Charts

Who needs them?

With decent chartplotters getting cheaper and cheaper whilst the screens get bigger and bigger, it's a struggle nowadays to find almost any size RIB not sporting a whizzy screen laden with a wide selection of electronic charts.

Without doubt it is widely accepted that the primary means of navigation is now based on electronic systems, which begs the question: is it actually worth bothering with charts? Certainly, in my experience GPS appears very reliable, and I, like many others, will use it for waypoint and route navigation and to navigate a channel in the dark or in fog. I haven't experienced any instances yet of a complete failure of a set to acquire a position, but have heard of instances where this has happened and have also heard of occasional military jamming of the signal. It is not error-free, therefore, and I have experienced many instances of the position being reported either being or 'feeling' wrong. I've also had occasions where silly errors have occurred, like the way a set didn't like the way we were setting up the 'dim' function at night and it kept resetting itself to minimum, rendering it useless. Generally speaking, therefore, it's a pretty reliable system but not immune from problems.

In respect of accuracy, a commonly reported statistic regarding GPS is that it is accurate to 20m 95% of the time; whilst at first glance this appears great, it does beg the question: what about the 5% when it is less than 20m accurate? As these errors could be anything from a few metres over 20m to many hundreds, this could have a material bearing on the safety of your passage.

These observations about the accuracy and reliability of GPS are not to suggest that you shouldn't use it but, like anything, if you are aware of the limitations of an item you are using then you are more likely to engineer ways to ensure that you don't fall foul of those limitations.

Which brings me to how charts can, and I feel should, still form part of your essential kit. To convince you to carry charts in addition to your GPS units/chartplotters, consider my top ten 'Keeping a chart benefits list':

As already clearly pointed out, GPS units by their nature will never be foolproof. When lives can depend on safe navigation it seems foolhardy to put all your eggs in one basket by not having a chart. We all have insurance on our RIBs, our cars and houses. Consider a chart pack an insurance policy for your navigation.

Chartplotters are great, but even the largest RIB can only have a screen a fraction of the size of a chart. Your brain can assimilate the data from a large section of a chart very rapidly, and it can scroll in and out far more quickly than you can alter the screen, meaning that you can often make safety-based decisions more rapidly and perhaps accurately on a chart. Combine the two and you have an almost perfect solution. Part of the fun of undertaking

passages is often the planning. It is possible to transfer the data on chart cartridges onto your PC to do the planning, but this typically requires an extra chunk of investment in software for the PC. The chart is cheap, and you can create the plan in the peace of your living room, then transfer it to the plotter/GPS unit.

If you have a smaller transportable plotter or basic lat/long GPS the screen will inevitably be smaller anyway, so using the unit alongside the chart is essential.

Following a route on a GPS unit can cause the helm to focus a lot of time on the screen. If this is occasional it is not a great issue, but in my experience there can tend to be a fixation on staying in the middle of the 'rolling road', reducing the time spent looking ahead and around and addressing whatever sea conditions you are facing.

Charts contain a wealth of information, from slipways to phone numbers for marinas and bridges.

My preference tends to be to work out the heading between waypoints and follow that heading via the main compass. I can then just check my position on the chart from time to time to make sure I haven't strayed off course, coupled with a check of my cross track error from the route created to run between the waypoints. (See box for info.) Charts contain a wealth of information, from slipways to phone numbers for marinas and bridges. Whilst this information is generally available on vector charts, you have to seek it out rather than being presented with it. Five minutes scanning a paper chart can give you a really good appreciation of the local area.

Raster versus vector charts:

