



# POLAR PERFORMANCE DIAGRAMS

Most sailors are familiar with the Polar Diagram used by serious racers to help them achieve the best performance their yacht can provide. However, this information is not solely useful to racers as every sailor who wants to sail faster, whether for fun or safety, can use the information in the Performance Package for practical application or personal edification.

A polar performance diagram for a yacht is a circular graph with wind angle plotted around the perimeter and boat speed plotted as distance out from the center of the graph at each angle. The plotted points for one wind speed are connected to describe a continuous curve of performance. The process is repeated for other wind speeds, resulting in a family of curves of performance by wind speed and point of sail.

The radial distance outward from the center point represents the speed of the yacht through the water. The angle of each radial line or spoke represents the yacht's point of sail in relation to either true wind direction, which is the more common, or the apparent wind, which may be easier to use. The polar diagrams furnished by US SAILING Offshore Office show both true and apparent wind direction.

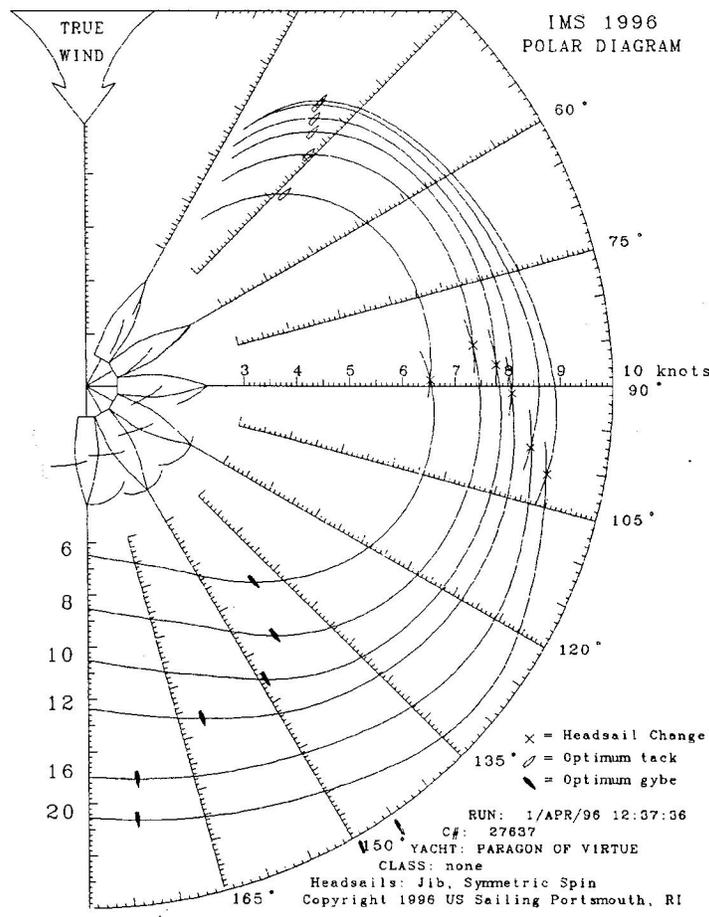
The diagrams and their tables can be used as a constant standard measure against actual performance so that even when no other yachts are in sight the skipper can determine whether the boat is sailing up to potential. Many races are lost when sailing at a distance from competitors or in darkness, because the flow of wake, the angle of heel, and the feel of the helm are not always reliable indicators of optimum performance.

The US SAILING Performance Package includes a total of twelve pages of explanatory text, eight pages of tabular data (one for each wind speed and a summary), seven pages of WALLY information, True Wind and Apparent Wind Polar Diagrams, a page of hydrostatic data and a stability plot, all bound in a high quality, vinyl, three-ring binder.

Whether you race or cruise, the information contained in the US SAILING Performance Package is of enormous value, and is frequently difficult (or impossible) to obtain anywhere else. All US SAILING Performance Packages are made-to-order, using measurement data on file for your yacht (and if you wish, with changes to sail plan, crew weight, etc.). The price of the US SAILING Performance Package including shipping is \$170 to members of US SAILING (\$195 to non-members). You may order your Performance Package by completing the form on the reverse and sending it to US SAILING with the appropriate fee.

Not including annual improvements to the performance prediction programs used to produce the US SAILING Performance Packages, there have been several other noteworthy improvements and modifications over the past few years:

- For 1996, methods to predict downwind speed have been improved, especially with changes in performance prediction programs to account for jibs poled out downwind, which is particularly important for yachts sailing in non-spinnaker races.
- Jib/spinnaker crossover points are now included to assist skipper's determination of how high to carry spinnaker or



how low to carry a genoa on reaches.

- Genoa and spinnaker heights are now separated in the VPP, permitting determination of different offwind predicted speeds for yachts having different foretriangle configurations, e.g. masthead spinnakers on fractional foretriangle.
- Performance of yachts with asymmetrical spinnakers can now be predicted, however, until more research is obtained, the performance predictions for these sails are intended to be conservative (i.e. speed of yacht is overpredicted).
- A feature named "WALLY" is included. WALLY is a technique to improve Velocity Made Good on Course (Vmc) when sailing in a breeze that is oscillating in direction. Such a situation might arise, for example, if you had worked your way across the course very near to a layline and as the wind direction oscillates across the direct course to the mark, the optimum sailing angle for best Vmc (as opposed to VMG) will change with it in subtle and sometimes counterintuitive ways. WALLY will help you maintain optimum Vmc in these challenging conditions. WALLY data pages are arranged in tables, one for upwind and one for downwind. Each table is divided into header and lift sections and each section contains five "shift" columns, labeled 2, 4, 6, 8 & 10 degrees. (WALLY was named during the 1987 America's Cup campaign by the afterguard of winner *Stars & Stripes* to identify an invaluable fictitious crew member.)