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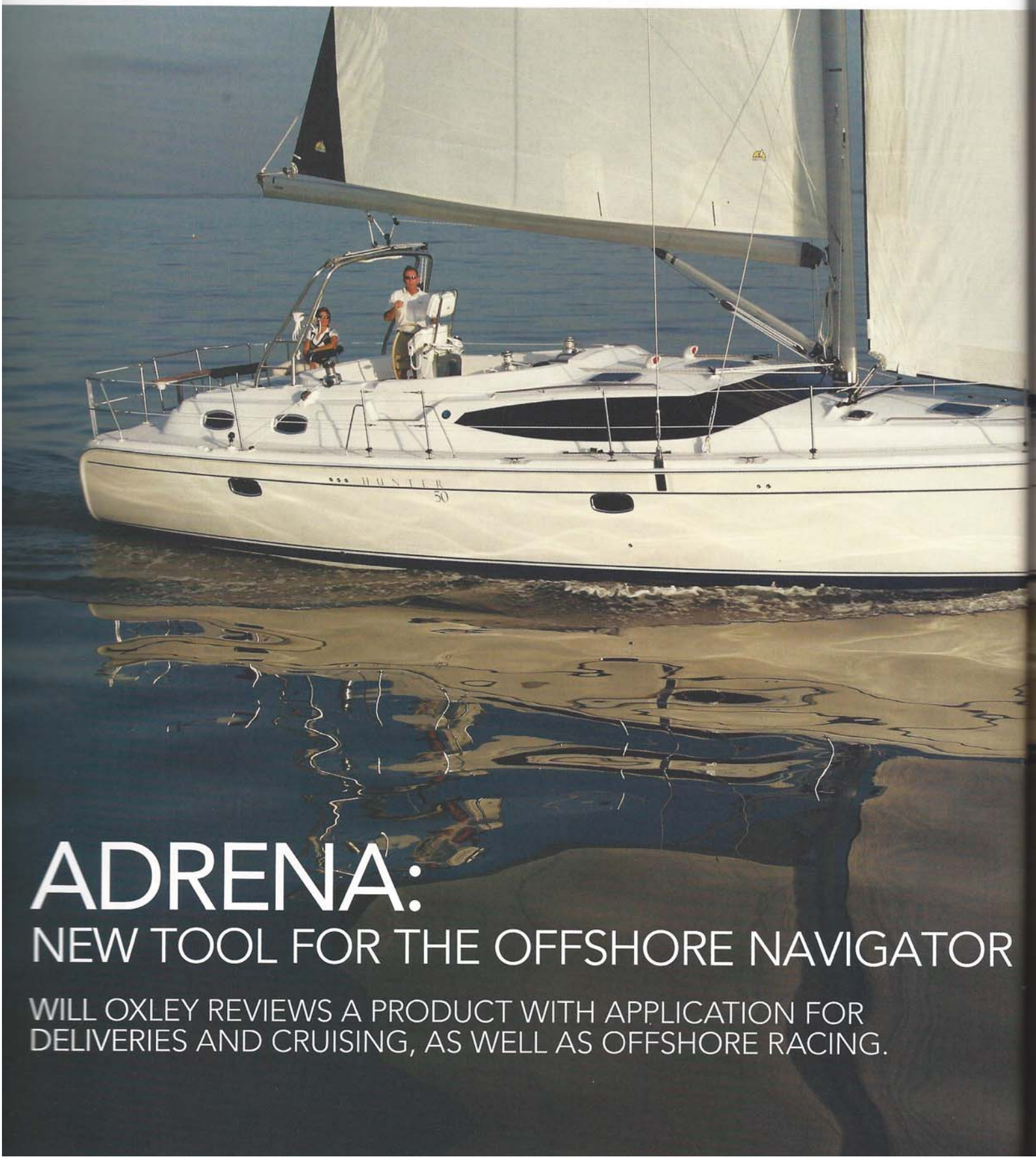
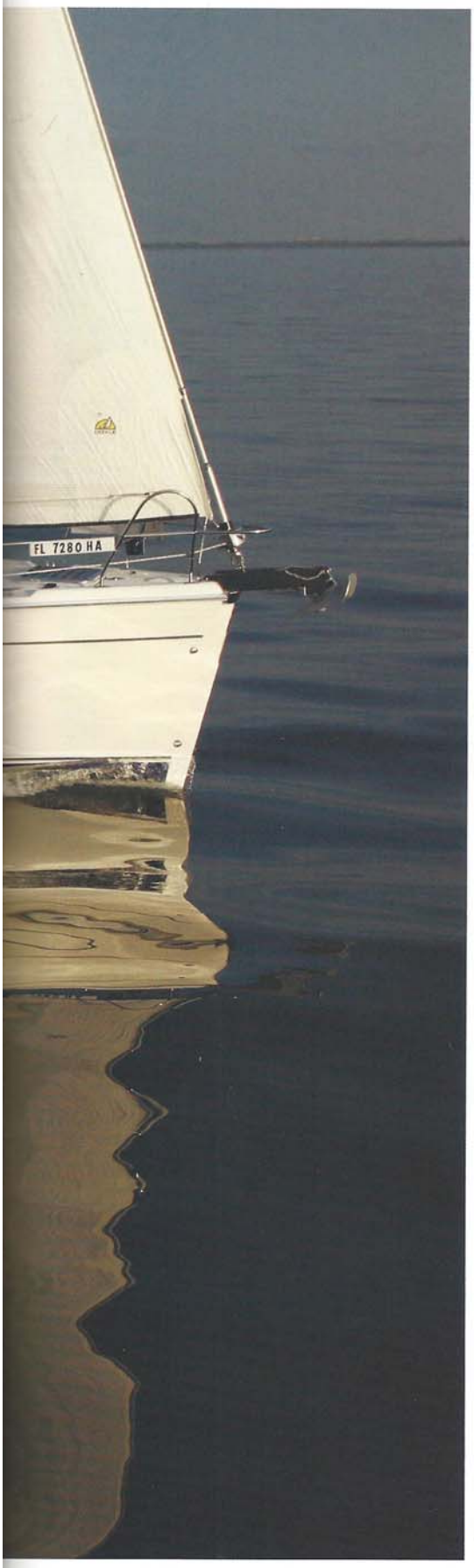


