Submarine Safety Measures in the Indo-Pacific
An Australian Perspective

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The Indo-Pacific region has seen a surge in the number of nations acquiring submarines and they have done so for classic reasons. Submarines are unique platforms that can operate without control of the sea and air. Because the sea is still a magnificent hiding place despite advancing technology, they require a disproportionate effort to counter them: hence, they deliver what has been described by former President of the Submarine Institute of Australia retired Australian Rear Admiral Peter Briggs as a 'strategic sting'.

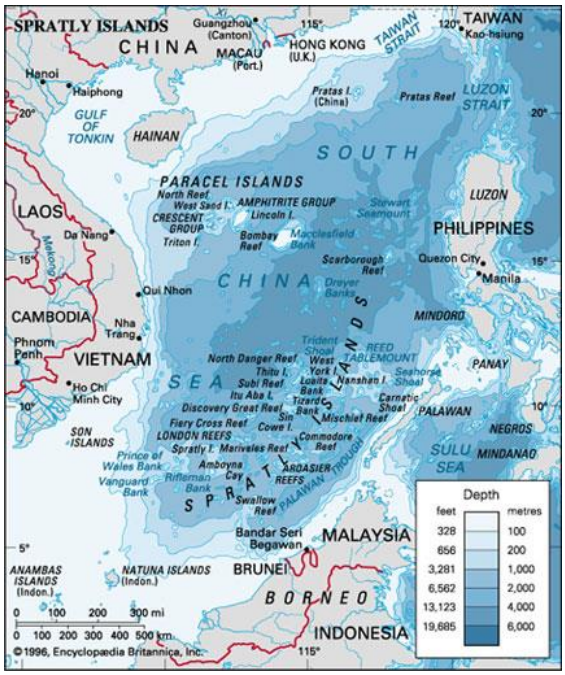
Like the blue-ringed octopus which can produce a fatal sting if you step on it, they are small but pack a heavy punch and ownership of submarines makes a strong statement on sovereignty. In a region where there are so many disputed claims on offshore territory, ownership of submarines gets a nation that might otherwise not be considered worthy to the negotiating table.

I have been asked to offer my perspective on measures undertaken by the Australian Government in promoting operational safety in the region The SIA is not in a good position to speak about Australian initiatives to improve submarine safety in the region but can make some observations that might contribute to the discussion by explaining some of the issues Australian submarine commanding officers would consider when deploying into the region.

Submarines operate in an inherently dangerous environment that demands stringent attention to safety at all times. The US Navy learned from the loss of USS THRESHER the need for comprehensive attention to submarine safety in design, construction, operation and sustainment.

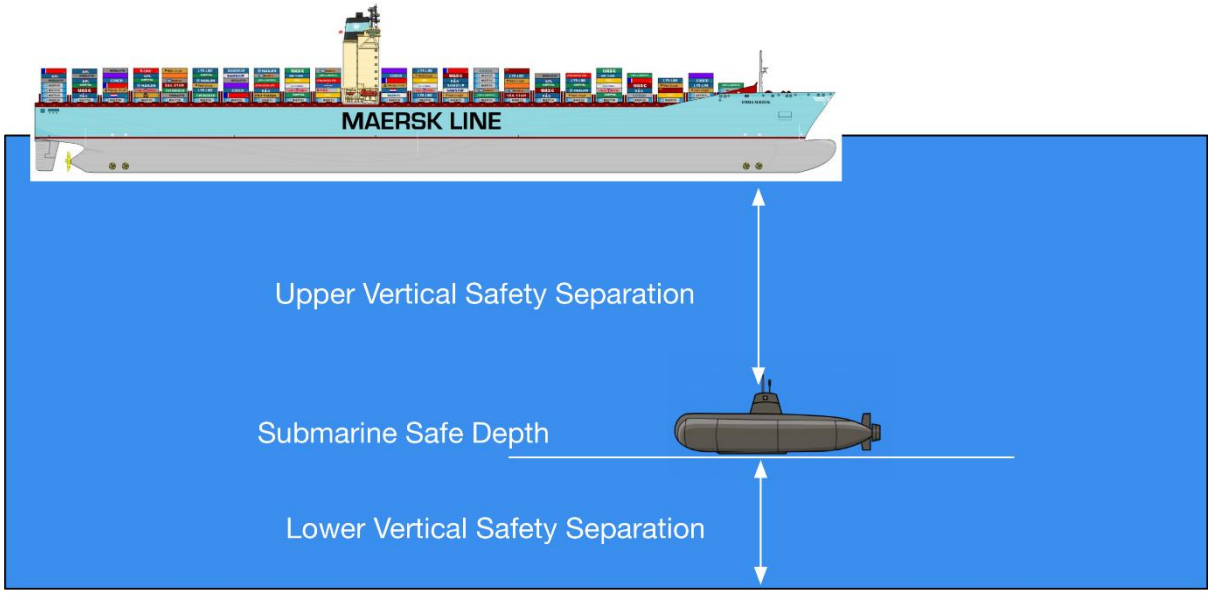
Most recently we only need to cast our minds back a couple of months to understand the ultimate risks faced by those who sail in them. Of course, the catastrophic outcome of the accident suffered by the Argentinian submarine *San Juan* creates pause for thought but, while such an accident can occur, it lies at the extreme end of the risk-likelihood spectrum for nations that operate submarines.

