5 forward-looking sonars PBO TESTED

How effective is forward-looking sonar at flagging up shoals and obstacles on the seabed? David Pugh compares the findings from five devices

Would you like to be able to spot an obstacle before your boat hits it? Of course you would, and so would every other sailor in the world. Looking ahead is the Achilles' heel of the conventional echo sounder, which can only tell you the depth of the water in which you are already floating. If you wait until the sounder reads zero, it's too late.

Admittedly, the conventional sounder can tell you a lot, and in recent years plotters have started to display not only current depth, but also history via their fishfinder screens. It's a fair bet that if the depth is steadily decreasing, the time will soon come to change course. But this approach only works in gently shoaling water: abrupt changes in depth could spell disaster.

Looking ahead

The traditional approach to looking ahead has always been to do so before you take your boat anywhere near a potential hazard. We do it all the time, using the chart and calling it passage planning. A good survey and a precise position has been the key to keeping boats off the rocks for years, but there are times when this isn't an option. Some places are still poorly charted, and even in our well-surveyed UK waters there are moving shoals which defy the efforts of hydrographers and harbour buoyage.

One option is to jump in the dinghy with a leadline or sounding pole and carry our your own mini-survey beforehand. But if you're nosing up a river and simply want an early warning of a shoal, or are nervous of finding the right spot to anchor in a rocky loch, wouldn't it be nice if your echo sounder gave the depth ahead of the boat?

What's available

For years, the undisputed king of the niche market of forward-looking sonar has been Ringwood-based Echopilot. Various iterations of their forward-looking technology have sold all over the world, and their only historical competitor disappeared some time ago.

Now, however, things have changed. Navico, the parent company to Simrad, B&G and Lowrance, recently announced a forward sonar transducer and updated software for their SonarHub module and plotters, while Garmin have developed a version of their high-definition Panoptix fishfinder designed to look ahead. While Echopilot and Navico are in direct competition, the Garmin product is a little different, aiming to find fish at a limited range ahead of the transducer – they provide a version of the transducer designed to fit a trolling motor shaft to facilitate scanning around the boat. However, it does provide imagery of topographical features too, and hence could be of use in spotting hazards.

We gathered together five contenders: three from Echopilot and one each from Garmin and B&G, fitted them to an old 3.6m (12ft) dinghy and put them through their paces in Poole Harbour. We tried looking at a range of features, including solid piling, bridge piers, gently shelving beaches and mooring chains, as well as using the units to find our way down a narrow channel of soft mud.

Echopilot FLS 2D

PRICE: £770 WITH STANDARD TRANSDUCER

Contact: www.echopilot.com

The only unit tested with a dedicated display, the FLS 2D comes with a choice of transducers. The standard transducer is sold as suitable for smaller boats, has plastic encapsulation and uses a 45mm through-hull fitting. The 'Professional' transducer is a much heavier unit of bronze, costing an extra £170 and using a 60mm through-hull.

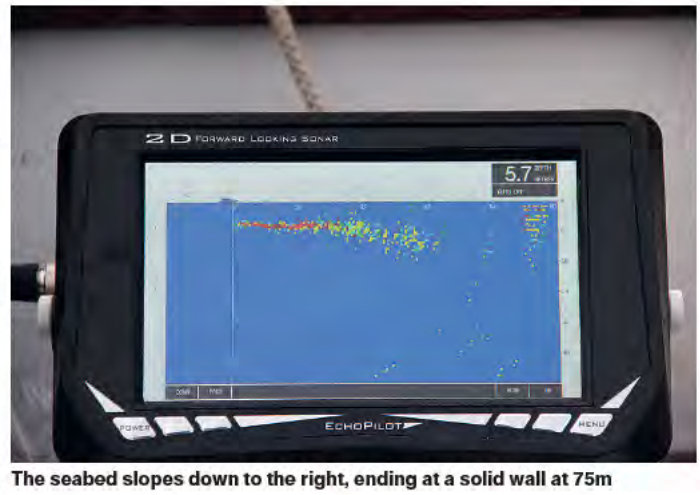
Installation is simple – fit the transducer, plug it and the power cable into the back of the display and you're done.

