

GOODBYE SEXTANT, WE ARE IN THE 21ST CENTURY

By Capt. Suneel Sule

I teach celestial navigation to earn a living. I have taken pride in taking star sights, noon sights and even ex-meridian observations during the 25 years that I sailed. I studied the principles of navigation in greater details, to the point of deriving complicated formulas and equations, while studying for my extra master's exam. I have been to Greenwich Observatory in the spirit of a pilgrim. My heart goes out to the men who sailed the seas in the pre-chronometer days and got lost and died of starvation or scurvy or shipwrecked on rocks; all because they could not calculate their longitude. Humanity in that era, Galileo and Newton included, did not know a way of finding the longitude of a ship on the high seas. The more I know about the great men like Kepler, Napier, Harrison brothers and others who devoted their lives to understanding the behavior of heavenly bodies and making navigation at sea more and more accurate, the smaller I feel in my own eyes. To put it in short, I am proud to be a marine navigator and I am proud of the rich heritage that goes with it. The sextant that I used at sea, holds a place of pride in my home and yet today, with a heavy heart, I am saying these words, "Goodbye sextant, we are in the 21st century".

Early steamships which set out to cross the Atlantic, 'steamed' for a few days and then 'sailed' for the rest of the voyage by putting up their tried and tested sails that they had trusted for centuries. No one had expected the steam engine to take a ship across the ocean. Even later, when such engines were built, many ships had the masts of a square-rigger and carried a full set of sails, "Just in case". Much closer in time, today our industry is once again showing that mindset when it comes to accepting electronic charts. We have not yet learnt to trust electronic charts completely and many ships are still carrying a load of paper charts "Just in case". An-

other such "Just in case" remnant of the past century that we carry onboard our ships, is the equipment and the expertise required to fix the ship's position using heavenly bodies, "Just in case" someone tampers with the Global Navigation Satellite System.

The fear is genuine. Satellites can be destroyed, or easier still, their transmissions can be jammed during times of hostilities. The accuracy of positions can be diluted by the service provider or spoofed by some miscreant. This has been done in the past on some occasion. However if we consider last 30 years of "Satellite dependence"; how many ships, for how long were without a satellite-derived positions? If we consider this statistics vis-à-vis the number of ship-hours sailed, the figure will be infinitesimally small. What is the worst that can happen if suddenly all satellite derived position-fixing systems are disabled concurrently? Ships will continue sailing on D.R., then make a landfall and then fix their positions by radar and visual observations until the situation improves. We did exactly that when Mother Nature routinely "jammed" our celestial position fixing system by throwing a cover of clouds over us. It was a matter of discomfort at best, certainly not a disaster.

All said and done, celestial navigation cannot be a substitute to GNSS. The alternative will have to be comparable in sophistication and accuracy, independent of user skills and widely available. Inertial navigation system is completely independent of support from any external source. Some land-based navigation systems like E-Loran may be developed and integrated with the satellite systems as aviation industry is already doing. What we need is a firm decision by the policy-makers to expressly state that celestial navigation is not an alternative to GNSS. Hence this is an appeal to the people who can make a difference.



WE HAVE NOT YET LEARNT TO TRUST ELECTRONIC CHARTS COMPLETELY AND MANY SHIPS ARE STILL CARRYING A LOAD OF PAPER CHARTS "JUST IN CASE". ANOTHER SUCH "JUST IN CASE" REMNANT OF THE PAST CENTURY THAT WE CARRY ONBOARD OUR SHIPS, IS THE EQUIPMENT AND THE EXPERTISE REQUIRED TO FIX THE SHIP'S POSITION USING HEAVENLY BODIES, "JUST IN CASE" SOMEONE TAMPERS WITH THE GLOBAL NAVIGATION SATELLITE SYSTEM.



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