

A more pragmatic approach

I've been on the International Technical Committee (ITC) for a long time, working in our spare time at the Sisyphean task of handicapping racing yachts based on performance prediction (VPP).

At the start of the 21st century we laboured mightily to 'perfectly' simulate the physics of the sailing yacht with thousands of lines of computer code. We had to do this from an imperfect knowledge of hull shape and rig dimensions, and interior fit-out, but at least we did know the boats' righting moment.

And the more we 'improved' the more opportunities we created for savvy designers to create boats that measured slow and sailed fast. Something had to give - the more we did the right thing the more we did a bad job of handicapping the fleet.

Now ORC use is more popular than ever. What's changed? We abandoned our search for perfection and focused on creating a system that worked for the sailors. We stopped giving credit for design features that are 'less than optimum', while still capturing the features that obviously separate grand prix yachts from weekend warriors and their more Corinthian craft.

From my standpoint this has worked, we are seeing stable fleet numbers and well-supported world and national championships. More importantly, what used to be a cacophony of arguments about rating 'bandits' has now subsided to a low hum. But it's getting tougher: the changing nature of the racing calendar, and the sprouting of foils on everything from Optimists to 100-footers.

Back in the day, in the UK at least, club racers would get a rating



First sea trials of the new Gunboat 68 designed by VPLP and life onboard is already getting to be fun. The latest generation of big long-distance cats are without doubt things of beauty (and probably things of wonder to anyone who sailed the boxy two-hull caravans that preceded them not so many years ago)

certificate at the start of the season, and race all year in different venues, inshore and offshore. Over 10 to 15 races generally there was no muttering that the wrong boat and crew had won the series; over the season a few one-trick ponies got into the chocolates, which kept everyone believing they were in with a chance.

Now the major prizes are won in short regattas with a much reduced offshore component - that greatly reduces the randomness of the results. Teams are looking to tune their handicap every which way, via crew weight, hull trim, sail wardrobe and so on. So the handicappers are rating boats several times in a season, and the nuances of re-configuration are pushing the limits of what a handicap rule can reasonably do. To this end we are upgrading sail forces, hull resistance and our treatment of changes in rudder angle as the boat heels.

Our big technical challenge this year is to implement a process for foiling boats such as the Figaro 3. The VPP code already carries a module for the Dynamic Stability System (DSS) configuration, where a horizontal foil is extended to leeward to provide vertical force and increased righting moment. Usually the DSS foil produces a vertical force of about 10 per cent of boat displacement, so we can still use our normal hull drag predictions based on the effective

angle of attack relative to the hull is impractical. And even if we could do this we have no way of predicting the boat's trim while it is sailing. The foil is fixed to the hull, so as hull trim changes with speed so the angle of attack changes. And when boats are riding a foil that's producing lift of half the boat weight there are much bigger trim changes than when the boat is pottering along supported by good old Archimedes.

hull displacement (ie weight minus foil lift). If the boat is fully flying

We look forward to working away at that, but experience with the DSS handicaps has exposed a conundrum. If, as you have to do with something new, the handicap polars predict a large speed increase with the foil, the sailors are up in arms that they can't possibly sail to that handicap. Conversely, if the handicap polars predict only a modest speed increase the owner may rightly ask, 'Why have I spent all this money?' Watch this space.

Despite having abandoned our search for VPP perfection we still need to predict polars that match closely the 'real' performance of the yachts. In recent years the ITC have been correlating against observed performance data from a small number of boats. The

> number is small because our aim was to have data from boats with well-calibrated instruments... and highquality, consistent crews. Finding more of these boats is a slow process that will continue.

> But there is the prospect that the new Race Tracker and Analyzer app being developed by the Sailing Yacht Research Foundation (SYRF) could offer a new source of observed polars. The app can track and log the instrument data from every boat in the fleet and store the results in a database. Now we really are in big data and Al territory, but it may be there is safety in numbers.

The wind speed and direction over the course can be divined from multiple sources and so we can get a more by reliable history of the wind speed where each yacht is sailing. Yachts with badly calibrated instruments can be identified and ignored. Naturally the app will offer the these 'offenders' tips about how to do a better job. Currently KND Sailing Performance are doing just this kind of work with the TP52 fleet with great success.

It's an intriguing prospect, and the ORC are happy to be collaborating with SYRF to make this element a new part of the race management and scoring landscape.

Finally, behind the shield of being good, rather than perfect, the ORC is using its VPP engine to handicap other types of boat. Following the ORCsy Superyacht Rule approach, this year we are collaborating with the Offshore Multihull Association (OMA) to help manage their multihull regattas. The goal is to create an ORCmh VPP and then a handicap rule. The collaboration with Larry Rosenfeld and KND on this project is stimulating and exciting. We have the chance to get our head out of the bottom of the typical ORC boat and see a bigger picture.

For example, the OMA fleet have developed their own 'Archimedes' freeboard system. This uses pre-installed freeboard datums on the hull, and an electronic flotation device linked to an app to quickly get the yacht's waterline profile. The app links to the ORC Manager software and you can travel from freeboards to calculated polars in just a few minutes.

This is a great boon when a big multihull arrives at a regatta a couple of days before the first race in a different loading state from its existing certificate. It is a clever, user-friendly solution to solve an important technical issue that greatly influences the rated performance of these magnificent yachts. Andy Claughton, ITC