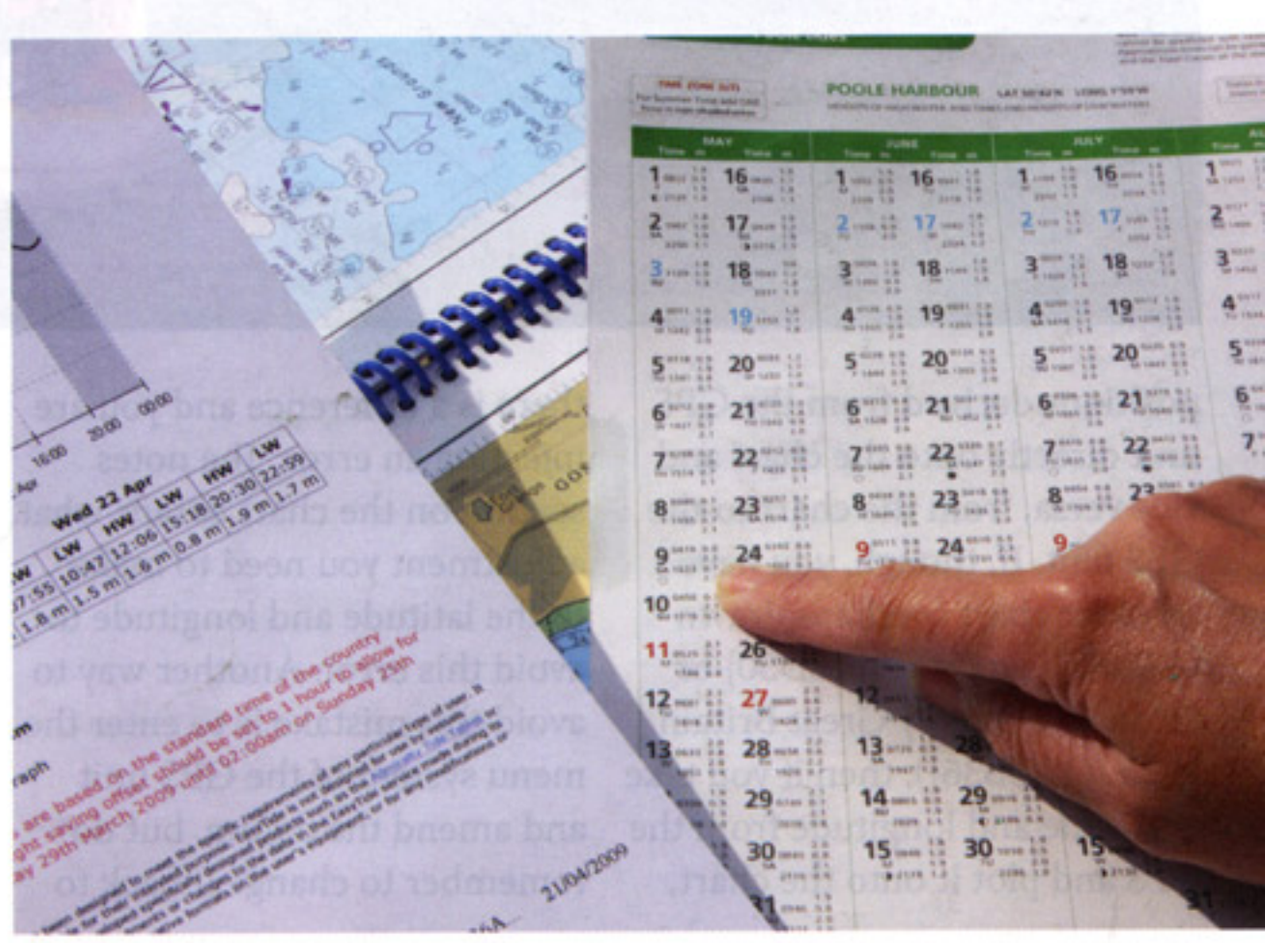
The first electronic charts were just scanned versions of Admiralty paper charts, with the position derived from the GPS simply superimposed on the chart. Like any 'photo', to see the detail on these electronic charts (known as 'raster charts') you need to scroll in and out. As more and more was invested in electronic charts, so these scans were digitised and the information on the chart divided into 'layers' that can be switched on an off. This type of chart is known as a 'vector chart' and is really the only type of electronic chart now available.

When navigating an unfamiliar area by day or night, conspicuous marks are a key way to confirm your position and help you navigate along the coast or a channel. It is easy to see these on a paper chart and then look for them around you. On an electronic chart it is generally far more difficult to spot these relative to your present position, as scrolling the chart around the area adjacent to you is often cumbersome. Once again it is a matter of combining the two to give you the best of both worlds. It is quite easy to update a paper chart by downloading from the manufacturer's website the details of any changes to buoyage, the positions of channels etc. Electronic charts need to be reprogrammed, and this has a cost, leading to a more occasional update process than is ideal.

