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Singapore's New Submarines: Seeking Balance

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Fleet design and maintenance has always been extraordinarily demanding because of the need to balance a wide range of uncertainties. In today's world this is probably truer than ever, as the probable thinking behind Singapore's acquisition of another pair of Invincible-class submarines shows.



Two additional Invincible-class submarines reflects hard choices that the RSN had to take between its

hard security missions versus non-traditional maritime security requirements.
Image from of *MINDEF Singapore*.

The recent announcement that [the Republic of Singapore Navy was planning to acquire a third pair of *Invincible* submarines](#), bringing its total up to six by the end of the decade, shows the Republic's determination to maintain as balanced a fleet as seems sensible and affordable.

The decision was made against a backdrop that sailors find unpalatable – namely that naval power naturally decays. Ships rot and rust, crews get tired and operational readiness is a consumable that can get used up quickly. Nothing is forever.

This is not a new problem; it is to be expected and prepared for. Back in 1691, that largely unsung naval strategist Henry Maydman wrote: 'England must resolve to be at the constant charge of keeping a great Fleet in continual action, if ever the Nation hopes to have Peace or Tranquillity.' That 'constant charge' is the prevention of a decline in naval power, it meant that a country has to keep investing in it, in order to avoid potentially catastrophic consequences; in his time, the operational decline of the Royal Navy had led to the loss of control of the Channel after being defeated by the French and you can't get much more catastrophic than that.

Rough Seas Ahead

An equivalent prospect may currently seem remote for Singapore, but we are going through a period of quite radical change. Responsible naval planners must be wary of what might happen, they must prepare for the worst case, even in the best of times. And these are definitely not the best of times.

The Ukraine and Gaza wars, the Sino-American tensions over Taiwan and the South China Sea, the economic disruptions caused by the upending of the world's trading system, frictions arising between former allies and gathering cooperation between other potentially disruptive powers – these all suggest an uncertain future world in which beneficial outcomes can certainly not be taken for granted. Singapore's then-defence minister Dr Ng Eng Hen [justified a sizeable \(12.4%\) if temporary uplift in defence spending](#) partly on the need to recover from Covid-related delays and partly on what he called 'rapid changes in our external environment.' Accordingly, the situation must be closely monitored and if necessary, 'invest more to further strengthen our capabilities.'

Nor is Singapore alone in coming to the conclusion that it needs actively to ready itself for a more competitive future. The United States has accepted the need for a radical rethink of its naval and maritime priorities, especially with its acknowledged need to resuscitate its ship-building industry; the Trump administration is looking at a [23% reduction in non-defense spending and a 13 % increase in defence appropriations](#). India recently announced a [\\$3 billion increase in its all-round maritime investment](#), and most European countries are doing much the same. Russia and China started rejuvenating their maritime power several decades ago and in some ways are well ahead in the process. Even North Korea has launched its first [5000-ton naval vessel](#) and appears to be developing a nuclear capable submarine force.

Fleet Design and Balancing between Competing Requirements

When it comes to fleet design, the first balance to be struck is political in nature, between a familiar present and an unfamiliar future and consequently between non-defence and defence spending. Singapore's trajectory is arguably towards the latter. Bearing in mind how long it takes to procure a complex naval asset and how long their service life can be, current uncertainties mean that the operational career of a unit could last significantly longer than the assumptions behind its design. For this reason, future proofing the fleet and its constituents is extremely difficult.

The second balance to be struck follows naturally: what should be the priority of competing operational taskings, simply, what does the government think its navy needs to do most? This is a question of balancing a navy's task profile between high-intensity hard-security issues like warfighting and deterrence versus the softer more benign things that navies do, especially disaster relief and maintaining the good order at sea, on which the trading system relies, against major disruption and all forms of maritime crime. These decisions reflect the national defence objectives derived from the government's approach to the international context, with all its uncertainties.

These different naval tasks require different capabilities. However versatile a platform is, it simply cannot be cost-effective across all mission-sets. Furthermore, there are more detailed issues to be addressed within each mission area. For instance, it's likely that a continuing need to contribute to maritime security will be especially important for a trading nation like Singapore. Even in competitive times, disruptive problems like people and drugs smuggling are getting worse. Colombia, for example, produced 8 times the cocaine in 2024 than it did in 2012. But where and when is the capability to help defend the system best deployed? Is this a matter of local waters or distant ones? If the latter is the case, range and distant underway support is important. If the former, it isn't. Such issues shape questions of unit and fleet design.

Why More Submarines?

These procurement uncertainties and the general inability to predict the future pave the notion of producing as balanced a fleet as resources allow, in order to cope with as many contingencies as possible. But this in turn produces the next choice in how those resources are spent, and here the unknown cumulative effect of the apparently limitless new technologies leaves their mark.

Singapore's decision to upgrade its submarine force is interesting because this is a particularly demanding area. It may even be a morality tale for other navies. The initial acquisition is high. Crew training needs to be especially rigorous since submarine operations are inherently more dangerous than most as the recent experience of other navies shows all too clearly. Maintenance and refit cycles and operation are expensive and so are the resultant opportunity costs in terms of the alternatives that now can't be pursued.

Almost by definition submarines are designed for warfighting and its ancillary requirements, and for general deterrence. They can be used for covert surveillance in maritime security operations for example or to add muscle in grey zone operations. The reported [surfacing of a British SSN by a Russian ship suspected of cable tampering](#) for example might have had a dampening effect on the latter commander's enthusiasm. But these operations are not what these submarines are usually designed for. Consequently, investment in them means fewer resources for other acquisition priorities.

Some analysts argue that technology is making sea denial more effective. If true, there is a strong argument for the deterrent effect of quite modest submarine forces against hostile surface forces and maybe – just maybe – against other possibly more advanced nuclear propelled submarines of great navies. A relatively small ‘bottomed’ diesel propelled submarine in listening mode can be very hard for the bigger fry to detect and thereby avoid being ambushed.

But technology, especially in the shape of underwater drones and generative AI, just might be finally making the oceans more transparent, in which case the odds might still be on the bigger battalions as usual. We just don’t know the answer to these questions, not until deterrence fails and a conflict produces at least a partial answer. It remains speculative. Going by the professional trends around the world – and not least in Southeast Asia, where both Vietnam and Indonesia already have six or more submarines and others like Thailand and Malaysia would clearly like to grow or rejuvenate their submarine capabilities – most naval professionals have concluded that diesel submarines, provided they are good ones, remain a good bet in uncertain times.

The long experience of ThyssenKrupp Maritime Systems suggests Singapore’s *Invincibles* will be. Moreover, the steady cumulative acquisition programme, in three pairs over nearly a decade and more, allows the first operational pair to establish basic proof of concept and to identify areas in which improvements within budget seem feasible.

The result will be a significant upgrade on the performance of the Archer class they replace. With their improved AIP (Air Independent Propulsion), they will have half as much more endurance again. Their 2000-ton displacement provides space for more effective weapons and sensors. Their unusual rudders provide a tactical manoeuvrability useful in shallow waters. Of course, they have been ‘tropicalised’ since Singapore’s waters are a lot warmer than the Baltic. But refuelling the batteries is very demanding, finally illustrating that none of these capability decisions are either easy or cost free.

Maydman was undoubtedly right to urge the need for constant investment in all forms of maritime power; still, the question of how best to do it, as the ensuing centuries of naval experience have demonstrated, has always been – indeed, will always be – demanding and full of uncertainty. It is all a question of balance and choice. There’s a downside to everything. More of one thing means less of another. The difficult issues that almost certainly lay behind Singapore’s desire to acquire two more *Invincible* submarines will surely have confirmed that point.

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