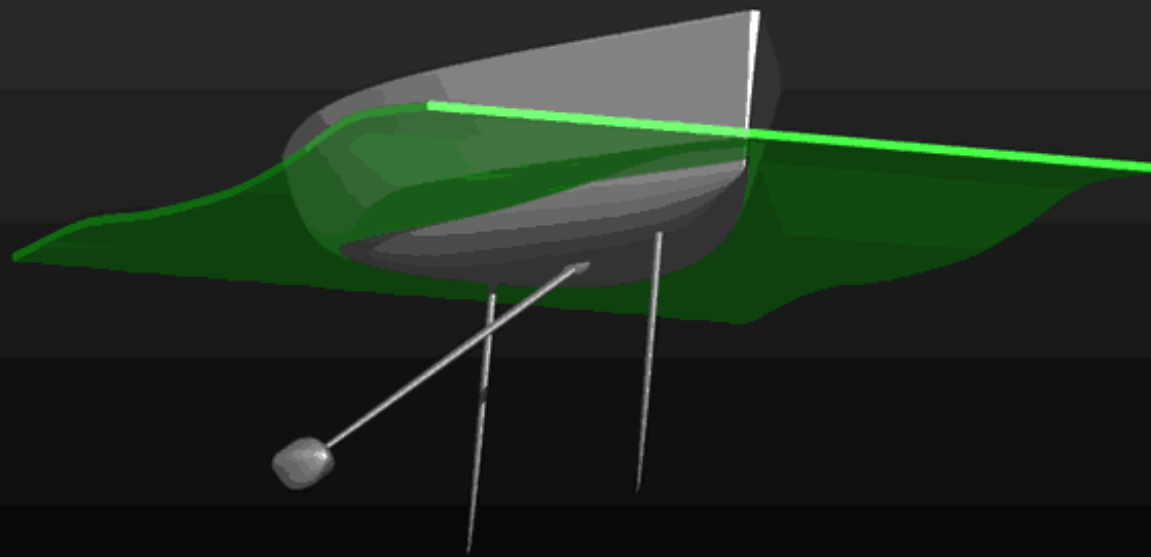


Inshore



CBTF - the technology of the future



The Daily Sail spoke to America's Cup veteran Peter Isler about his time on the Red Hornet

This article follows on from [our feature yesterday](#) on the Australian big boat *Wild Oats*.

The participation of *Wild Oats* in the Admiral's Cup is the first occasion a boat with CBTF (canting ballast-twin foil) technology has been raced in anger in Europe. This will have made some impression on the racing establishment and this can only increase once the new generation maxZ86 maxis for Roy Disney and Hasso Plattner hit the water later this year, for they too will have fore and aft rudders and a canting keel - the biggest boats to date to have this system.

There is also a distinct possibility that the system will be allowed under the new Volvo Ocean 70 rule...

Both the new maxZ86s are Reichel-Pugh designs and the result of CBTF Co (originally known as DynaYacht, the company that developed and patented the system) to open their product out to other designers.

Despite it only starting to take off with the success of *Wild Oats* and the maxZ86s, CBTF has been in development for some 15 years now. The system was originally developed by Alberto Calderon, who had been involved with Tom Blackaller's tandem keel 12m used in the 1987 Cup. Driving force behind the technology is now Chuck Robinson whose company CBTF Co now develops and promotes CBTF technology.

The first attempts with the system were carried out retrofitting the appendages to a Soling, then a stretched Hobie 33 and standard production Catalina 30.

These were followed by *Red Hornet*, the first purpose-built CBTF boat. She was the test bed for the first production CBTF boat, Schock 40, of which around 10

Subscribe here

Make The Daily Sail.com my

[Homepage](#)

weekend papers

Your weekly PDF Newspaper

member benefits



Plus: Exclusive special offer on Nowcasting's Liberty weather service, [click for details](#)

technique

The complete Asymmetric Technique Series, re formatted into PDF for easy printing

venue guides

Don't even think of leaving home without them!

new gear

Read all about the new products and gizmo's to help the racing sailor go faster

examples now exist. This boat won Sailing World/Cruising World magazine's Best Innovation, Best Sportsboat and Best of the Year awards in 2001.

America's Cup veteran and commentator Peter Isler campaigned *Red Hornet* throughout the States over 1997-8 and is now on the board of CBTF Co, based in Isler's hometown of San Diego. He gave his views about the CBTF system to The Daily Sail.

"*Red Hornet* against similar-sized boats, like Farr 40s or IMS 40s - there was no comparison," Isler says of *Red Hornet's* performance when he was racing her. "We were sailing around with the 50-70 footers. Often I was cruising along with Santa Cruz 70s especially on downwind races on the West Coast. You felt like a giant killer. There's 16 people on these big boats and you are sailing around with 4-6."