ADRENA:
NEW TOOL FOR THE OFFSHORE NAVIGATOR

WILL OXLEY REVIEWS A PRODUCT WITH APPLICATION FOR DELIVERIES AND CRUISING, AS WELL AS OFFSHORE RACING.



EXPEDITION and *Deckman* have been key tools of the trade for the top navigators around the world for quite a while now. In the Anglo-Saxon world, Nick White continues to upgrade and improve *Expedition* while, in contrast, work on *Deckman* has stalled for some years.

Recently, *Adrena* has emerged as a new player in the English-speaking world. The program was originally developed in France in 2003 and since 2010 has made huge steps with the English edition. In fact, five of the six yachts in the recent Volvo Ocean Race used *Adrena*. On *Camper* we used *Adrena* and *Expedition* for all of our routing analyses.

The program is a full-featured charting/racing tactical package. In this article I will focus on the routing portion of the program and in particular those features that are unique and/or especially helpful.

The program has three products in the range with varying levels of options and therefore some of the features described below may only be available in the Pro version. More details can be found at *www.adrena.fr*.

As with all routing programs, the following data are required as inputs:

1) A performance polar for the yacht.
2) A wind GRIB file covering the area and time for the planned route.
3) A start and end point for the route.

The following additional inputs are required to take advantage of some advanced features

4) A sail chart.
5) Wind wave and swell wave GRIB file.

The old adage garbage-in-garbage-out is never more apt than when using routing tools. Time should be spent preparing the program to run a routing and thinking about the inputs and the settings to use. Resist the temptation to just press the GO button! In acknowledgment of the importance of planning a routing, I will spend some time discussing the steps to prepare a routing for *Adrena*. This will introduce some of the key features of the program.

Remember also that, if the GRIBS are not handling the developing weather correctly, or your polar is way out, or a developing sea state affects your performance in a way you had not anticipated, you have no chance of the routing being at all helpful. In fact it is more likely to send you in the wrong direction!

ROUTING SETUP

The setup page for a routing is shown in Figure 1.

Under ***Start*** and ***Destination***, you specify when and where you wish to start the route and whether it is a point-to-point course or a pre-defined set of waypoints. The waypoints can be left to port or starboard.

Under ***Calculation*** parameters, you can specify rhumb line rather that the default great circle. This is especially helpful in a transatlantic or southern ocean race where the great circle route might take you too close to ice for example.