To display the information, Echopilot uses a screen showing a cross-section of the water ahead of the boat. On this are plotted the echoes received by the transducer, using colours graded from blue to red to show the strength of the echo (red being the stronger). By default, the unit is set to choose a range automatically, but the user can override this.

The user interface is not immediately intuitive, but once the unit is set up the most you are likely to need is to change the range, achieved simply enough using the 'Up' and 'Down' softkeys. There is an auto setting, which changes the range based on the depth, but in difficult conditions the manual setting is helpful.

On the water, we initially struggled to make sense of the display, but with practice the manner in which the data is shown and colour-coded to indicate the strength of the echo allows a significant level of interpretation from the user. For example, a mooring chain or stake will give a vertical line of strong, red returns with some weaker echoes either side. The red shows that you should pay attention despite there being relatively few data points. Soft mud, on the other hand, gives a scattering of weaker echoes as the sounder struggles to find the bottom, so the truth is likely to be a middle value.

A channel buoy's chain, picked up at around 12m



The seabed slopes down to the right, ending at a solid wall at 75m

We tested the range of the sounder by looking at a solid concrete wall. The wall was clearly visible at ranges just over 100m, which was the width of the channel in which we were working. Smaller targets such as mooring chains were harder to acquire, with the range typically less than 10m before we could say with confidence that the object was there. At this kind of range the narrow width of the transducer beam becomes obvious, so the bow needs to be held steadily on the target.

In soft, shallow mud, the FLS 2D would become confused when in auto mode owing to some echoes being apparently very deep, requiring the range setting manually. This removed most of the spurious results and made the display useful once more, although the depths it recorded were clearly far too high.

Switching to the professional transducer resulted in a cleaner signal, but surprisingly a shorter range at just over 80m. The beam also appeared narrower, so on a small boat where the heading is not necessarily constant, the standard transducer is perhaps a better choice.

Echopilot FLS Platinum Engine

PRICE: £1,000 WITH TRANSDUCER

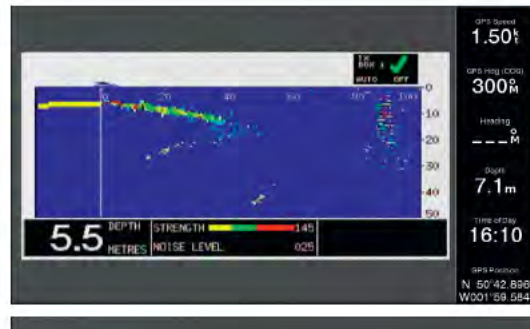
Contact: www.echopilot.com

The FLS Platinum Engine comprises three components: the transducer, a sturdy bronze unit with a 60mm through-hull fitting, a transducer interface box and a video interface box. The video interface can output composite or S-video, suitable for viewing on a third-party plotter or external screen. Control is via an external keypad plugged into the video interface.

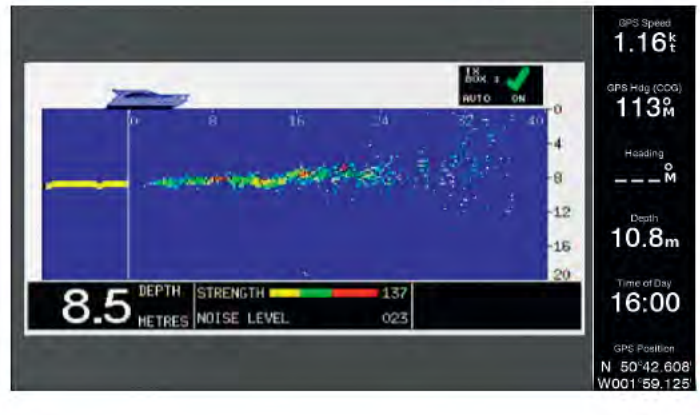
In operation, the Platinum engine is similar to the FLS 2D, with the data displayed in the same way. We used the composite video output, but it would pay to use S-video if possible to take advantage of its improved resolution.

