

**CHIEF OF NAVY ADDRESS TO SUBMARINE INSTITUTE OF AUSTRALIA  
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**“SUBMARINES IN AUSTRALIA’S MARITIME STRATEGY”**

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Good morning distinguished guests, ladies and gentlemen,

This Conference addresses an issue that I think might fairly be called a central theme of Australia’s current and future maritime strategy: the role of the submarine.

The 2009 White Paper took the view that our “strategic circumstances necessitate a substantially expanded submarine fleet of 12 boats” because “a larger force would significantly increase the military planning challenges faced by any adversaries, and increase the size and capabilities of the force they would have to be prepared to commit ... against us”(p64).

Indeed, in terms of numbers, submarines would constitute just over 50 per cent of the major naval combatant force and double the current force. Without being specific about the operational usage of our submarines, an expanded force of 12 boats is based on:

- concurrent operational tasks covering the full spectrum of benign to warlike operations (see WP para 10.9);
- a maritime force structure based around three Surface Action Groups (SAGs) - each comprising an Air Warfare Destroyer and two Frigates; and
- a force sizing gauge based on operating three boats in order to continuously maintain one on station at any given time.

From this it follows that operating 12 boats would allow for four submarines to be on station at one time – of which two could support the anti-submarine warfare requirements of a SAG and two could be engaged in other strategic missions.

The submarine plan resonates with the White Paper’s identification of the ADF’s primary force structure determinant as the ability to deter or defeat an armed attack on Australia. This includes both our primary maritime environment and selective projection further abroad.

This strategy demands a highly capable future submarine, whose design is determined by the four factors of range, endurance, crew and systems. It also demands a rethinking of force structure for Force 2030.

## **Submarine Capability**

So, why submarines?

For as long as submarines have been operating, they have been potent instruments of maritime power. Their innate offensive capacity provides substantial deterrence and they are useful force multipliers, simply by operating in an environment which is not transparent to existing technology. This much is not surprising or revolutionary. It has been the foundation of the submarine fleet for close to 50 years.

## **Design Challenges for Force 2030**

However, the successful introduction of Australia's future submarine capability will face a number of design, industrial and financial challenges that will truly make it a program of national dimensions.

Developing a design suitable for Australia's distinctive security requirements is inherently complex. The key factors in setting design parameters are range, endurance and crewing. Or, to put it another way, getting there, staying there and operating there, noting that the White paper tells us 'there' is potentially far abroad. And I would add to those communication, sensor and weapons needs, which govern fighting there.

For example, whether the FSM will have air independent propulsion is already a hot topic. Energy generation and storage needs, including payload and sufficient design margins for capability growth over a 25 year life, are key parts of any acquisition project, but especially for submarines. Since stealth will certainly remain an enduring and fundamental aspect, air independent propulsion may prove one of the solutions. However, and I stress this, we cannot afford to consider it out of context, choosing systems and processes not best suited to our own needs.

## **MOTS vs Design Solutions**

Our strategic geography alone imposes unique requirements on the first two key elements of range and endurance.

Since the acquisition of the Oberons, the RAN has always operated some of the largest Western conventional submarines. This has been primarily driven by the significant size of the Indian and Pacific oceans and the range, endurance (and thus crewing) requirements to span its enormous transit distances. It is important to understand the history of such submarines, because many of the lessons learned are relevant to the RAN's (ie FSM's) needs today.

The evolution of the conventional submarine shows that most navies have continually struggled with a single design to meet all of their mission requirements. They adopted a philosophy of two submarine designs, but both were slewed towards defining the capability requirements based on range. This was most significant between 1914 and 1945, where 'home waters' defence and long-distance patrol produced two different classes of boat. It suited the European/Atlantic theatre, and for the British gave it options in the Indian Pacific.

Post-war, after Allied trials of German fast drive submarines of both battery drive (Type XXI and XX111) and HTP (Hydrogen Test Peroxide) drive hybrids (Type XXV11), it became clear that a third mission had developed for the submarine. This was ASW, and resulted from the demonstrated inability of surface vessels to effectively counter a fast submarine threat.

This may appear to be an over simplified view of the evolution, and some historians would point to the British R Class submarine of the First World War as the first 'Hunter Killer' type. However, the R-class had little success at this role because its weapons systems did not suit the task and, as a result, it is fair to say that it did not influence subsequent British designs.

Immediately following WW2, most navies overcame the obsolescence of their current designs through stop-gap sonar upgrades and propulsion conversions, including the US 'Guppy' (Greater Underwater Power and Propulsion) and the British 'T Class' super drive programs, while the next generation was planned. From this point, I will try to put aside the US experience as they ventured into nuclear power for underwater combatants.

Both Britain and Russia, however, focussed on developing their own HTP indigenous designs, with little success. I recall both RN boats HMS *Excalibur* and *Explorer* were dubbed 'the exploders' by their unfortunate crews.

The new British solution eventually favoured the traditional two design approach. One would be a small sophisticated anti submarine type with a modern hydrodynamic shape that could sustain a high underwater speed for a significant period. It was beset from the start with changing requirements and indecision as to displacement and the necessary operating theatre, and the design was eventually discarded in favour of modifications to the second design.

