
HTC Touch HD


Palm Treo 680


HP iPAQ hx4705


Palm TX


Garmin Oregon 400C

Navigate by Phone?

Yes, it is possible, with some important caveats.

With the hopes of answering readers' questions about the viability of using a "smart phone" or Personal Digital Assistant (PDA) and the requisite charts and software for marine navigation, *Practical Sailor* recently test-drove a sampling of software and mobile devices.

Pocket devices can be used for onboard navigation in two different ways. One method is to use Virtual Network Computing (VNC) to link the display of the handheld to a personal computer (PC) that is running navigation software, connected to a GPS, and functioning as the primary navigation computer. Another method is to install charts and software on a handheld device that has a built-in GPS or is capable of establishing a Wi-Fi or Bluetooth-link to a remote GPS. This eliminates the need for a PC belowdecks but adds the expense of purchasing separate software, charts, and possibly another GPS.

WHAT WE TESTED

For this comparison, we selected a cross-section of PDAs, pocket PCs and smart phones between $100 and $800-plus. These devices include Palm OS and Windows Mobile software, although a PC is often needed for software installation. We could find no viable marine navigation software for Blackberry and Symbian OS phones.

Mac lovers, be patient. The iPhone, and all its many sailing applications (including navigation) will be the subject of a future article.

This technology moves fast, with new phones, like Motorola's Droid, and new software appearing on an almost daily basis. Although some of the equipment and software reviewed here already has been superseded, our experience can generally be applied to the latest generation of equipment and software from the same makers.

• **HTC Touch HDOS**: This device uses Windows Mobile 6.1 Professional software, and features a 16-bit color thin film transistor (TFT), 3.8-inch diagonal display. Its 480x800-pixel resolution puts it in the high range. It has an internal GPS and has USB, Wi-Fi, and Bluetooth interface options. Price: $600-$800.

• **Palm Phone's Palm Treo 680 OS:** This older Palm device was tested with Palm 5.4 software. Its 2.5-inch diagonal, 16-bit color TFT screen has a 320x320 resolution. Interface options include infrared (IR), USB, and Bluetooth. Price: $100-$200.

• **Hewlett Packard iPAQ hx4705**: One of the earliest PDAs to crossover into marine navigation, this familiar pocket PC operates on Windows Mobile 5. Its 4-inch, 16-bit color TFT display has 480x640 pixels. It can interface via IR, USB, Wi-Fi, and Bluetooth. Price: $600-$800.

• **Palm PDA Palm TX OS:** This touchscreen Palm device was tested with Palm OS 5.4. Its 16-bit TFT display measures 3.9 inches and has a 320x420-pixel resolution. Interface options include IR, USB, Wi-Fi, and Bluetooth. Price: $100-$200.

Navigation software is a big part of any digital charting system. To examine the functionality of Pocket Navigation charting software, we tested:

• **Active Captain MobileSource:** Compatible with Windows Mobile and Palm software, this free software uses modified NOAA raster charts at a cost of $20 per region or $50 for full U.S. coverage. The Active Captain website features a series of in-depth articles on the art of phone navigation.

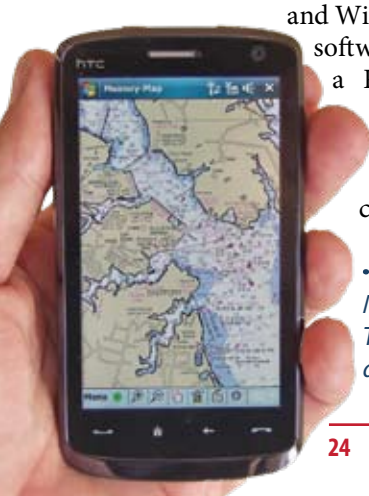
• **Memory Map Navigator & Professional with Pocket Navigator:** The $100 Navigator and the $220 Professional versions are compatible with Windows Mobile and Memory Map's proprietary Quickcharts ($40 for regional kits), NOAA charts, and other BSB format charts.

• **OziExplorer CE:** *PS* reviewed the PC version of this software in the October 2007 issue and rated it Good to Excellent in every category except support, in which it rated Poor. OziExplorer CE works with Windows Mobile. It sells for $40, but you must input your own maps or download free charts from NOAA.

HOW WE TESTED

On the water, each phone was used for navigation in a variety of conditions including bright sunlight and near darkness. Routes were constructed and followed. Readability, functionality, and practical application were foremost considerations, but reliability, weather resistance, and battery life and charging requirements were also considered.

