

## **“Proper Lookout” using electronic navigation aids.**

At 19.16, on a dark night, on the 29<sup>th</sup> November 2014 “*Team Vestas Wind*” was racing at 19kn towards the Carajos reef in the Indian Ocean. A compounding series of mistakes by the Skipper and Navigator, as well as the Volvo organising committee meant that the crew was not aware of the danger ahead.

The cockpit cam clearly shows a Crewmember shouting “Check this out” as 4 crew all rush to peer out ahead to see the unusual wave conditions. No one looks at a chart-plotter or the depth sounder. Another person comments “we are passing a 40-metre contour” based on what the Passage Plan had incorrectly calculated many hours, or days beforehand. The crew, obviously confused and concerned about the wave conditions they were seeing, but partly reassured by the comment about the depth peer into the darkness for a further 28 seconds before “*Team Vestas Wind’s*” Volvo race is at an end. A 6-Million-dollar boat is lost. Fortunately, the crew training and experience kicks in and all crew are evacuated safely to shore.

At 2.35am, on the 10<sup>th</sup> October 2009 in rough seas and passing rain showers, the Maxi yacht “*Pricewaterhouse Coopers*” was racing towards Flinders Islet near Port Kembla, south of Sydney. There were concerns expressed about the accuracy of the Chart-plotter at the start of the race but it appeared to work OK after it was rebooted. The Chart-plotter was set up on the Starboard Helm but the helmsman was on the Port Helm as they approached. The crew noted that the helmsman did move to the starboard helm from time to time to check, but as most sailors know, in rough racing conditions, at night, and with fatigue playing a factor, this would have been difficult. “*Pricewaterhouse Coopers*” hit the Islet before the fore-deck hand, who first saw the danger could warn the helm, resulting in 2 lives lost and the boat smashed on the rocks.

At 23.40 on the 31 October 2017, shortly after leaving Capetown in the Clipper Round the World Race, “*Greenings*” ran aground and was written off on a well charted reef just off the African coast. The skipper was resting at the time and a full accident report has not been completed yet.

There is a common link between these accidents, that I believe, all sailors should understand. It is a common factor, identified, but not highlighted in the accident reports done. That common link is the lack of use of Electronic Aids to assist in “Proper Look-out” and position verification.

“*Team Vestas Wind*” and “*Greenings*” did not have a chart-plotter set up on deck for the skipper or helmsman to check regularly and “*Pricewaterhouse Coopers*” chart-plotter was set up in a position not easily visible to the helm on Port tack.

In any accident, there are numerous contributing factors, but these three incidents could have, in my opinion, been avoided if a chart-plotter was set up in an easy to read position for the helm or the skipper on deck at the time. A check of a Chart-Plotter and correlating this with visual observations would probably have prevented the previous errors in causing these losses.

Whilst the Accident Reports into the loss of “*Team Vestas Wind*” and “*Pricewaterhouse Coopers*” identified a number of failures, any of which could have prevented the loss, in none of these cases, including “*Greenings*” did the helmsman know precisely where their vessel was.

A mere glance at a properly mounted Chart-Plotter near the helm, correlated with the depth reading and the visual observations could have saved these boats and prevented the lives lost.

In the case of “Pricewaterhouse Coopers” a fatigued, overloaded skipper standing at the Port Helm, occasionally glancing at a Chart-Plotter mounted near the Starboard Helm would have had great difficulty in processing what he was seeing.

We often hear of GPS or electronic chart assisted collisions, but in reality, it is the lack of use, or improper use of electronic aids that causes many of these accidents.

It is important that all instruments are easily accessible. The Chart-Plotter should be large enough, set at the correct light levels, have corrected charts installed, and have A.I.S. and Radar overlays so that all information can be easily correlated. The Depth Sounder display should also be easily observable and the helmsman know the tidal correction to correlate the charted depths to the depths shown on the Chart-Plotter. All this is required for “Proper Lookout” and checking purposes. If the Chart-Plotter Depth does not correlate to the measured Depth or the visual observations do not correlate with the Chart-Plotter then care should be taken to determine the reason for this conflict. Paper Charts and Electronic Charts all have errors and limitations that need to be considered.

