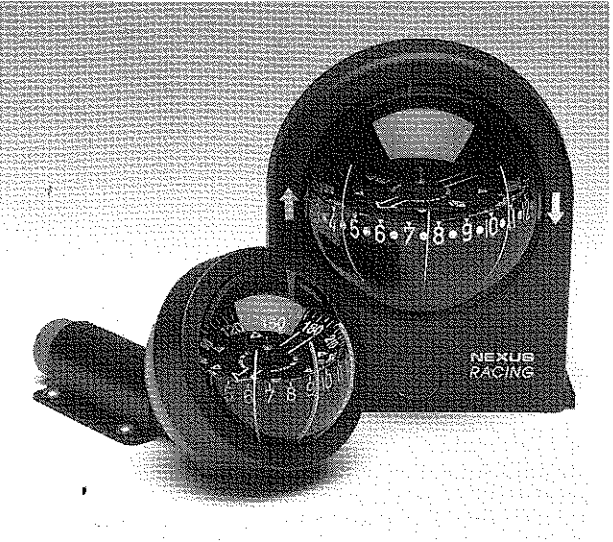


NEXUS RACING

Marine tactical compass 103/R, 103/P and 73R

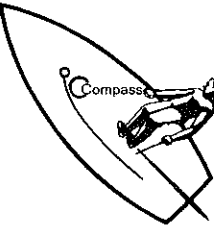


The NEXUS RACING tactical compass is designed primarily for yacht racing. However, cruising sailors, who enjoy taking advantage of wind shifts in their sailing and make it a sport to use the wind at greatest advantage, will also find it more useful than a conventional marine compass. The entirely new **tactical scale** is easy to use and the compass has an extra ordinarily **high stability**. The readability for both the tactical scale and for the conventional **navigation scale** is outstanding. Its rugged design makes it equally suitable for racing dinghies and large keel yachts.

General information

The **navigation scale** (360 degrees) has 5 degree markings in large figures and is read from the horizontal card against a forward center lubber line. It is used for navigating in the conventional way.

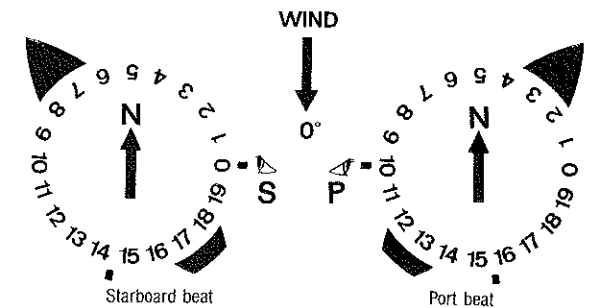
The new **tactical scale**, which is used for monitoring wind shifts and for navigating around a racing course, is placed at the edge of the compass card as a vertical **band scale**. It is divided into 20 units marked 0 to 19, each unit corresponding to 18 degrees of the conventional compass scale ($20 \times 18 = 360$). Thus, 5 units of the tactical scale are equal to 90 degrees. To make the tactical scale more easy to read, the figures are marked in the usual order from left to right. Using a band scale for the tactical scale diminishes disturbance by water drops on the compass housing and makes the compass easier to read at a glance.



The tactical scale is read against either of two lubber lines, very well visible from the helmsman's normal position — obliquely aft and to the windward side of the compass. The starboard lubber line is used on starboard tack and the port lubber line on port tack. **The tactical scale is easily read also when hanging out or standing in the trapeze.**

NEXUS RACING shows the actual wind direction in a simplified way. The tactical scale is rotated 90 degrees in relation to the north—south of the compass, so that while be-

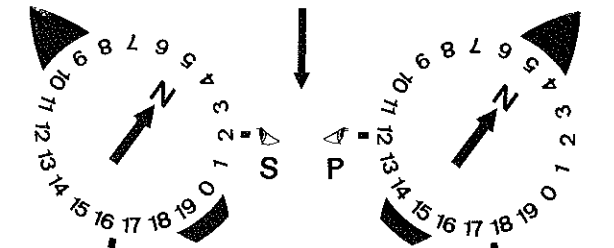
ating on starboard in a northerly wind (at 0 degrees), the helmsman reads 0 on the tactical scale at the starboard lubber line. The reading on both tacks form easily remembered pairs of numbers. Whatever the wind direction, when beating at an optimal angle of about 40 degrees to the wind, the difference between the readings of the tactical scale for the starboard and port tacks is always 10 and the last figure the same on both tacks. This is because the readings lie opposite each other on the compass card (180 degrees). When tacking, the compass housing is rotated 80 degrees (the tacking angle) in relation to the card. Also, the reading point is shifted 100 degrees (the angle between the lubber lines). This adds up to 180 degrees so that after tacking, your reading on the new tack has the same last figure as the corresponding reading on the other tack. Thus, if the helmsman reads 0 on starboard tack, he would read 10 after tacking to port as shown below.