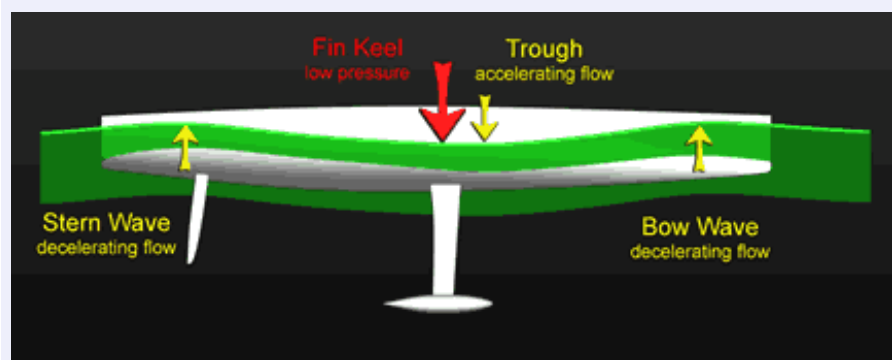
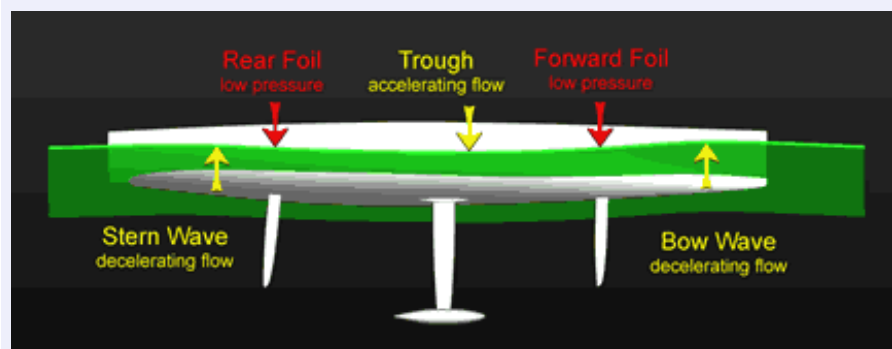
Generally Isler says *Red Hornet* was a little faster upwind than other similarly-sized boats, but much much faster downwind and reaching. He points out though that now other designers such as Reichel-Pugh are using the system on some of their designs, the performance of the system may have further improved. "I went 30 knots on *Red Hornet*. Imagine how fast a 86 footer could go..."

In theory the CBTF system allowing both fore and aft rudders to be trimmed to weather by around 2-3 degrees improves pointing ability.

"You can watch the wake of the boat," says Isler. "Turn it [the forward rudder] the wrong way and it is like turning the trim tab the wrong way on an AC boat - the boat slips sideways. Turn it to zero and it feels kind of normal and turn it positive and you can watch the wake straighten out."

"You can crank it so much that you get negative leeway, so the boat crabs to weather, but when you do that you are creating drag. What we found in our sailing was that it wasn't worth going for negative leeway. The drag was too great although at some times it was a useful tactical tool..."

Aside from the possibility of 'zeroing out leeway', another point not touched upon in our article about *Wild Oats* yesterday was the difference in hydrodynamic properties between a CBTF boat and a conventional boat.



With a canting keel, there is less requirement for form stability in the hull, so CBTF works most effectively on narrow hulls. The result of this is a reduction in overall hull drag.

A hull passing through water creates a bow and a stern wave between which

there is a trough. Obviously on a conventional boat this trough tends to be where the keel foil, the principle element in preventing leeway, is located.

In comparison a CBTF boat has less beam, and therefore when moving has less drag and a more even wave profile down the length of the hull. In addition the rudders, which prevent leeway rather than the keel foil in the CBTF set-up, are located in the 'deepest' part of the hull's wave pattern (see diagrams above) and hence operate more efficiently.

A development of these waveform ideas is being put to good use by CBTF Co's sister company Mangiaonda, who are creating powerboats with a 'wave eating' hull form. "They have an M-shaped hull that have skirts that essentially eat the wave of the central body and capture that energy and refocus it," explains Isler.

One of the advantages of CBTF's canting keel system is that it can make a boat lighter as less weight is required in the bulb, because it is positioned more efficiently compared to a fixed-keel boat. "Where you need, say, 10,000lbs of lead for a 43ft boat you can go with 6,000lb of lead," says Isler. "About half is the ratio. So all of a sudden the loads go down and you need less sail area. That makes it fun and easy to sail."

Recently the evolution of the CTBF system has taken the form of re-engineering it for larger boats like the maxZ86s and *Wild Oats*. One of the main areas of development has been the canting mechanism.

"Although there are many canting keel boats around with some pretty agricultural pulley systems, all the CBTF boats have been designed with a special torque shaft, where all the load is taken in the torque shaft which is a small lever arm that the rams push and pull on," says Isler. On smaller incarnations, such as the Catalina 30, the entire canting mechanism has been reduced to such an extent that it can be hidden below the saloon floorboards.



"All the load is taken up in the torque shaft arrangement so the load is spread transversely which is good because like the keel you want to spread the load over as long a distance as possible as opposed to having it all point loaded. That is where most of the refinements have come," says Isler.

And what if it all goes wrong and the keel is left on the wrong side during a tack? "We've experimented putting the ballast down and the boat goes to one angle of heel and it doesn't go any further."

On the future of the system Isler says that because of his one design background he would ideally like to see a CBTF One-Design class. "From a racing standpoint, the sky is the limit as more and more people in rating rules and handicap systems are open to rules 51 and 52 being changed and when it comes to movable ballast and stored energy issues, you're going to find that CBTF is THE solution.

"It so out-performs water ballast. Canting keels - they slip sideways and don't go upwind. The leeboard arrangement for offshore racing is fine when you're going straight for 1,000s of miles, but what happens if you're short tacking? And daggerboards take up interior space. So it has been a long time in coming and the sailing industry tends to be conservative...

"A lot of the rating handicap systems didn't initially allow it. You can't have a canting ballast Cup boat, but the IRC has a handicapping system for it as does PHRF in the States. So times are changing and I could see it on boats of all sizes. They are faster, easier and more fun to sail and more fun to race."

Assuming that you have faith in canting keels - and enough have been around the world now to believe that they have proved themselves - our only concern about the CBTF system is the vulnerability of the forward rudder. On the Wolf Race for example *Wild Oats* managed to wrap a fish around their forward rudder - what if it were something more substantial?

On page two Peter Isler talks about the last America's Cup with Team Dennis Conner and his plans for this year



Published:21 July 2003