The focus on Navigation training has clearly been on passage planning rather than execution or proper lookout in the electronic age. The focus has been on using Paper Charts and electronic charts as Planning Tools and perhaps, unfortunately, not as “Proper Lookout” tools. The Planning and Execution functions require the tools to be set up in different areas. Planning is best done in comfortable conditions, either at home or below decks. The Execution of this plan is done on deck, at the Helm with the assistance of the deck crew.

The International Regulations for the Prevention of Collisions at Sea, Rule 5 require a proper lookout “...by Sight and Hearing as well as all available means...”. While Rule 7 and 19 mention Radar as an aid, the COLREGS do not specifically mention AIS or chart-plotters. The SOLAS regulations do mention AIS (required for vessels over 300 tonne) and the fitting and monitoring of Radar and proper installation and use of Electronic Navigation Charts in large ships. The needs of Racing and Cruising yachts are different from large ships where air-conditioned bridges with regular checks of Electronic Charts, Radar and other instruments can be conducted in Gale Force conditions whilst having a cup of tea. Large ships may undertake their entire voyage in accordance with the Passage Plan, whereas sailing vessels face the challenges of changing wind directions, sea conditions resulting in changes to course, and speed.

In this age of cheap, reliable electronic aids, the loss of life or boats due to crews conducting a limited lookout by visual means only, is not acceptable.

Given the relative low cost of modern Chart-Plotters there is no valid reason for them not being installed on deck where they can be incorporated into a “Proper Lookout” regime.

A proper lookout should include: -

1. **A visual scan** of the horizon on a constant basis. This should be the responsibility of all crew on deck and communicated with the helm. The observations made should be correlated to the Chart-plotter.
2. A check of **the wind speed/direction, speed log and depth** indicator regularly, or immediately if any change is expected or experienced. The depth reading, adjusted for tide should be cross checked against the chart-plotter indicated depth.
3. **The chart-plotter** to determine current position and any hazards around the boat. The chart-plotter should be left in a zoomed in range to ensure all chart features are shown. The chart-

plotter should only be zoomed out for passage planning, distance measuring etc. and should be used with an understanding of the benefits and limitations of the range selected.

4. **A.I.S.** should be on at all times to warn other shipping of your presence and the chart-plotter set up so that any A.I.S. target is seen in time to take appropriate action. A 6 or 12 nautical mile radius is usually about right with alarms set for any vessel likely to be within 2nm within 5 minutes. The A.I.S. transmitter should only be turned off in a Marina and the receiver only turned off in congested waterways where the track of other vessels can be determined by marked channels or depths. The A.I.S. targets should be identified visually and/or by Radar to determine if all vessels are displaying A.I.S. correctly.
5. **Radar** is useful in detecting smaller craft not fitted with A.I.S. but often these are still difficult to detect. Wooden fishing boats in rough water are difficult to detect.

A Chart-plotter with A.I.S. overlay, and in poor visibility, a Radar overlay, set at a zoomed in range should detect all dangers. The chart-plotter should be visible from the helm (or both helms) at all times. A chart-plotter at the Navigation Station below should be used for Planning purposes, in conjunction with Paper Charts, Pilot Guides, Tide Tables etc.

On our boat, "Shirley Valentine" a Bavaria 38 Cruiser, we have a Raymarine Chart-plotter with Navionics Charts incorporating a Radar and A.I.S. overlay directly in front of the helm. This is zoomed in to pick up all the detail but gives a good range for picking up A.I.S. and Radar targets. This is usually set at a 6-nm radius to pick up other vessels in time for collision avoidance and also, to pick up all chart detail. We often zoom In or Out the range for checking purposes. At the Nav Table we use an I-Pad with Navionics charts for planning and back-up purposes. I have charts on my Mobile Phone and often, my crew also have charts on their mobile phones. Before undertaking a voyage, we spread out the paper charts over our saloon table for passage planning. I don't think any Cruising Boat has a table in their Navigation area large enough for most Paper Charts. The Nav Table is better suited to using the I-Pad along with our Pilot Guides, Tide Times etc.

Passage Planning is done at home before the voyage or below deck in comfortable conditions. There is a lot of work to complete a proper passage plan and a lot of areas where mistakes can be made. The execution of the plan, monitoring and lookout is all done on deck. If conditions change substantially, we go below and re-evaluate our plans using the paper charts and the electronic charts below.

Clear thinking about the different requirements for Passage Planning, execution of that plan and Proper Lookout should reduce the risk of more accidents like "Team Vestas Wind", "Pricewaterhouse Coopers" and "Greenings".