To see how these PDAs and smart phones would stack up against a handheld GPS/chartplotter specifically designed for navigation, we compared them to the Garmin Oregon 400C, which we reviewed in the December 2008 issue.



Memory Map Navigator running on a top-of-the-line HTC Touch HD offers an example of good performing software and a high-tech smart phone.

PS VALUE GUIDE SMART PHONES AND NAVIGATION SOFTWARE

PRODUCT TYPE	SMART PHONE	PALM PHONE	POCKET PC	PALM PDA	HANDHELD GPS **
MODEL	HTC Touch HD ★	Palm Treo 680 $	Hewlett Packard iPaq hx 4705 ✓	Palm TX	Garmin Oregon 400 C
SOFTWARE	Windows Mobile 6.1 Pro	Palm Ver. 5.4	Windows Mobile 5	Palm Ver. 5.4	Ver. 2.20
PRICE	$600-$800	$100-$200	$600-$800	$100-$200	$400-$500
DISPLAY SIZE (Diagonal)	3.8 inches	2.5 inches	4 inches	3.9 inches	3 inches
BATTERY LIFE	8 hours *	6.5 hours	10 hours *	6 hours	12 hours
RESOLUTION (Pixels)	480 x 800	320 x 320	480 x 640	320 x 420	240 x 400
INTERFACE	USB, Bluetooth, Wi-Fi	IR, USB, Bluetooth	IR, USB, Wi-Fi, Bluetooth	IR, USB, Wi-Fi, Bluetooth	USB, GPS
DISPLAY/PERFORMANCE	Excellent	Good	Good	Good	Excellent

SOFTWARE SNAPSHOTS

ACTIVE CAPTAIN MOBILE ($20-$50) $	MEMORY MAP PC ($100-$200) ★	OZI EXPLORER CE ($40) ✓
Pros: Palm and Windows capable, offers a wide range of information on marinas, harbors, etc. that can be downloaded via the informative Active Captain website.	**Pros:** Standalone version is easy to install using an SD card; display allows for multiple data layers (speed, course, etc.); Professional version offers AIS capability.	**Pros:** Negates need for stylus; very versatile and customizable to suit preferences. Cheap way to log and analyze performance.
Cons: Limited to U.S. waters. Tiny databoxes on some high-definition Windows Mobile devices	**Con:** Process of building routes is clunky compared to others.	**Cons:** Complicated to operate compared to others, limited support.

★ Best Choice ✓ Recommended $ Budget Buy

* Estimated. ** For comparison only.

POCKET NAVIGATOR SOFTWARE

All versions of the charting software used in this evaluation were compatible with raster NOAA Recreational Nautical Charts (RNC), but several also could use raster charts from other sources. NOAA RNC charts usually need adjustment to be viewed on small PDA displays. Some firms do this for you, which adds a fee to otherwise free charts, or you can use utility software that installs the downloaded NOAA charts. As with all raster charts, ease of chart manipulation is a must. The software must let you easily change between small and large scale charts and move between adjacent charts.

None of the software reviewed here included a steering screen with a "highway" view, but it's fairly easy to track a route by monitoring the amount of cross-track error. All versions tested did include a steering arrow that further simplified route tracking.

Installing the software generally involves synching between a PC with Windows XP/2000 (some won't work with Vista) and the device. Memory required to store any of these programs isn't usually a problem, but storing charts for large areas may require the use of a removable memory card. A memory card can also streamline installation.

ACTIVE CAPTAIN MOBILE

At this time, only Active Captain charts for U.S. waters are available, but coverage for Canada and Europe is slated for the near future. Information about marinas, anchorages, and even local knowledge can be downloaded directly to an Internet-ready device from the Active Captain website's Interactive Cruising Guidebook.

Installation of this Windows Mobile- and Palm-compatible device was straightforward. Chart handling is very good with position-sensitive popup chart lists and automatic next-chart selection when tracking a route. Route entry and editing is first rate, and a waypoint table with headings and distances is included.

A steering arrow shown with cross-track error data indicates the direction to turn to regain the desired track. User-programmable data displays, easy-to-see GPS warnings, and automatic connection to a Bluetooth GPS are nice features of this charting software. On Windows Mobile devices with high-definition (HD) displays, some features of Active Captain Mobile, including the data box information, were too small for easy interpretation.

Memory Map Pro Pocket Navigator was the only version we tested with AIS capability.

