands, you can by no means count on it.

Finally, beyond hardware preferences and needs, the other thing to check out is whether or not a company or system covers the area in which you plan to sail. Of course, if you are simply planning on navigating the Eastern Seaboard, you will still find yourself with plenty of options. It will come as no great shock to anyone that places like the East and West coasts of the United States—as well as Northern Europe and the Mediterranean—are more than adequately covered by pretty much every player in the business.

If, however, you plan on sailing farther afield, be sure to take a close look at what kinds of charts are available with the different providers. Central and South America, for example, may be only partially covered, or not covered at all, depending on the company. The fact that a provider has charts for Mexico's Gulf Coast, for example, does not necessarily mean you will be covered on the Pacific side.



The United Kingdom Hydrographic Office produces raster versions of its Admiralty charts, top. While Transas, above left, and The Capn, above right, provide different chart viewing software.

C-Map bundles its charts with helpful marina information.

MANUFACTURERS LIST

Admiralty Charts and Publications/ARCS, **www.hydro.gov.uk** • C-Map, (508) 477-8010, **www.c-map.com** • Fugawi, (416) 920-9300, **www.fugawi.com** • Garmin, (800) 800-1020, **www.garmin.com** • GPSNavX, **www.gpsnavx.com** • Maptech, (888) 839-5551, **www.maptech.com** • MarinePlanner (IMAPS), (618) 281-6277, **www.marineplanner.com** • Maxsea, (508) 420-5903, **www.maxsea.com** • Nautical Technologies/The Capn (IMAPS), (800) 637-4020, **www.thecapn.com** • NOAA, (202) 482-6090, **www.noaa.gov/charts.html** • Nobeltec, (800) 946-2877, **www.nobeltec.com** • SoftChart (IMAPS), (866) 707-6277, **www.softcharts.com** • Transas, (206) 838-3000, **www.transas.com**.