The transducer is identical in appearance to the Professional transducer for the FLS 2D so, perhaps unsurprisingly, our results were similar. Our range test picked up the wall at about 90m and, like the FLS 2D, it tended to show spurious depths in soft, shallow channels. It was, however, quicker to get back to normal once the boat moved out of the difficult area. We found it harder to pick up mooring chains and narrow objects with the Platinum engine, perhaps due to a narrower beamwidth from the transducer and the tendency of a small boat to yaw.

It detected the multi-faceted rocks of some sea defences, albeit with a fairly scattered plot.



LEFT Solid piling, visible at 90m on our range test



BELOW Rocks at 32m. The scattering from the irregular shapes makes the return weaker, but there is clearly an obstacle

Echopilot FLS 3D

PRICE: £7,200, 2 T'DUCERS

Contact: www.echopilot.com

Echopilot's flagship model, the FLS 3D, takes a different approach to the 2D products. By using two hefty 75mm through-hull units, each of which contains two angled transducers, the sounder can combine the data to display a 60° sector ahead of the boat.

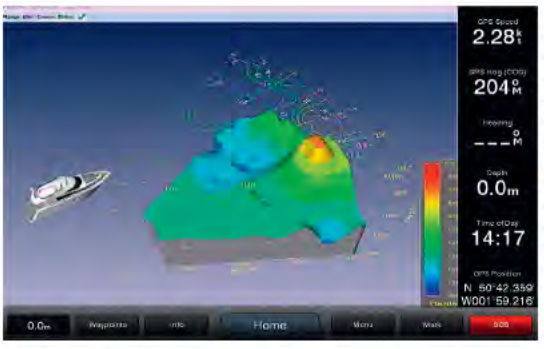
The amount of data from four transducers would produce a confusing mess if displayed with no further processing, so Echopilot have included a computer in the system to render a surface which best fits the data, and output the video. As a result the system comprises three stages: the transducers, the transducer interface and the computer. From the computer, you can output VGA or DVI to a screen, or go through a converter for composite or S-video.

Like the 2D models, the picture is colour-coded to aid spotting the difference between shallow and deep water. This makes for a very intuitive picture, but a user needs to bear in mind that the surface displayed is similar to that which would be made if you were to drop a blanket over the seabed – spikes are smoothed into curved peaks and vertical walls become steep slopes.

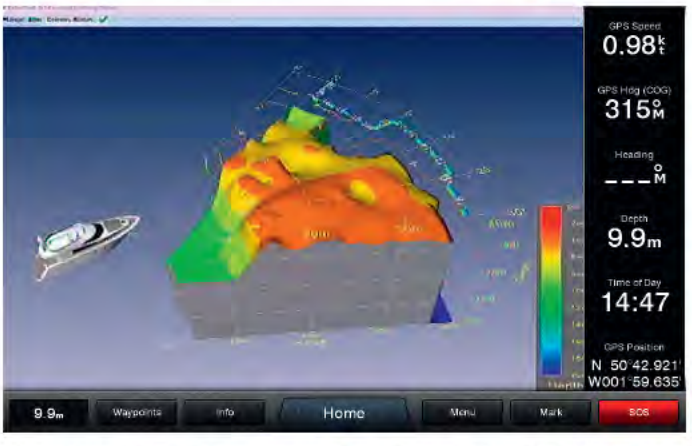
On the water, the display is very easy to read, and we found it good for seeing continuous features such as channel edges. Our range test yielded a shorter range than the 2D sounders, with the wall ahead convincingly visible from about 35m. I suspect this may be due to there being insufficient data points for rendering until you are closer to the obstacle, while the 2D products show the data for the user to interpret.

