

PRINT-ON-DEMAND PAPER CHARTS

Why Serious Mariners Continue to
Carry Paper Charts to Complement
Digital Navigational Tools



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SUMMARY

While navigation systems such as GPS have had a dramatic impact on navigation, serious mariners continue to rely on paper charts as well. Sailors recognize that print-on-demand charts can serve as important insurance in the case of electronic failure or other complications.

Introduction

For hundreds of years, sailors have counted on reliable paper charts for navigation. While paper charts might not be considered leading-edge, they never fail and are always close at hand. Ask an old sea dog and he'll tell you: there is something comforting about having a paper chart onboard.

Yet, thankfully, technology has resulted in significant advancements for those navigating on water. Today's sailors have at their disposal everything from digital charts on CD-ROM to laptop computers. It seems everyone is taking advantage of global positioning systems (GPS), which have no doubt revolutionized navigation. Even paper charts, now available print-on-demand, take advantage of technology to incorporate the very latest changes made by NOAA cartographers.

When one considers the great advantages of modern-day marine navigation systems, there do not appear to be any down sides to the use of navigation technology. After all, technology has bettered so many aspects of life. Yet an old sailor's rule of thumb warns against depending on a sole means of navigation. And that's exactly what many of today's mariners are doing.

The Landscape

The United States has 500,000 square nautical miles of navigationally significant areas and 95,000 miles of shoreline. In 2006, there were 70 million recreational mariners using those waters. Add commercial vessels to these statistics, and you get a whole lot of traffic on today's waterways.

Not surprisingly, some mariners run into mishaps. According to the National Oceanic and Atmospheric Administration (NOAA), there are approximately 6,400 recreational boating accidents each year.

"Collisions account for 80% of all reportable recreational boating accidents, and 78% of non-reportable accidents, totaling an estimated insurance loss of over \$450 million a year from nearly 100,000 claims," says a 2007 Hydrographic Services Review Panel report. "A major cause of claims is 'striking a submerged object' and groundings, two scenarios in which accurate NOAA surveys and charts can play a major role."

Not only do numbers such as these present a strong case for the use of navigation tools, they indicate that no one is immune from potential trouble.

Why Charts Change

NOAA currently maintains over 1,000 charts, each providing important cartographic data. “The nautical chart is an essential tool for insuring safe navigation and as a result must be kept up-to-date,” explains a report by the Marine Chart Division of NOAA. “The nautical chart depicts information vital for safe navigation such as water depths, obstructions, regulated navigation areas, buoys and landmarks. The information can change hourly.”

According to the Hydrographic Services Review Panel report, “Each year, additional areas are identified for resurvey due to natural shifts in sea bottoms and water depths caused by such phenomena as currents, hurricanes, glacier melts, and earthquakes.”

These changes are real and frequent: NOAA issues 100 or more changes each week in the form of Notices to Mariners. “These include dangerous wrecks, rocks and obstructions discovered by NOAA field parties,” explains Richard Sillcox, chief of NOAA’s Chart Update Service. “NOAA quickly applies all critical safety corrections to its digital files that are made available to the mariner in the form of its Print-on-Demand paper, and Raster and Electronic digital chart products.”

WHY TECHNOLOGY IS NOT FOOLPROOF

According to Ralph Yost, a licensed pilot and captain who has traveled all over the East Coast by boat, “Paper charts are needed for backup and reliability purposes if you’re navigating with mapping software on a PC or have a chart plotter with maps. Computer systems can have problems when you least expect it.” Below, Yost shares his thoughts on why technology is not foolproof.



SYSTEM FAILURE. My two-year-old chart plotter started rebooting and going crazy while I was out fishing one day. After some troubleshooting, we determined the fix might be a master reboot, which would take the system back to factory defaults, but I’d lose all of my saved data. Fortunately, I was in an area of familiar waters and not on a trip in which the chart was more critical.

REBOOT FAILURE. Computer systems can unexpectedly experience problems. My Nobeltec PC chart program has had some interface issues with the USB buss and RS-232-USB converter device. It will reboot the program on me without warning—and suddenly. Paper charts don’t reboot.

EASE OF TRANSFER. Charts are easily transferable, which isn’t the case with a chart plotter. You could give me the map chip if you wanted to, but I’d still need the chart plotter to read it. Computer software for maps has licensing restrictions that restrict you to one license copy per machine. You could give me the software, but I would need a computer to run it on.

Why Are Paper Charts Essential?

Experienced sailors know that using paper charts is one way to avert problems, and they use paper charts in conjunction with other means of navigation.

An April 3, 2007 article in the *New York Times* warns, “Just because you have GPS does not mean you should leave your compass and sextant on dry land. Failure, whether due to an electrical problem or a drained battery or old fashioned human error, can be devastating.”

One drawback to electronic charts and GPS systems is that they are only as good as the paper charts from which they were created. Recreational mariners often suffer from a false sense of security, assuming that the data they are relying on is accurate when, in fact, the information could be months or even years old.

“Every boat should have charts and a skipper who knows how to read them,” explains Steve Ford, who has been navigating the waters of Southern California for over 30 years. “About the only thing that will be around longer than charts are electronic failures. Charts are inexpensive insurance. There is absolutely *no excuse* for not having the appropriate charts on board.”

“I was a celestial navigator on race boats, and our boats were extremely well-equipped with plotters, LORANs and GPS units, and all of it got used,” says Ken Williams, who has logged 18,000 nautical miles offshore. “But, the paper chart was what the watch going on and the watch going off wanted to see. It allowed them—and me—to get the overall picture of what was going on. I *never* failed to maintain an up-to-date chart and the chart was always looked at by all the crew at every watch change. Regardless of the experience of the crew and the navigator, the paper chart is a format that everyone can understand and use to get themselves out of a jam if required.”

In addition to their reliability, paper charts have some practical advantages.

DAYLIGHT READABILITY

Paper charts can be read in bright daylight, whereas some electronic screens require a particular angle or lighting.

NOTES

You can hand write notes and highlight with colors on paper charts, such as “good anchorage here” or “fish traps here.” Many chart plotters and chart software allow you to add marks, label them and add notes, but it is far quicker on a paper chart.

NO ELECTRICITY REQUIRED

Paper charts do not need electricity, the only exception being if you need a light to read at night.

What's the Wave of the Future?

Is there a place for technology when it comes to boating navigation? Certainly. Are paper charts still necessary? Absolutely.

When in doubt, trust the pros. According to the USCG, "A safe boater will always have the appropriate nautical chart(s) onboard their vessel. The exact meaning of an aid to navigation may not be clear to the boater unless the appropriate chart is consulted."

Richard Sillcox adds, "Technology is not foolproof, and unforeseen circumstances may affect your ability to take advantage of that technology. Even with electronics such as GPS, accurate charts are still paramount."

Among serious mariners, the consensus is always this: **never rely on only one means of navigation**. Interestingly, technology manufacturers frequently echo the same warning.

ABOUT OCEANGRAFIX

St. Paul, Minnesota-based OceanGrafix spent five years developing an online, real-time network that is in constant contact with NOAA databases to gather the Notice to Mariners changes as they're issued. As a result, the company's charts incorporate all the critical corrections from the weekly USCG and NIMA notices. Files are sent from NOAA to OceanGrafix, where the charts are printed on-demand using digital image technology and large format plotters. By comparison, the traditional chart printing process uses offset lithographic printing presses, resulting in substantially out-of-date charts that must be hand-corrected by mariners.