Aquapac with IPAQ HX4705

Otterbox 1900 with HTC Touch HD

Elemental Protection

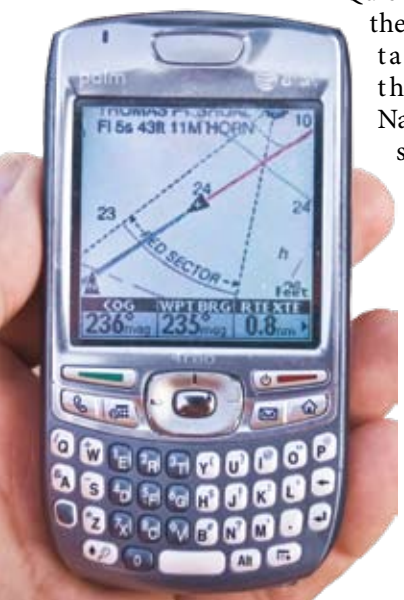
For this test we also compared two cases designed specifically for these devices, the hard-case Otterbox 1900 Series PDA Case ($100) and the soft plastic Aquapac Mini Waterproof Phone Case ($30). The Otterbox's thin membrane face provided good access to the keys and touchscreen, and protected against hard knocks and water intrusion. Access to the keys and touchscreen was equally good with the Aquapac, and it was still small enough to fit in an average pocket. Both did a good job of preventing water intrusion. The Otterbox affords better damage protection, but it requires a fairly large pocket to hold it. For regular onboard use of a smart phone or PDA, some form of protection is a must.

MEMORY-MAP POCKET NAVIGATOR

Memory-Map Pocket Navigator software for Windows Mobile devices is packaged along with Memory-Map Navigator or Memory-Map Professional. Both are capable charting packages for Windows XP/2000 (not Vista). The Professional version includes expanded support for data export formats and AIS capability—provided your device is linked to a PC with all the necessary AIS software and hardware.

During installation, Memory-Map Navigator is loaded on a Windows PC and configured with compatible charts, in this case, NOAA RNC charts, which have been downloaded separately. Pocket Navigator can be installed via Microsoft's ActiveSync and maps, routes, and waypoints can be transferred between the PC and mobile device.

A standalone version of Pocket Navigator is also available on a SD memory card. Loaded with Memory-Map's QuickCharts, the card contains both the Pocket Navigator software and your choice of a large package of NOAA RNC charts—four regions cover all U.S. waters. The memory card requires no additional installation and is ready to run when inserted in a Windows Mobile device.



Active Captain software combined with a Palm Treo 860 offers a cost-effective option for those dipping a toe into the world of smart phones.

Memory-Map's Pocket Navigator is well crafted with data layers that can be user-selected to display speed, position, and route information, and to examine waypoint and route specifics. A unique feature allows the creation of hotspot icons inserted on the chart and linked to an external file (image, audio, or text message) that pops up when the icon is touched.

As panning during route creation is not possible, routes need to be created in the "zoomed out" mode, which is a challenge. Once created, the route can be readily modified by dragging or inserting waypoints while panning through the route when zoomed in for a more detailed look. Logged data can be later analyzed.

OZIEXPLORER CE

OziExplorer CE is designed as companion software for Windows-based OziExplorer, and installation is via Microsoft ActiveSync.

Some PDAs and phones rely on a stylus to control program functions but this can be difficult if the ride is a bit rough. OziExplorer CE neatly addresses this problem with a screen control mode that lets you control many functions with your fingertips.

A PC-based screen-design utility creates custom display screens so you might have one for racing and another for dinghy navigation, although the screens must be designed in advance. Display screens can be easily cycled, and many program functions can be accessed through pop-up toolbars. An auto-prompting feature can be activated to verbally warn of an approaching waypoint and the direction of the next turn. Individual waypoints can be designated as "silent," which prevents auto-prompting as these points are passed.

OziExplorer CE maintains a logbook for later review and a nifty replay function that allows an existing track to be replayed or followed on the screen in a simulator mode. OziExplorer CE is the most versatile Pocket Navigator software we evaluated, but also the most complex.

Bottom line: Within this software group, Active Captain Mobile was an able performer and the winner from a best value standpoint. For about $20, you can install it and all the charts for a major region—the Chesapeake Bay, for example—and the Online Cruising Guidebook is a valuable resource.

Memory-Map QuickCharts combine everything you need on a memory card. The convenience of a ready-to-use package and some very capable software could easily justify the slightly higher price tag. For about $100, Memory-Map Navigator is an excellent value, if you want charting software for both a belowdecks PC and

a Pocket Navigator. The AIS feature of the professional version will be handy for some sailors, and we expect to see this feature in more of these devices.