Another oddity when approaching the wall was that the sounder showed a depth of water continuing beyond it – not a problem, but something that takes getting used to.

The FLS 3D is primarily sold to larger boats, so our test in a narrow, shallow channel was perhaps unfair. Nevertheless, variations in depth consistent with the channel edge were visible, and had a shorter range than 40m been available would have been clearer. Heading down the edge of a deepwater channel, the edge was clearly defined and navigation mark chains appeared as steep peaks, suggesting that this would be a valuable tool for nosing up a river.



LEFT A channel mark's chain, appearing 30m away as a peak in the midst of deeper water



BELOW Approaching a steep wall at about 15m. Water appears to exist beyond the wall

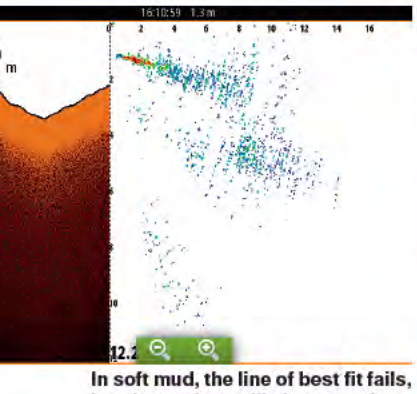
B&G ForwardScan

PRICE: TRANSDUCER £540, SONARHUB £470

Contact: www.bandg.com

As might be expected from a plotter manufacturer, this unit is designed to work with B&G's own displays, removing the video interface element common to the Echopilot black box products. However, you will still need an interface box (SonarHub) to connect the transducer to the plotter.

Once done, and with your software updated to suit, a new option will appear on the menu: ForwardScan. By default, this shows a shaded area designed to represent the seabed ahead of the boat – brown in our pictures, but you can change the colour pallette. Essentially, this is a line of best fit – the data points can be overlaid if you wish, either both above and below the line, or just above. These points are colour-coded in a similar fashion to the Echopilot plots.



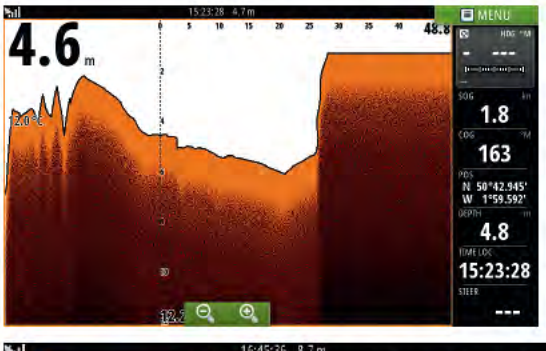
In soft mud, the line of best fit fails, but data points still show trends

ForwardScan in use

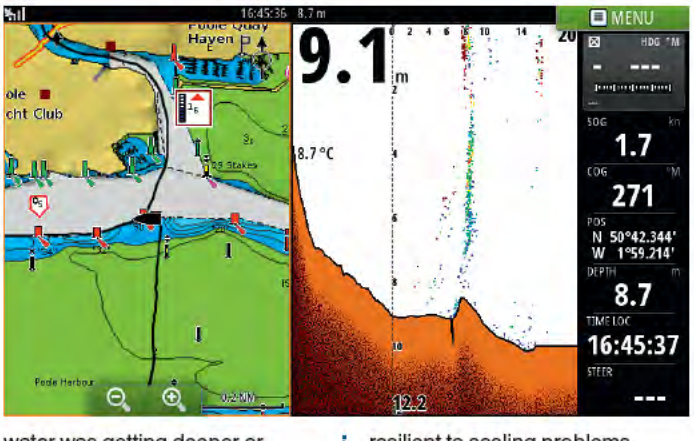
In its default state, just showing the line of best fit, the screen is easy and intuitive to read. On our range test, the sounder showed the steep wall at a maximum range of 65m. This is significantly shorter than the Echopilot, but turning on the data points showed evidence of the wall at around 80m – the software clearly needs more data points than the human eye to confidently predict the seabed.

