

A good sense of direction

Developments in technology mean modern ship navigation is more NASA than nautical. Specialist **Michael Howorth** investigates how methods of navigation have changed over time and explains the sophisticated, accurate systems used today

It was back in the 1960s when computerised navigation first became a household word. The world watched enthralled as ships were navigated by Captains instructing their helmsmen, seated in front of banks of sophisticated machines directing their mighty vessels from place to place. Of course, back then though, it was fiction, the said Captain was James T Kirk, the ship was television's Starship Enterprise, and they were navigating their way through space, not through the world's oceans.

The premise was not so ridiculous, though. Even at the time, the first satellite navigation system, called Transit, was being used by the US military. Other early electronic navigation systems included the land-based DECCA, LORAN and Omega systems, which all used terrestrial radio transmitters instead of satellites.

But methods of celestial navigation (using a sextant to assess the angle between the horizon and the sun or various stars to plot a ship's progress) continued, and it took some time for these satellite navigation systems to be introduced on passenger ships, as Captain Ian Walters recalls. "In 1978, I was Second Officer on the original Oriana, which had one of the few satellite navigation systems on a commercial ship at that time. It was the size of a large American-style fridge and only gave an accurate position every 40 minutes, with an update in the dead reckoning position in the interim. These days, you can hold a GPS system in the palm of your hand and it will constantly update the position."

Today, a constellation of some 24 or more Global Positioning Satellites (GPS), are geostationary in space and they continually transmit precise microwave signals to everywhere on earth. These are the very same GPS signals that are used by SatNav systems

Technological advances mean that navigating a ship today is a very hi-tech affair – sextants and compasses have been replaced with GPS gadgets that constantly update the ship's position. Opposite page: today radar systems are linked up to electronic navigation charts to show a completely accurate picture of the ship's surroundings

fitted in many cars ashore and the constantly updating signals are so accurate that ships always know where they are to within 10 metres. Information is constantly available now electronically; there is no need to wait for the sun to appear from behind the clouds, it no longer matters if there is a clear horizon and star sights are almost a thing of the past. Methods of communication have improved too – it is the same satellite technology that enables passengers to benefit from on board email, send text messages and make telephone calls to friends back at home.

Radar, once a science open to interpretation by ships' officers, has also developed through the years, becoming an essential navigation aid almost unrecognisable from its predecessors on liners of the past. The word 'radar', first coined back in 1941, stands for Radio Detection and Ranging, and refers to a system that uses electromagnetic waves to identify and display the range and bearing of moving objects, such as ships, and fixed objects, such as navigation marks.





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It can even be used to detect weather formations, and officers can use this information to steer superliners clear of heavy rain.

Modern radars can be linked via computer to electronic navigation charts that digitally portray the most accurate and recent information from the Hydrographic Office and aerial cartography images, thus providing a complete picture of the environment surrounding the ship. This is particularly useful when approaching exotic destinations, where shifting sand bars and isolated coral outcrops might not appear on printed charts yet are clearly visible on frequently updated satellite photography.

On board navigation computers plot a ship's direction and speed, giving information on how far away vessels are from each other and calculating how close by they will pass. Split screens gather signals transmitted by nearby shipping and quickly identify information on speed, direction, destination and even how many people are travelling on board. Captains on the bridge can then use these received ship's identities, along with their type, position, course, speed, navigational status and any other safety-related information to identify and, if necessary, communicate with nearby shipping, so as to safely navigate while in their vicinity.

Captain Paul Brown, who has captained Aurora, says that, over the years, all the new technology has greatly improved the job of the navigator. “The satellites that are used now can pinpoint the position of the ship to within just a few metres,” he explains, “a far cry from the days of having to rely on a sextant. The need for those traditional and time-consuming methods has gone, and that means that today the mariner is free to focus on his core task, which is ensuring the safety of the vessel.”

On board every P&O Cruises superliner today is a Staff Electro-Tech Officer – a rank that was not even conceived of 50 years ago, when it was the job of a radio officer to look after Morse Code-based radio communication and assist navigating officers with bridge electronics if they went wrong. “Communication systems have improved to the point where radio officers are no longer required,” explains Arcadia's Staff Electro-Tech Officer, Martin Hepple. “Systems now automatically monitor the airwaves and then inform the officers on the bridge when a message is incoming. And modern equipment now monitors itself, which means that if a fault develops, the equipment tells you rather than only finding out if and when a failure occurs.”

Old skills of celestial navigation and methods of calculating a position using sextants and complicated formulae are taught and practised by officers today – indeed, these methods still form part of their essential training. The reason for this is simple: the sea can, at times, become a hostile environment and ships (no matter how sophisticated) will always rely on the skills of the navigator to personally conduct them across the oceans. Alongside these skills though, P&O Cruises Captains have the most cutting-edge technology at their disposal, and who knows what amazing technological developments will come along next.

While you leave the navigation to the bridge officers, there are all sorts of technological benefits you can enjoy on board a P&O Cruises ship, including interactive television on Ventura plus, throughout the fleet, email, internet access and an in-cabin TV channel that shows the ship's position 24 hours a day