That second design was for a Patrol class submarine, capable of conducting a 42 day patrol in all climatic regions. As the design was originally less contentious, and based on proven capability, it evolved relatively quickly. The eight vessels of this *Porpoise* class were immediately successful, in that they were quieter than the T Class Conversions, and they were soon modified to meet the additional design requirements.

The result was the 13 Oberon Class submarines, which were seen by the RN as a compromise to the mission requirements but served effectively in five navies, including ours. When their replacement in the RAN fell due, the fundamental requirement for a long-range Australian patrol submarine remained. The India/Pacific oceans remained vast, but the reliance on submarine capability, stealth and lethality had increased, particularly in the area of long-range offensive ASW.

The British, by this stage, had committed to an almost all SSN program, except the O-boat sized, conventional Upholder Class. In Australia's case, this no longer suited our unique needs and the RAN had to adopt Parent Navy status for its own submarine needs. The Collins class was the result.

In respect to the Future Submarine Program, we face a similar challenge. Our geographical circumstances remain the same and magnify the historical problems faced across Europe; our operational requirements have not lessened; and we are committed to a conventional design. Again, to reduce it to its most basic terms, our requirements for range and endurance are unique, as is the technical response to the particulars of the southern marine environment.

Remembering that a fundamental objective for FSM is to significantly increase the military planning challenges faced by any adversaries, it is essential that it is a highly effective platform with just the right range and endurance.

## **Personnel**

This brings me to the third critical design factor: crewing. The planned expansion to a fleet of 12 highly-capable Future Submarines poses a challenge for our ongoing efforts to rebuild a sustainable submarine workforce.

Navy is already working towards this. Through our New Generation Navy program, now well into its second year, we have devoted substantial effort to addressing the crewing concerns of our current fleet, with a firm eye on future requirements. One of our earliest efforts was establishing the Submarine Sustainability Program, now part of the new Submarine Capability Branch. Achievements to date include a 25% increase in the crew size to allow a more sustainable workload; improved shore accommodation; improved IT access for crew members and a more balanced sea-shore posting structure. These early successes are reflected in the full training pipeline for new submariners, and the return of discharged members – 9 have returned to full-time service in the last year, saving \$4.4 million in training costs. As you can see, progress is steady in rebuilding our workforce.

Closely related are the training systems, through-life support arrangements and adequate shore-based infrastructure to exploit fully the future submarine.

None of these endeavours will be straightforward, and it would be simplistic to think that the usual way of doing business will invariably suffice. In fact, past business practices have proved less than effective in maintaining our submarine capability. Meeting the challenges posed by the Future Submarine must begin with a concerted and deliberate effort to remediate current shortfalls. The success of the introduction of the Future Submarine will hinge on the legacy of our future Collins class experience.

## **Submarine Systems**

The fourth of the design factors I mentioned – the systems to coordinate and fight the submarine – have been more clearly outlined in the White Paper.

Besides special forces support, it specified land strike and made it an addition to the already substantial anti-surface capability of the Collins class. A submarine specifically loaded for land strike missions could carry a substantial number of cruise missiles alongside torpedoes, and they would likely be among the first weapons fired in a campaign. Moreover, the ability of the submarine to clear a launch datum and

exploit the undersea environment to evade may offer greater impunity against counter-attack.

In addition to direct warfighting, submarines can consistently contribute to intelligence and surveillance efforts. The advent of secure, discrete, and high-data rate communications for submarines now also means that they can operate as part of a networked force, magnifying the combined effect of the fleet.

What I hope is clear is that the selection of hulls, equipment and systems for the future submarine cannot occur in isolation. We must ensure that our strategic needs, summed as range, endurance, crew, and systems, set the design parameters and not the other way round. It is important to maintain a balanced, and sustainable approach.

### **Balanced Force**

This brings me to the final issue I would raise with respect to the future submarine, and that is force structure. When I last spoke to the Submarine Institute in November 2008, I made clear my conviction that submarine capabilities were not so overwhelmingly superior that we ought to increase their numbers at the expense of a balanced fleet.

This should not be a tribal argument between surface ships and submarines – I also would argue strongly against reducing submarine numbers to return the surface ship fleet to the level of capability I believe would be ideal given their versatility across full span of maritime operations.

I stand by my position, and see nothing in the White Paper's extensive planning for future Naval surface and air assets to raise concerns.

### **Conclusion**

As one of the most ambitious acquisition programs to be undertaken by the ADF, the Future Submarine, like the Collins class and their predecessors, represents an essential part of our maritime defence strategy. The sheer complexity of the project has dominated discussion of Force 2030 from Navy's perspective.

However, while they define the debate, submarines alone do not define our future naval capability, in which landmark incoming classes such as the *Canberra* class LHD, our introduction to Aegis in the *Hobart* class DDGs and the anti-submarine capability of the future Naval combat helicopter, cement the ADF's future as a joint operational one, across the full spectrum of the maritime environment.