To keep a submarine safe, the first thing that's needed is to avoid collision and groundings. Much of the South China Sea is shallow and while a bathymetric chart of the area would show a lot of dark blue areas, much of it is very shallow. Shallow is a word that means different things to those who navigate on the surface and those who dive. In a ship, it's a relatively static affair determined by the ship's draught.



For a submarine commander, 'shallow' means any area where you need to think where the bottom is since the keel of the submarine could be anywhere between 6 and, say, 250 metres. In this map, shallow would be white and very pale blue.

The CO also needs to consider what's referred to as Vertical Safety Separation. The submarine needs vertical clearance between the top of its fin and the bottom of the surface ship including a factor to allow for the suction effect of a very large and fast ship. This is referred to as Upper Vertical Safety Separation. The other consideration is the proximity of the bottom or seabed. Quite apart from the fact that the seabed is never smooth, the Lower Vertical Safety Separation needs to allow for any angle the submarine adopts to change depth. When the water is shallow and the surface ship traffic is heavy, the submarine commander can be presented with very complicated calculations in order to keep the submarine safe.



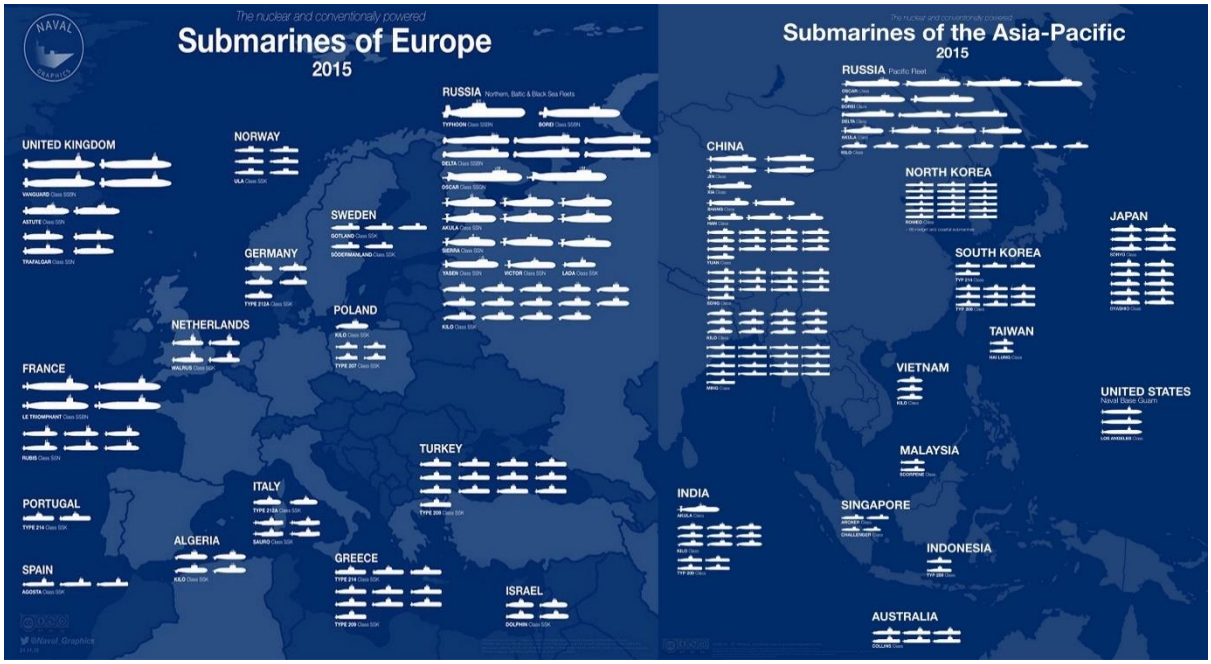
In many ways, that is the easy part because the submarine commander is dealing with what is seen or known. You can see (or hear) surface ships and can (or should) know where you are geographically.