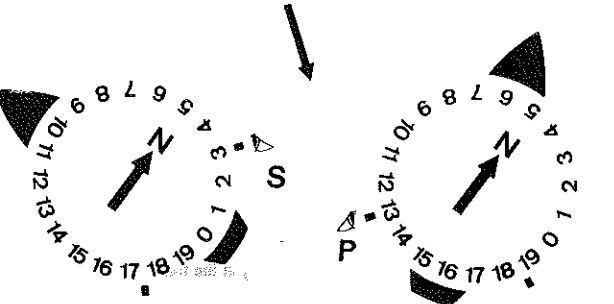
Below, the practical use of the NEXUS RACING tactical compass is described. Also, the details of how this innovative compass works are explained. Finally, some valuable hints are given regarding the various types of wind shifts and how they should be handled.

With this novel system, you can easily follow the wind shifts and choose the lifted tacks, as shown below.

If your starboard tack reading is 2, your port tack reading would be 12.

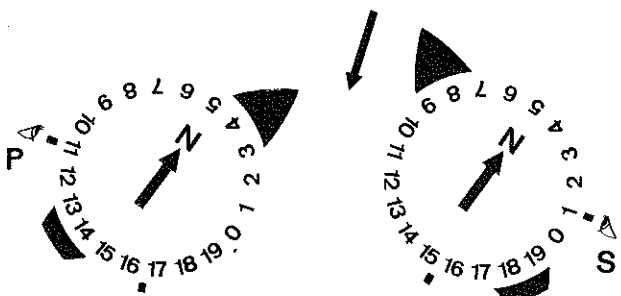


Now, suppose the wind is backing (swinging left) so that your starboard reading increases to 3. To avoid being headed, you tack to port where you will read 13.



Next, the wind veers (swinging right) and your port reading diminishes to 11. Tacking back to starboard, you will now read 1 — and be lifted again.

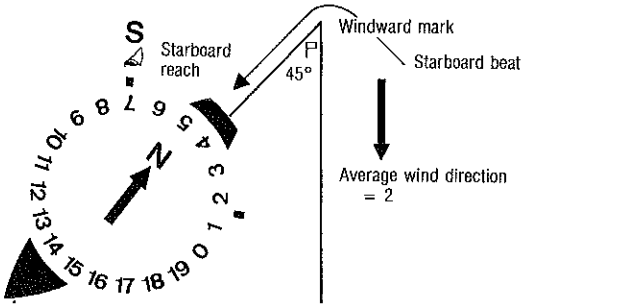
2



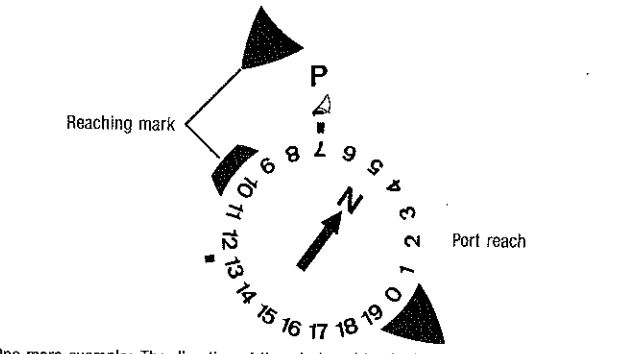
Thus, if the average wind direction is indicated by 2 (or 12), reading 1 (or 11) means that the starboard tack is lifted and reading 3 (or 13) means that the port tack is lifted. Experience with Lasers and other boats shows this to be a very useful and easily handled tactical system. It takes advantage of the superior characteristics of the globe compass and needs no pre-setting as in other tactical compasses.

REACHING

With NEXUS RACING, finding the right courses for the reaching legs is quite simple. Turning around the Windward mark, you should bear off about 90 degrees from the beat. This corresponds to 5 units of the tactical scale. So we add 5 to the figure on the tactical scale that corresponds to the direction of the windward leg. This is usually the same as the average wind direction given before the start. If the starboard tack tactical scale reading for the average wind direction is 2 as above, the reading for the starboard reach should be $2 + 5 = 7$. Thus, you should bear off until reading 7 at the starboard lubber line, regardless of the actual wind direction at the Windward mark.