Under ***Polar*** you select your polar and the percentage you want to run the polar at. The program can take in a variety of polar formats including those for *Deckman*, *Expedition* and *Maxsea*. This is really

When cruising, Adrena can be programmed to allow use of the engine if the wind drops.

DIAGRAM 1

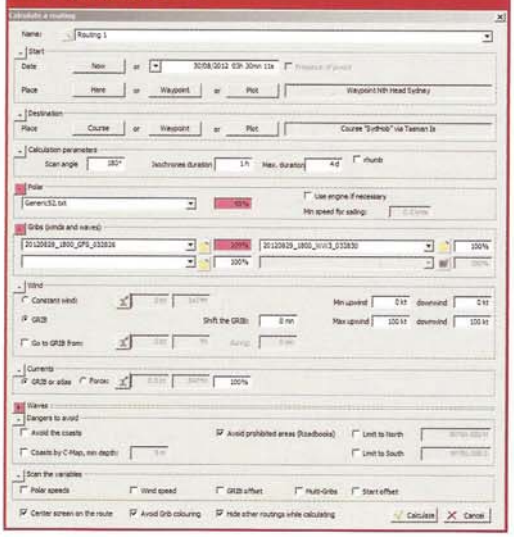
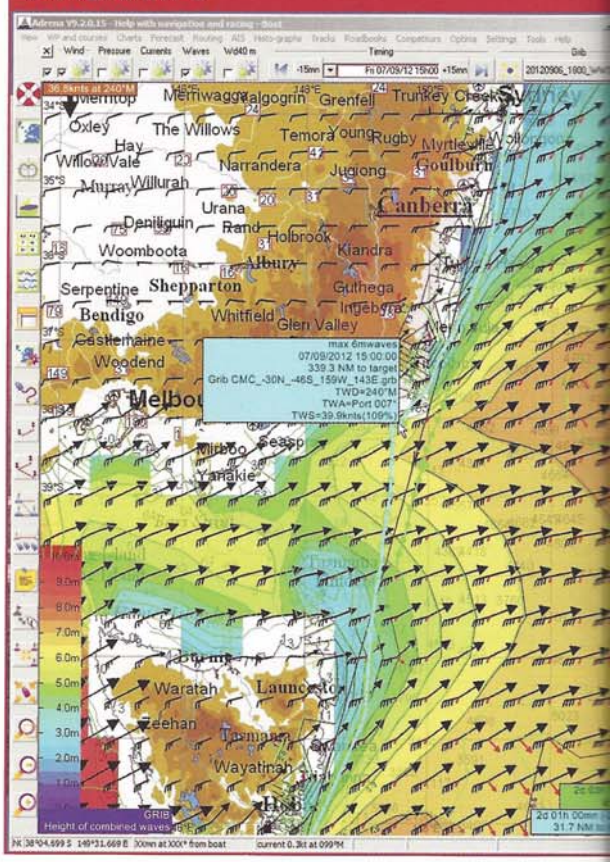


DIAGRAM 2

Correction table for swell (wind speed 30 knts)

direction/height	1 m	2 m	3 m	4 m	5 m
0°	98	95	85	75	65
45°	98	95	85	75	75
90°	100	100	95	95	95
130°	100	100	105	105	105
180°	100	100	105	105	105

DIAGRAM 3



YOU SPECIFY HOW FAST YOU TRAVEL UNDER ENGINE AND THE FUEL CONSUMPTION AT THIS SPEED.

useful because it allows you to directly compare the routing outputs from the different programs without creating a new polar.

Another useful feature, especially for cruising or deliveries, is that you can choose to route with the option of using the engine when the sailing speed drops below a specified number. In another part of the program you specify how fast you travel under engine and the fuel consumption at this speed. When the box is ticked, the routing output will show the cumulative fuel consumption over the route. If this figure is too high then you can set the minimum speed for sailing to be slower, and this will reduce the fuel requirements.

Under ***GRIBs***, in the Pro version you have the option of using multiple GRIBs. You might for example use a high resolution Predict Wind GRIB for the beginning of the route and a low resolution GFS GRIB to get to the end of the route. If available, a swell/wave GRIB can be added for more routing options and information. Current GRIBs are loaded elsewhere.