You can annotate a paper chart with key notes about an anchorage or marina you have visited.

Finally, a chart annotated with details of a passage creates a history of a journey like photos

When lives can depend on safe navigation it seems foolhardy to put all your eggs in one basket by not having a chart.

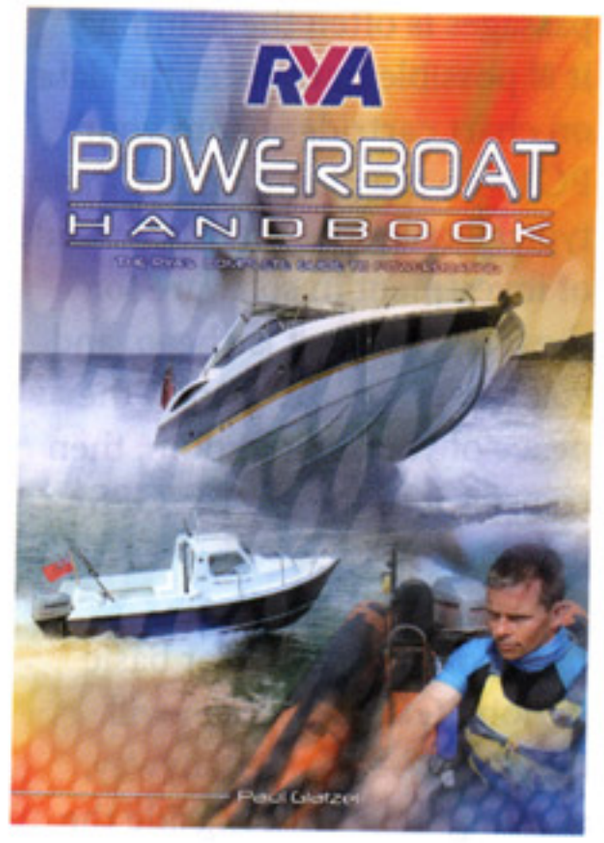


do, reminding you of where you went and, hopefully, of the enjoyable time you had.

There are things you need to remember, though, when using paper charts alongside a GPS/chartplotter, one of which relates to the datum to which the chart is drawn (this is not to be confused with the chart datum which relates to depths/heights etc). On newer charts you will find a code WGS84 printed in the margins of the chart. Irrespective of the age of the chart you will also find it referred to in the note section. WGS84 stands for World Geodetic System 1984; over the years there have been various assumptions about where the centre of the Earth is, and thus where exactly the lines of longitude and latitude are positioned – the latest calculation is WGS84. But why is it important and how do you use it? GPS units are usually set to WGS84, meaning that if you are using a newer WGS84 chart in conjunction with a GPS set to this datum you can plot

RAPID POSITION PLOTTING

A good way to be able to rapidly plot your position on a chart instead of using latitude and longitude (which is prone to you making an error when bouncing around in an open RIB) is to use the compass rose plotting method. Enter the centre of a compass rose on your chart as a waypoint. Select 'go to' that waypoint and your GPS set will display a bearing to and distance to the centre of that compass rose. Using the latitude scale, measure the distance and use the compass rose to plot your position – simple! This is a great way to make really good use of the basic lat/long GPS unit languishing at the bottom of your kit bag!



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positions derived from the GPS unit directly onto the chart and vice versa, from the chart to the GPS unit. If, though, you have an older chart (perhaps drawn to European Datum {ED50} or Ordnance Survey Great Britain 1936 {OSGB36}), then if you take a latitude and longitude from the GPS and plot it onto the chart, there is a difference and you are injecting an error. The notes section on the chart details what adjustment you need to make to the latitude and longitude to avoid this error. Another way to avoid this mistake is to enter the menu system of the GPS unit and amend the datum, but do remember to change it back to match other charts that you are using. With ED50 and OSGB36 charts the error that you would inject is potentially 100–150m (potentially very significant!), however the difference between some charts drawn to datums used elsewhere in the world when compared to WGS84 can be as much as one mile!

Hopefully in this article I have provoked some thought about your use of charts and GPS units/chartplotters. I am in no way anti electronic aids but am passionate about getting the best from both by combining the benefits of each – the 'best of both worlds'!

Paul Glatzel