In shallow, muddy water the best-fit line lost its lock on the bottom, but turning on the data points again made the display useful, with the distribution giving an indication of whether the water was getting deeper or shallower ahead of the boat.

Because ForwardScan is integrated into an existing navigation package, it already has reliable depth information from a separate transducer, so is more resilient to scaling problems based on false readings than the Echopilot units. It also proved useful to be able to display the data alongside the chart, especially when moving along a channel edge.



LEFT With simple structures like the wall, the danger is immediately obvious



BELOW Mooring chains are shown by the data, but ignored by the line

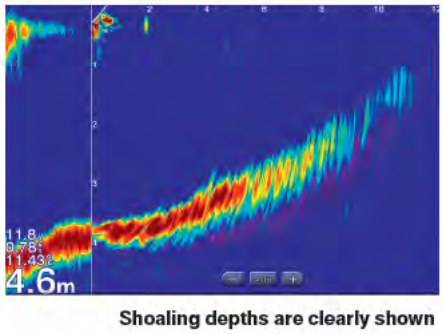
Garmin Panoptix Forward

PRICE: £1,100 (TRANSDUCER ONLY)

Contact: www.garmin.com

A single transducer, which plugs directly into the back of a compatible Garmin plotter using Ethernet, Garmin's Panoptix Forward sonar product is more intended as a fishfinder for looking around your boat than as a device for spotting obstacles while under way.

The transducer comes with two mounts – one for the transom, the other to fit it to the shaft of a trolling motor, allowing it to rotate. The transducer itself is large (approx 170mm x 90mm) and dips below the transom at an angle of around 45°, so it is unsuitable for sailing craft in its current incarnation owing to drag. It also loses picture at speed, presumably owing to disturbed water around the transducer, while the Echopilot and B&G products can be successfully used on the move.



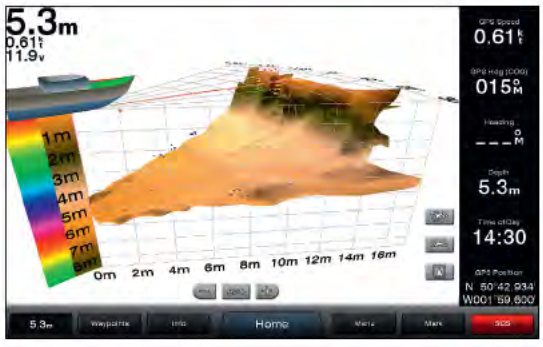
Shoaling depths are clearly shown

The plotter offers two forward views: LiveVü and RealVü 3D. LiveVü will look familiar to fishfinder users, with the classic blue screen and smeared lines, coloured to show the strength of the echo. RealVü scans a 60° arc ahead of the boat to build a picture of the seabed ahead, similar to the Echopilot 3D. However, unlike the Echopilot, which shows a picture all the time, RealVü scans, building the image from left to right.

The Vü ahead

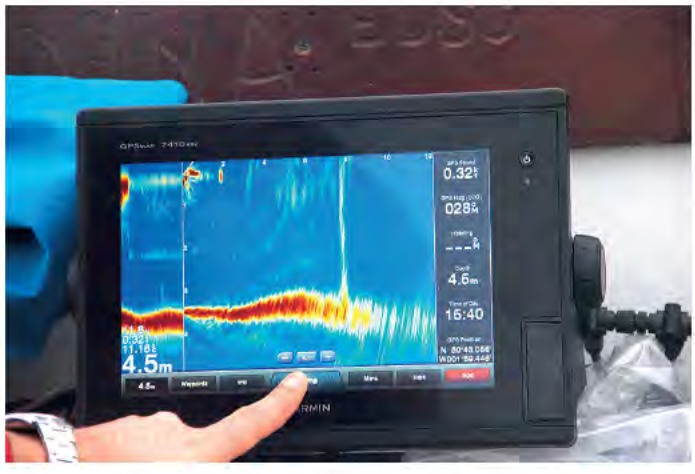
Using LiveVü, the range is limited compared with the other products, the best we achieved on the solid wall being just under 40m. At close range, however, the system offers significantly more detail than any of the other products, suggesting that it operates at a higher frequency, trading range for detail.