At the Reaching mark, you gybe and luff until you read 7 again, now on port.



One more example: The direction of the windward leg is 180 degrees. Which is the corresponding reading on the reach? Answer: Tactical scale reading on starboard at 180 degrees is 10. Reach reading is $10 + 5 = 15$.

3

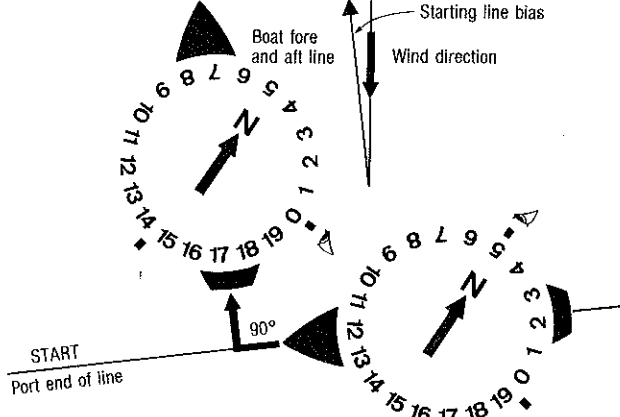
At the Leeward mark, you round up on the beat on port tack. Choosing the right tack at the beginning of the new windward leg is very important. You should compare your reading with the average wind direction 12 to see whether you are lifted or headed.

RUNNING

For the running leg, simply aim to read the reaching figure (here 7) at the midpoint between the lubber lines. You will then be on the straight course to the Leeward mark.

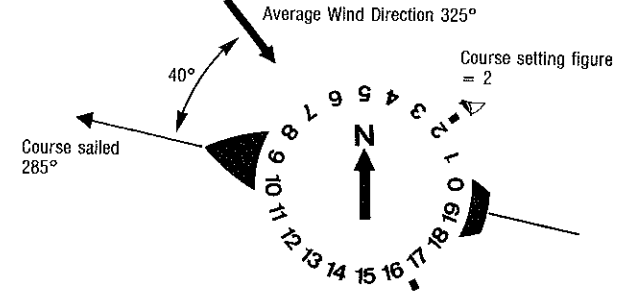
STARTING

NEXUS RACING is also easily used for finding the favoured end of the starting line. Simply sail along the line on either tack and check your reading on the tactical scale. Then luff 5 units (right angle). If the wind is now coming in from starboard, this is the preferred side.



Average wind direction and how the course is laid.

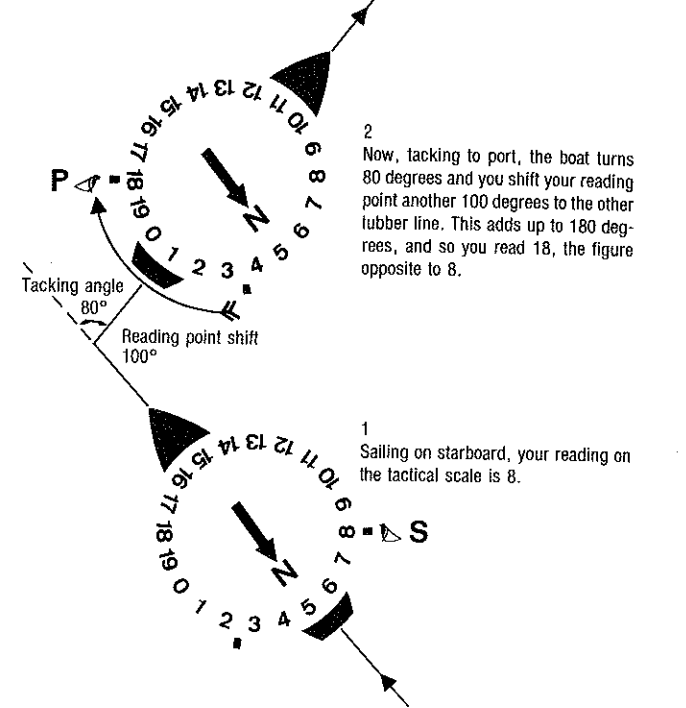
Before the start, the Racing Committee usually gives the direction of the windward leg in degrees. This is the supposed average wind direction and it also determines the direction of the reaching and running legs. To find the corresponding "course setting figure" on the tactical scale, simply sail on a close beat on starboard, being careful to maintain a course 40 degrees off the given direction, as read on the navigation scale:



The course setting value can also be found directly by entering the figure given by the Racing committee into the table given below. The simple figure of 2 now tells you how the reaching and running legs lie (7 on the tactical scale) and also when to tack in the wind shifts. See also section on "How to sail in wind shifts with NEXUS RACING".