There are a wide variety of places to obtain these GRIB files. Some common ones are UGRIB (*www.GRIB.us*), SAILDOCS (*www.saildocs.com*), and recently PREDICT WIND (*www.predictwind.com*). In some other parts of the world it is considered illegal to access Predict Wind GRIBs during a race, as there is a charge to obtain them. However, in 2010 the Rolex Sydney Hobart Jury issued a Notice to Competitors that contradicted earlier views around the world and I guess this opens up these very good GRIBs to be used while racing, at least in Australia. (Notice: *www.cyca.com.au/sysfile/downloads/rshyr10_ntc2.pdf* accessed September 5, 2012)

Under ***Wind*** you can specify the maximum and minimum wind speeds you wish to sail in and the routing will do its best to accommodate you. If you believe that a weather system is moving faster or slower than predicted by the GRIB you have, then you can enter an offset time to correct for this.

Under ***Currents*** you can choose to use a GRIB (a tidetech GRIB from *www.tidetech.org*) or in some parts of the world a tidal atlas. The UK and France are the most common places for these tidal atlases to be available.

SEA STATE

The ***Waves*** section is only available in the Pro version of Adrena. This is potentially a VERY useful feature so I will spend some time describing it. As a general

DIAGRAM 4

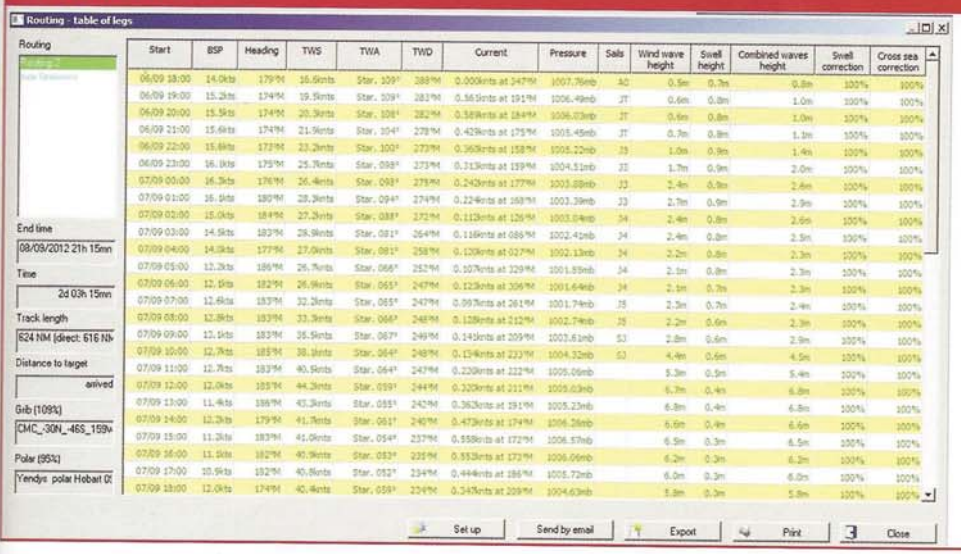


Figure Four shows the routing output for the green route which did not constrain the course by wave height. You can see that a max of 6.7m significant wave height is predicted at 1300 on the 7/09. Note also that the wave is made up mostly of wind wave rather than swell so the swell correction and cross-sea corrections were not used. The sails column is blank in parts because the sail chart used only goes up to 40 knots!

DIAGRAM 5

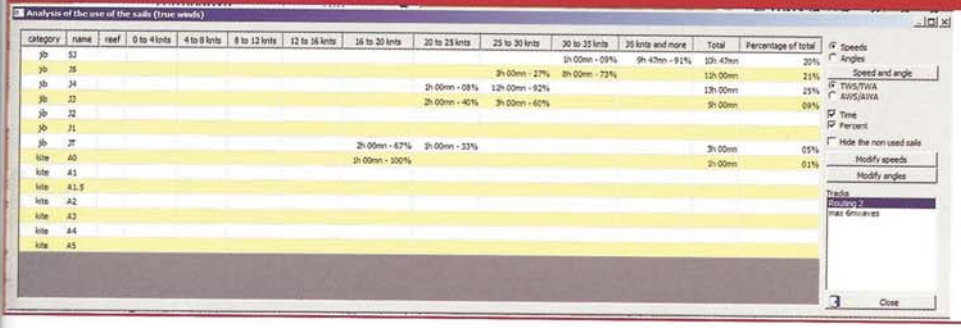


Figure Five. Analysis of the Use of Sails. The sails from your sail chart are all shown along with the time spent on each and the wind band in which the sail is up. Not sure I am that keen on a routing which has 67% of the race time on J4 or smaller and then no kites! The routing was run in September so we can only hope that December will be kinder.

rule modern yachts are faster than their predecessors, but along with this increase in speed potential, their performance is very susceptible to sea state. Consequently, the ability to take wind and swell waves into account when routing can be extremely helpful.