For tech-saavy sailors who like to tweak their data, the versatile OziExplorer CE is worth a test drive. It requires a bit more work to setup and learn, but it's also the most configurable.

POCKET NAVIGATORS

Testers had our doubts about the readability of smart-phone displays in bright sunlight, but surprisingly, by holding the display at the right angle, all could be read in direct sunlight, although none were as readable as the dedicated Garmin Oregon GPS. Backlighting was more critical in shaded locations, and all testing was done with backlighting set to maximum. In addition to being able to adjust the backlighting manually, all the software in this group offered night screens for use in low-light conditions that testers found quite effective.

Although some of these devices have different processing speeds, testers did not notice any impact on chart scrolling, which was always adequately fast. The trend toward touchscreen pays off when navigating, since it generally increases the visible amount of chart area.

With maximum backlighting and the need to power a built-in GPS or Bluetooth radio for GPS communication, none, including the Garmin Oregon, have enough battery life for much more than a short day's sailing.

HTC TOUCH HD SMART PHONE

Running Windows Mobile 6 with a fast processor, high-resolution screen and built-in GPS, the HTC Touch HD represents the top end of the smart phone market and is priced accordingly. Charts were bright and easy to read. Speed, readability and features were definitely superior to the other devices, and it was physically the smallest of the four we used for testing.

IPAQ HX4705 POCKET PC

Running Windows Mobile 5, the iPAQ was at the top of its field five years ago and is still a favorite. Charts on the slightly larger, high-resolution screen were comparatively easy to read, but the display was also the hardest to view in direct sunlight. Battery life is noticeably better with the optional 3,650-mAh battery, and batteries are easy to change.

PALM XT PDA

Even with a medium-resolution screen, the Palm XT was very readable through three zoom levels. A fourth was still adequate for trip planning. The display was usable in most lighting conditions, but the battery in this device is not readily replaceable. Six hours with maximum backlighting and Bluetooth enabled is about all you can get on a single charge.

PALM TREO 680

This Palm smart phone has a small battery and a fairly short continuous running life, but extra batteries are inexpensive and easy to change. An optional extended-life battery would probably be a better choice.

The 680 was the least expensive in our group and the only one with a keyboard. It also has both the lowest resolution and smallest display. Surprisingly, it was one of the easiest displays to read in both bright sunlight and shade.

Bottom line: In the final analysis, any of our tested smart phones and PDAs can be both practical and capable navigational tools with proper hardware, software, and charts installed. With a ruggedized protector and a high-quality built-in GPS, these devices could be considered a cost-effective substitute for a handheld backup GPS, although we would not recommend them as a primary navigation tool aboard a cruising boat.

CONCLUSION

These devices are clever gadgets, NOT primary navigational tools. Their screens are small and can be a challenge to read: they are no substitute for a proper chartplotter and paper charts. They are nice for day sailing, and racers may like the data-logging features. They would be handy when chartering or crewing on different boats. We liked having another extra source of data handy in our pocket.

Most mobile devices restart quickly and resume the last application that was in use automatically. This extends battery life, but recharging every 24 hours is still advisable.

After several fruitless tries to use these devices with Virtual Network Computing software, we gave up. The small display screen just isn't up to the task of displaying a full-sized duplicate of a belowdecks PC screen. We much preferred using a device with independent software and charts installed.

If you already have a compatible phone or PDA, then adding charts and charting software is a very economical approach, but it must be kept out of the weather and the display may not be as easy to read as a dedicated GPS, depending on the make and model of your phone or PDA.

If you don't have a smart phone yet, a device with a touchscreen and Windows Mobile software offers you the most options in this test field. We'll see how it stands up against Apple and its many application developers soon.

Lately, we've seen a trend toward terrestrial-focused handheld GPSs masquerading as marine units. Hopefully, the increasing competition from the software and smart phones and PDAs like the ones we tested will prompt GPS-makers to improve their dedicated marine-friendly handheld products.

CONTACTS

OTTERBOX, 888/695-8820, www.otterbox.com

AQUAPAC, +44 (0)20 7738 4466, www.aquapac.net

ACTIVE CAPTAIN MOBILE 207/326-9100, www.activecaptain.com

MEMORY MAP, 607/216-9195, www.memory-map.com

OZIEXPLORER CE www.oziexplorer.com

PALM 866/935-7256, www.palm.com

HEWLETT PACKARD IPAQ 800/752-0900, www.hp.com

HTC, 866/449-8358, www.htc.com

GARMIN, 913/397-8200, www.garmin.com