4

How the NEXUS RACING tactical scale works.

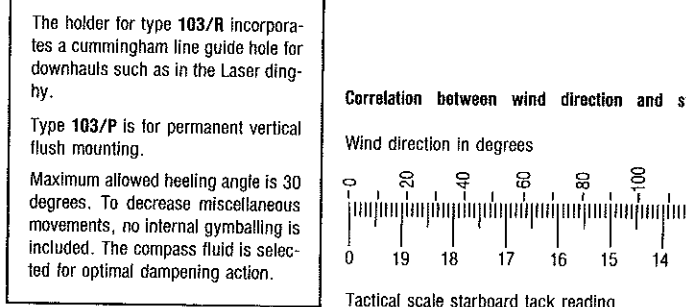


Understanding how the tactical scale of your compass works makes it even more useful, for example, for finding other fixed courses such as in nonolympic types of racing courses.

The tactical scale is aligned so that you read 0 on starboard when the wind direction is from north (0 degrees). The spacing between the pairs of numbers 0/10, 1/11, 2/12 etc is 180 degrees (half circle). The spacing between the starboard and port lubber lines is 100 degrees.

Most boats beat at about 40 degrees to the wind. This gives a tacking angle of 80 degrees. Remember, the compass card is still as the boat tacks.

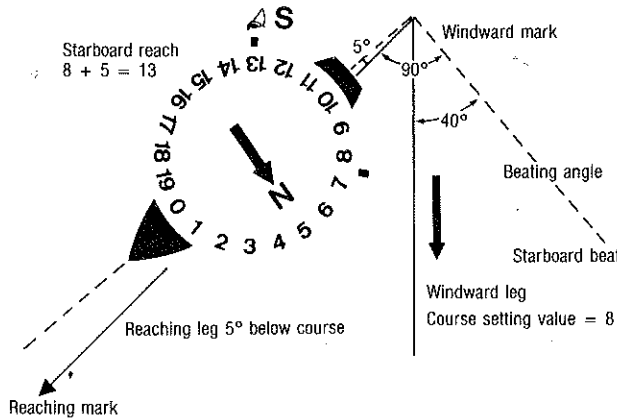
Mounting



5

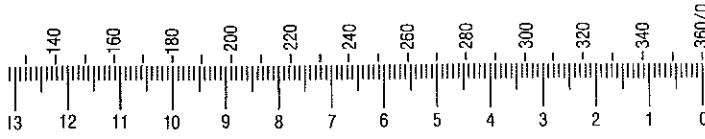
The tactical system of NEXUS RACING suits most boats that beat at about 40 degrees off the wind. Experience shows that small variations are easily handled and the pairs of numbers obtained are more easily remembered than conventional compass readings.

Using the same example as above, you bear off 90 degrees at the Windward mark to read 13. Actually, to be on the straight course to the Reaching mark, you should bear off another 5 degrees. For tactical reasons, this is often not done until later on the reaching leg. The reason for this divergence is that the compass is designed for a beating angle of 40 degrees, instead of the 45 degrees angle used in other compasses.

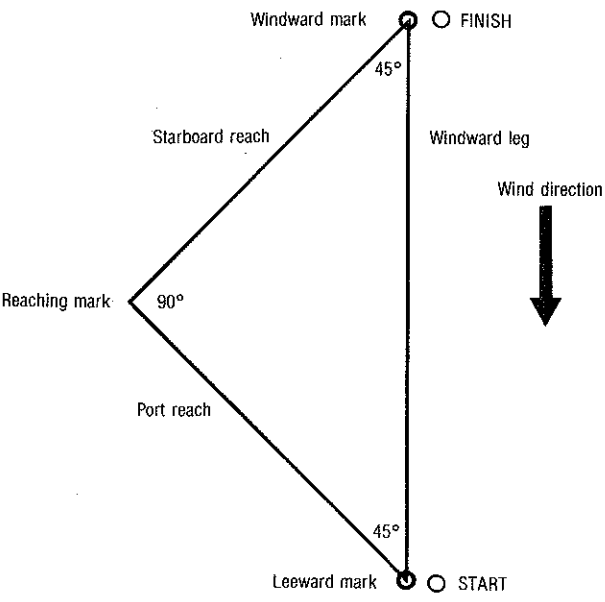


After gybing at the Reaching mark, 13 is read again, now on port. Also here, you begin the leg 5 degrees above the direct course to the Leeward mark, for the same reason as given above. If you want, you can put tape markings 5 degrees inside the lubber lines to get the readings aligned with the reaching legs.