Wind waves are those created by the wind you are experiencing. They are generally taken into account by the yacht's polar. For example, you would expect to go slower upwind in 35 knots due to the wind waves.

Swell waves are waves that have come from a more distant weather system or systems. A deep low pressure system hundreds of miles away will generate swell that travels to your area independently of the wind you are experiencing. There will often be more than one swell that arrives in an area.

These swells, if coming from astern, can increase the potential speed of a yacht as it surfs down the waves. If the waves are coming from the direction you wish to sail then they can impede progress.

Adrena can use wave data quite simply or in quite complex ways. The simplest way is to specify the maximum predicted combined wave height that you wish to encounter on your route. If you have some knowledge of how your vessel performs in swell, or better still hard data, then you can use this knowledge to explore a faster (and safer) optimal route than would be produced in the absence of wave data.

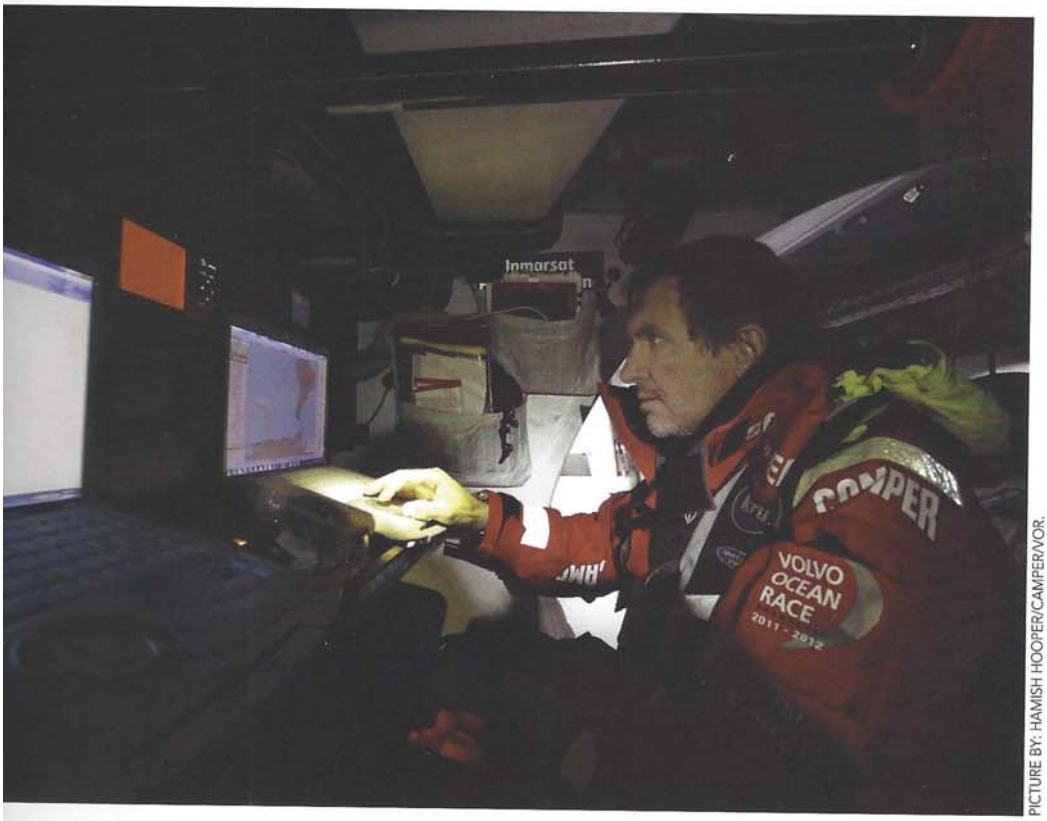
In *Adrena* you have the option to create a series of tables for various wind strengths, that either speed up, slow down or have no effect on the polar for a specific swell height and angle to the course (Figure 2). *Adrena* uses the primary swell train for this calculation.