This conclusion was borne out by a test we tried in the shallow waters of Poole's Holes Bay, looking at a channel mark made from a piece of old railway rail. Both the Echopilot and Navico products showed this as a collection of a few echoes, while the Garmin showed a clear vertical obstacle at about 8m.



LEFT RealVü scans from left to right to build a realistic image of the seabed. Here's a wall at 14m

BELOW A piece of rail marking a channel edge, viewed at 8m



In RealVü mode, the range is reduced compared with LiveVü by the rendering facility – as you move away from a feature, the image begins to fragment as the quality of the data reduces. It's also a bit slow, taking several seconds to build each picture before starting again. However, the image produced is realistic and detailed. Data points not used in the rendering are overlaid to give an indication whether any features have been ignored.

If RealVü could work faster and under way, it would make a great tool for exploring narrow channels.

PBO verdict

If you're looking to avoid collision, rather than carry out a close-range survey of the seabed, we have to discount the Garmin from the running. Its limited range and intolerance to turbulence make it unsuitable for use at anything more than trolling speeds, but if Garmin can produce a through-hull transducer that deals with these problems, its impressive level of detail makes it a product to keep an eye on in the future.

The Echopilot FLS 3D is best suited to larger boats, not least because of its size and cost. We also found it worked best in deeper water, where the ability to see for a significant angle either side of the bow proved extremely beneficial, picking up the edge of the shipping channel in Poole with a high level of detail.

For smaller boats, however, any of the 2D products would prove a useful addition to your instrumentation. ForwardScan is the most intuitive thanks to its line of best fit and is the obvious choice if you already have B&G, Simrad or Lowrance gear on board, but with practice I found that I preferred to see the raw data and draw my own conclusions – the approach used by Echopilot. In this mode, the Echopilot pictures were cleaner, with fewer spurious echoes either side of the true data. As the long-standing market leader in forward sonar, it's perhaps to be expected that their filtering of the data might be better, and this seems to be the case.

Which of the Echopilot products you choose depends on personal considerations. The FLS 2D offers best value for money, and we found the standard, cheaper transducer to be perfectly adequate. The Professional transducer adds detail but is bulkier and heavier, with a greater protrusion below the hull. For a little extra cost, if you already have a plotter the Platinum Engine offered best performance across a range of conditions.

Whatever you choose, it's important to remember that they aren't infallible, and are affected strongly by the surface at which they are looking. All of them worked well in shoaling water, the plots clearly indicating reducing depth from a shelving beach. Soft mud and shallow water confused them all to a greater or lesser extent, as is only to be expected when you fire a sonar beam obliquely into a soft medium. Broken rock (used as sea defences for a marina) scattered the beams, confusing attempts at 3D rendering by the Garmin RealVü or Echopilot 3D, but visible as scattered dots on the other products. Plane surfaces or protrusions from the seabed worked better.

When I set up the test, Mike Phillips of Echopilot warned 'it's a bit like using radar. You have to get used to it'. He's right, and like radar, forward sonar needs interpretation. Software can help, but a practised operator will get more from it than a novice. It doesn't replace a chart or a good position, but teamed up with other information might just keep you off the rocks or putty, or help avoid that uncharted underwater obstruction.

■ Prices taken from a single online retailer, correct at time of going to press