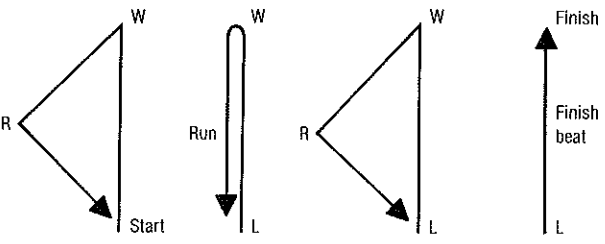
board tack reading on tactical scale = course setting value.



The Olympic Racing Course



This is how the Olympic course is usually sailed:



NEXUS RACING gives you that winning advantage to play the wind shifts right!

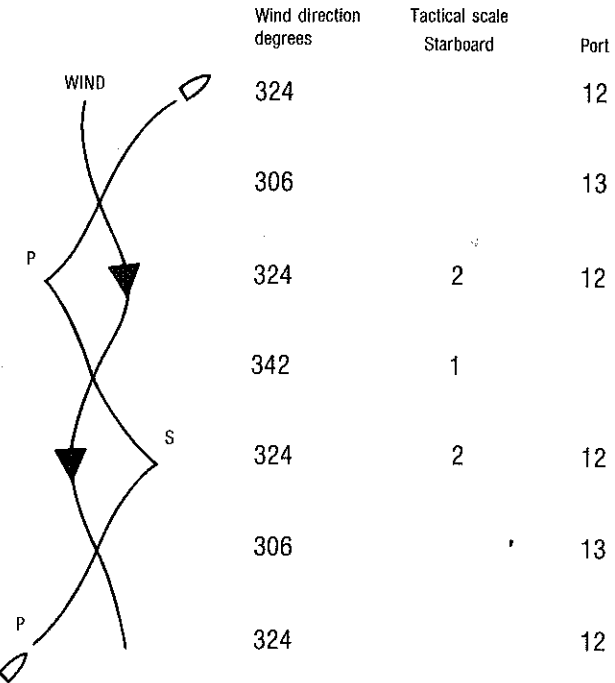
How to sail in wind shifts with NEXUS RACING

The most important use of the tactical compass is for finding the right times to tack in the wind shifts on the windward legs of the race. The typical wind shift situations are described here. To become a successful racing sailor, you should be thoroughly acquainted with these principles.

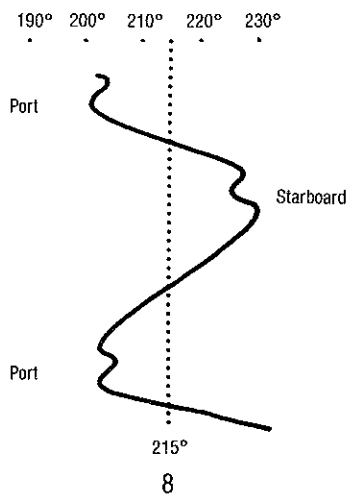
OSCILLATING SHIFTS

The wind direction sometimes oscillates about an approximate mean value. While sailing upwind, these shifts seem to occur more frequently to a fast boat. When sailing in such oscillating shifts, you should always tack so as to be on the lifted tack. This will give you the straightest possible course towards the windward mark.

If the wind veers, tack to starboard to let the wind come in from that side. If the wind backs (swings to the left), you should let it come in from the left by tacking to port.



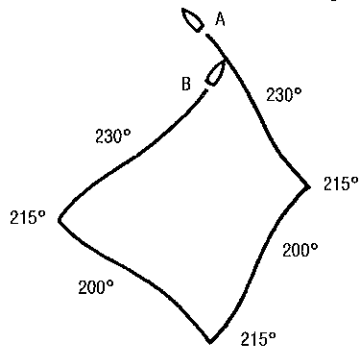
In the example above, the average wind direction is supposed to be 324 degrees. The boat starts by beating on port tack and is gradually lifted by the backing wind. But then the wind starts to veer and eventually passes the average wind direction. Believing that the wind will continue to veer, the helmsman tacks to starboard as the average wind direction is passed. He then is lifted by the veering wind until he can read 1 on the tactical scale. Here the wind starts to back again. When passing the average wind direction, the helmsman tacks to port. He then is lifted on port tack until he reads 13. Then the wind starts to veer again . . .