It is often the cross-sea that creates problems for a yacht. Cross-seas affect different types and sizes of yachts in very dissimilar ways. *Adrena* calculates the cross-sea by comparing the wind sea to the primary swell train using the angle between the two, the minimum height at which this will affect a routing and the relative size of the swell compared to the wind wave. A complete description can be found in the ***Help*** file.

When racing a maxi multihull around the world in 2005, we most often gybed because of bad sea state rather than wind shift, and in the last Volvo Ocean Race the sea state played a big role in routing decisions. In addition to *Adrena*, *Expedition* and *Maxsea* can now use swell in their routing calculations but so far *Adrena* is the only one to tackle cross-seas.

The reality is generally that you will not have good enough information to make highly accurate tables of performance differences in waves. My experience though, is that the

YOU CAN USE THIS KNOWLEDGE TO EXPLORE A FASTER (AND SAFER) OPTIMAL ROUTE.



PICTURE BY: HAMISH HOOPER/CAMPER/VOR.

Will Oxley on board Camper during the recent Volvo Ocean Race.

best guess is generally adequate. Running routes with and without wave data modifications can provide valuable insight to help with your eventual route choice (see Figure 3).

One final warning though, is that the wave data presently available will not generally deal with the sea state encountered when a jet of the East Australian Current flowing south at 4 knots encounters a 30 knot southerly wind. Avoiding these conditions comes down to good current and SST information coupled with the weather forecast. Nothing beats bitter experience to motivate one to avoid these "boat breaking" conditions

Under ***Dangers to Avoid***, I often use the ***Roadbooks*** tickbox. ***Roadbooks*** in *Adrena* are specific areas that are able to be mapped out on a chart. These can be used for a variety of really useful purposes, but for routing the key point is that you can block out areas that you want the routing to avoid. For example the coastal territorial waters of Morocco, Iran and Cuba are best to avoid if you want to evade possible detention by authorities, but the routing will happily send you there unless you specify otherwise.

Scan the Variables is another very useful feature in *Adrena*. You can choose to automatically run the routing at a series of polar percentages and/or wind speeds to see how robust the route is to changes in these parameters. For cruises and deliveries (or even record attempts) you can choose to automatically run the routing from a series of start times to see what the effect of starting earlier or later is. This can be very helpful indeed when trying to find the best time to depart.

SAIL CHARTS

Sail charts generally exist in TWS TWA two-dimensional tables and these can be imported directly into *Adrena*. When this is done, you can see the recommended sails in the routing output.

Having incorporated a sail chart, another nice feature is the ability to produce an ***Analysis*** on the use of sails. (See Figure 5). Under IRC especially, there is a limit on the number of sails that are able to be carried and plenty of thought is needed on which sails to leave behind. The analysis allows these sorts of decisions to be much more informed, with fine scale discussions about number of hours or percentage time on each sail and the possible alternative sail.

If you don't have a sail chart loaded, you can still generate analysis tables of time (and percentage time) within TWS TWA bins and in this way make decisions on the sail wardrobe to carry.

ROUTING OUTPUT

Figure 3 shows two routing outputs both departing Sydney at the same time. The shaded colours show the combined wave heights for 1500GMT on the 7/09/12 when the routing output suggested you could be in the position of the diamonds on each routing. The green route was unrestricted and stuck largely to the Rhumb line. The routing for the blue line specified a limitation of 6m waves and so, to avoid the larger waves, the route stays closer to the coast of NSW then ducks in closer to Victoria to try to avoid the larger waves offshore. The blue box shows data that is available when you "mouse over" a step in a route.

Several other things come to mind when looking at this routing output. Firstly, a strong Southerly current offshore against the prevailing wind would make the sea state horrendous offshore for much of the southern NSW portion of the leg and secondly the wave GRIB will probably not deal well with the shallow water west of the Rhumb line. Larger, steeper waves might be expected there than predicted. This would NOT be a good time to be crossing the paddock!

I have concentrated in this article on the routing features of *Adrena* though it does far more than just routing. It is a very good program that is worthy of a look by both navigators and skippers. There are some very nice features that provide extra insights that should help in the goal of finding a fast and safe route for the racing sailor. The program also has value for cruisers and delivery skippers, especially, with the option of taking into account the use of the engine in passage making. ✳

Will Oxley is one of Australia's most experienced and respected navigators, with four world circumnavigations and 13 Sydney-Hobarts to his credit. He has used all the major electronic programs extensively and is able to write authoritatively on all navigational issues.