

## Navigation Tip

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Here's a bit of curious behavior that I have both observed and fallen into at times but do not exactly understand. We use a GPS to navigate more easily than the old days of sun sights and sextants and it has led to a strange sense, for some, that there is more certainty in the world than is truly warranted. One of the screens that you will see on a typical GPS involves a highway looking visage where the boat representation then is "supposed to" track solidly down the highway. If you use a GPS on the ocean in this way it can lead to some odd confusions. Following the "highway" like this may mean you have to add fairly precise waypoints for each journey making the minute adjustments you would as the helmsman all along the way. If you are sailing (as opposed to motoring) it is less possible to predict the conditions and thereby "know" exactly where you want to be at any given time. Typically, too, the charts that you will find on these electronic guides are based on the same faulty ones that cause a problem in the paper version. Often land masses are represented as being miles from where they actually are.

The way that it makes sense to use a GPS to me is to plan based on where you don't want to be or go. That is, if you know there is a rock you do not want to encounter then figure a path to one side or the other of that rock and know that you want to be to port or starboard of the "highway" line at that time as an additional margin. You see, there may be plenty of room "over there" but not much if you exactly follow the highway. The problem is, perhaps, that we have all learned to drive on streets so that the highway concept takes over and we can blindly follow a symbolic path ignoring our senses and good sense. When someone comes up for the watch following me I might say something like, "Stay to port of the line and keep a sharp look out for the cape that should come into view on the starboard side by the end of your watch... if it doesn't let the next person know."

If you are sailing then you may need to tack away from a lee shore to stay safe. Following the straight imaginary line laid out by the GPS does not

Speak to that either. Say that you tack out to sea to stay clear of the land during the night but you want to be closer to shore the next day to find your way into a port. A straight line on the GPS screen is useless to follow precisely... it ignores the realities of sailing. It fits the way a power boat acts, sort of. Even here you should have concerns about where the land actually is and not blindly trust the chart that may be installed in the GPS. Electronic charts can be just as incorrect there as the paper ones on the chart table!! In fact, in the Sea of Cortez there are many, many discrepancies between reality and charts of all sorts. Go to Google Earth and take a look as you scroll in from above to see the outlines of things (in yellow) as they are on the charts versus where they show up in the satellite view. Whew!! It will give you pause.

This brings me back to the original point again. It is often more important to know where you don't want to be than to believe you are going where you want to be. Two things I have come to believe are that a straight line course is almost never the correct one and a course minus visual input is down right dangerous. But then... it has been said that common sense is the least common sense of all, so I have begun to consider different ways to lay out the course for those dark nights when you cannot see "diddly" and then translate that to all the times when I set the GPS up for transits.

Ponder this for the next time you want to lay a course for a cruise. If you have Google Earth available you will see the cursor's location given in the lower left corner of the picture. The one shown will often need to be translated into something useful to your GPS but that is easy to do. If you see that it says  $27.0965^{\circ}$  N, you multiply the .0965 by 60 and it will translate and give you  $27^{\circ} 05.79'$  N. You can plan a whole route by comparing, that is to say, charting the coordinates and looking for notations of dangerous things along the route. Then you will need to note where and when you will want to hold a course to one side or the other of a particular line on your course.

It comes to mind that a trip Rex and I made north from the Las Cocinas (The Kitchens) involved the shoal area extending three or so miles to the west of the shore. A good line at the time had us positioned about five

miles off shore and our planning said to us that we needed to be to port of our line if we wanted to safely deviate from the "highway".

Recently too I had the experience of using some high school geometry in planning a crossing from Mazatlán to La Paz. The shortest way was to go north of Isla Cerralvo but I had noticed a reef on the chart so planned to end up north of the reef as well as the island. The path often taken by boats making this crossing is to end up in Los Muertos before heading north through the Cerralvo Channel. Then I recalled the  $a^2 + b^2 = c^2$  from geometry meant that the shortest course was the  $c^2$  leg. For this crossing the  $a^2 + b^2$  route would have been the leg from Mazatlán to Muertos to La Paz (San Lorenzo Channel), an added 15 nautical miles or so (about three hours). As it turned out we had engine issues as we approached the north end of Isla Cerralvo that made me think the shortest route was out of the question. Since I had planned the route based on where I did not want to be it was easier to see that turning south and making Muertos via the east side of Cerralvo was the safest option at the time. We did so and ended up spending a fantastic time in Muertos (fixing the engine problem in no time at all) and then sailing north through both the Cerralvo and San Lorenzo channels with great wind. The safety margin for this was excellent during the whole time and our planning was made easier because we had looked at both routes before leaving the dock in Mazatlán. The shortest way is not always the best way.

One of the tools on most GPS's that helps see the issue more clearly while you are trying to see if you are actually going where you want to be is the VMG (Velocity Made Good) calculation. On our main GPS I have set up a screen that shows speed over ground and VMG so that I know that I am still making miles toward the goal even when tacking away in order to follow the best wind course. The comparison of the two numbers helps me keep the speed up and know when to tack back to the other side to keep moving toward the goal. On the same screen I have the "highway" showing so I know how far from the rhumb line we have gotten. It still means that I need to convey the concept to others taking a watch and if they have it firmly in mind that we will be tacking through an imaginary line rather than following it... all is well!!