If the wind oscillates between 200 and 230 degrees, tack as the wind goes past 215 degrees. The corresponding on the tactical scale is 8 on starboard and 18 on port tack. If you tack as soon as the wind starts to swing back from the extremes, you will find yourself headed on the first part of the new tack. So small shifts that do not pass the mean value shouldn't be tacked on. It is the average wind direction for the whole leg that counts.

Rule of thumb: As tactical scale reading goes above mean: Tack to port. As it goes below mean: Tack to starboard.

However, small shifts that do pass the mean wind direction shouldn't be neglected although they might be difficult to see. The difference between being headed or lifted while beating is almost one metre per degree windshift, knot sailed speed and minute sailed. This means that going the wrong way in a five degree shift while sailing at 5 knots for one minute would bring you almost 20 metres behind a boat that went the right way. It isn't easy to make up for such losses by trying to sail faster.

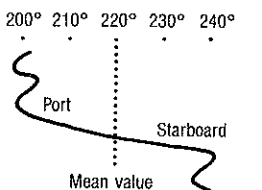


Boat A tacks right, boat B tacks wrong.

PERMANENT SHIFTS

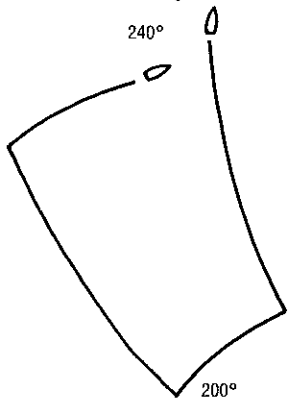
The wind sometimes shifts without returning to its original direction, at least not for the remainder of the windward leg.

In the example above, the wind is first oscillating at about 200 degrees. A permanent shift makes it veer to 240 degrees and here the oscillations continue. Tactically, the oscillations could be neglected in a case like this. Changing tacks should only be considered when the wind direction goes past its mean value for the whole windward leg.



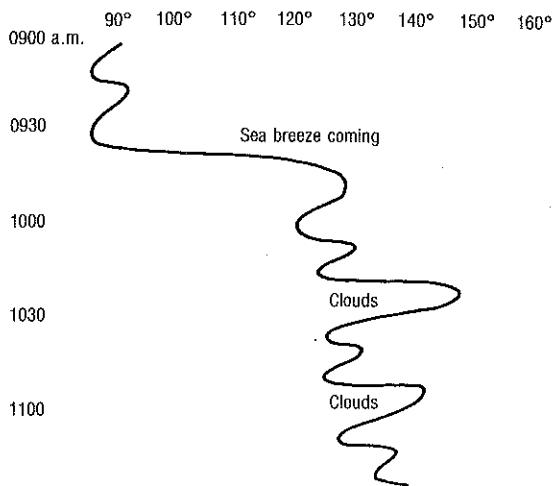
It is often difficult to predict permanent shifts. Sometimes they are caused by "wind bends" over the coast line or by channeling between islands. They could also be caused by clouds, the sea breeze coming in or appear for other, totally unpredictable reasons. Shifts caused by topography should be sorted out from those within the wind so that you can anticipate what will happen on the next windward leg.

Sail into the new wind when there is a permanent shift. If the wind veers, tack to port. You will be more and more headed. Then tack slightly before arriving at the lay line. Now the veering wind will lift you up to the mark. Tacking the opposite way does not pay off since you would lose more while being headed on the second tack than you could win by being lifted on the first.



Charts of windshifts made by sailing meteorologists during races show that the wind direction often changes in very complex patterns. Oscillations are added to shifts caused by the co-

ast line, clouds or the tendency of the sea breeze to veer with the sun during the day.



Other tactical compasses have to be adjusted before the start to set the estimated mean wind direction. This can be difficult and as soon as this direction changes any substantial amount the compass needs readjustment. It is an advantage if the variations of the wind direction can be followed directly and conveniently while sailing. This gives a better idea of how the wind is shifting and permits continuous reappraisal of the mean wind direction.

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