What you can't see or hear, often until it's too late, is another submarine. In a region where tensions are rising over claims, and where many nations are only now acquiring submarines, South East Asia lacks the international agreements that have generally been adopted in the rest of the world that provides for a system to prevent mutual interference. Many of the

more established navies share their submarine movements with the US Navy which has a comprehensive organisation to plot those submarine plans with the specific purpose of keeping the assigned areas separate from each other.

These agreements have been developed because of the trust that exists between the participating nations. In a situation where there is no underlying trust because of competing national claims, tensions are never far below the surface. The conversion of rocks into islands so as to extend territorial seas increases the complexity of the submarine commander's mission since unexpected encounters with other submarines whose nation lays claim to those waters might have a serious outcome.

It should be no surprise to anyone in this audience, given the theme of this conference, that the Indo-Pacific region is home to a growing number of submarines. Depending on how the region is characterised, its numbers far exceed those of Europe as illustrated by this image produced by Naval Graphics.



In European waters, with the significant exception of Russia, most of the submarine-operators are part of the North Atlantic Treaty Organisation (NATO) and the waterspace is managed by that organisation and the US Navy. With no similar organisation, the newer South East Asian submarine operators (all strongly independent for the very reasons described earlier) face much higher risks of submarine-submarine collisions.

Submarines do not necessarily move along shipping lanes but, where they do, their commanding officers will all consider vertical safety separations in order to calculate the depth at which they will be safe from deep draught surface ships and from impact with the seabed. Unsurprisingly, this means they may well be operating at the same depth. In a fairly noisy environment, the low radiated noise levels which provide such an operational strength to submariners can become a peacetime threat as highlighted by the collision between British and French nuclear submarines in 2009.

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Page last updated at 16:05 GMT, Monday, 16 February 2009

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Nuclear subs collide in Atlantic

A Royal Navy nuclear submarine was involved in a collision with a French nuclear sub in the middle of the Atlantic, the MoD has confirmed.

HMS Vanguard and Le Triomphant were badly damaged in the crash in heavy seas earlier this month.

First Sea Lord Admiral Sir Jonathon Band said the submarines came into contact at low speed and no injuries were reported.

Both the UK and France insisted nuclear security had not been compromised.

HMS Vanguard is now back at its home base at Faslane on the Clyde

Even though the UK and France are both part of the arrangements to prevent mutual interference, the very high security levels around strategic submarine deployments meant that these submarines were not covered by that arrangement. It's not too difficult to consider that nations in South East Asia might consider that their submarines fill equivalent levels of strategic importance, even if they are not armed with ballistic nuclear missiles. Movements of their submarines will certainly be highly classified, more so in periods of heightened tension.

These observations have been made, at the very least, by the Republic of Singapore. Its recent establishment of the Safety Information Portal and endorsement of the adoption of the Code for Unplanned Encounters at Sea (CUES) are very worthy initiatives, especially for surface ships. The challenge is to translate these initiatives for submarines while recognising that compliance may compromise the stealth of a submarine. Even in peacetime, this may be a bridge too far.