

ADM AUSTRALIAN DEFENCE MAGAZINE DEFENCE WEEK

SPECIAL REPORT

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The Collins will find itself operating in an increasingly crowded battlespace.

DEFENCE

Special Report: Sea 5000 and ASW – Meeting the future threat

Ewen Levick and Katherine Ziesing | Sydney and Canberra

The Sea 5000 decision is on everyone's minds as the government mulls over one of the largest defence acquisition decisions it has ever made. Speculation heated up around an NSC meeting in mid-May, although the decision seems to have been delayed until June. ADM understands that Defence is going back to the contenders for more information before NSC considers the program again next month.

The delay suggests that there is not much separating the three tenders. ASPI came to the same conclusion the day before the NSC meeting in a [report](#) highlighting the relative strengths and weaknesses of each design.

To recap, ASPI concluded that the FREMM and Type 26 have the strongest ASW qualifications; the Navantia bid has the lowest project risks and is likely to be the cheapest choice; the Type 26 will be the most expensive; and Fincantieri has the largest global supply chain opportunities for Australian industry.

Yet the fact that any potential [merger](#) of Naval Group and Fincantieri would also see close to \$85 billion worth of sovereign shipbuilding program in the hands of a single player has not been widely examined. Both FREMM designs (Italy and France) were signed off in an era of fiscal austerity in the wake of the Global

Financial Crisis – costs were cut wherever possible.

The Type 26 program in the UK will face its own pressures as the nation negotiates Brexit and works through the first of class issues that any large complex program faces.

Navantia's offering is perhaps the best known of the contenders in terms of what they bring to the table; yet for all the runs on the board when it comes to the Hobart class build, that program has not been without significant issues too.

ADM understands that despite the program slipping back in this early stage, the 2020 cut steel deadline is still in place. This will be addressed by the successful tenderer building three test modules, beginning in 2020: one of most complex blocks (a CEAFAAR perhaps?), and 'easy' one and another in the middle of the complexity scale.

The Commonwealth's decision will, of course, factor in costs, risk assessments, and industry opportunities. This first selection will see an initial four year design contract signed, allowing for more development and refining of the baseline with steel to be cut on the ships proper in 2023.

Yet as ADM Managing Editor Katherine Ziesing [pointed out](#) in February, ASW is the primary strategic purpose of the Future Frigate acquisition. Accordingly, each bid's ASW capabilities (a mix of sensors, design elements and signature management) may well be the determining factor in the final decision. With that in mind, it is worth examining which capability is best able to counter the undersea threat and how that may change over the lifespan of the Future Frigate.

“Even one additional helicopter has a dramatic impact on the relative performance of an ASW surface vessel”

Today's answer is helicopters

Interestingly, ASPI argued that the stand-alone ASW capability of surface combatants is primarily determined by the number of aircraft on board rather than by systems attached to the hull: “ASW is not best practised by big 'lumpy' systems,



Future ASW will require significant investments in integrated network capabilities.

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but instead by disaggregating sensors and terminal effectiveness over a wide area. Aircraft are the most effective way to do that from a surface vessel.”

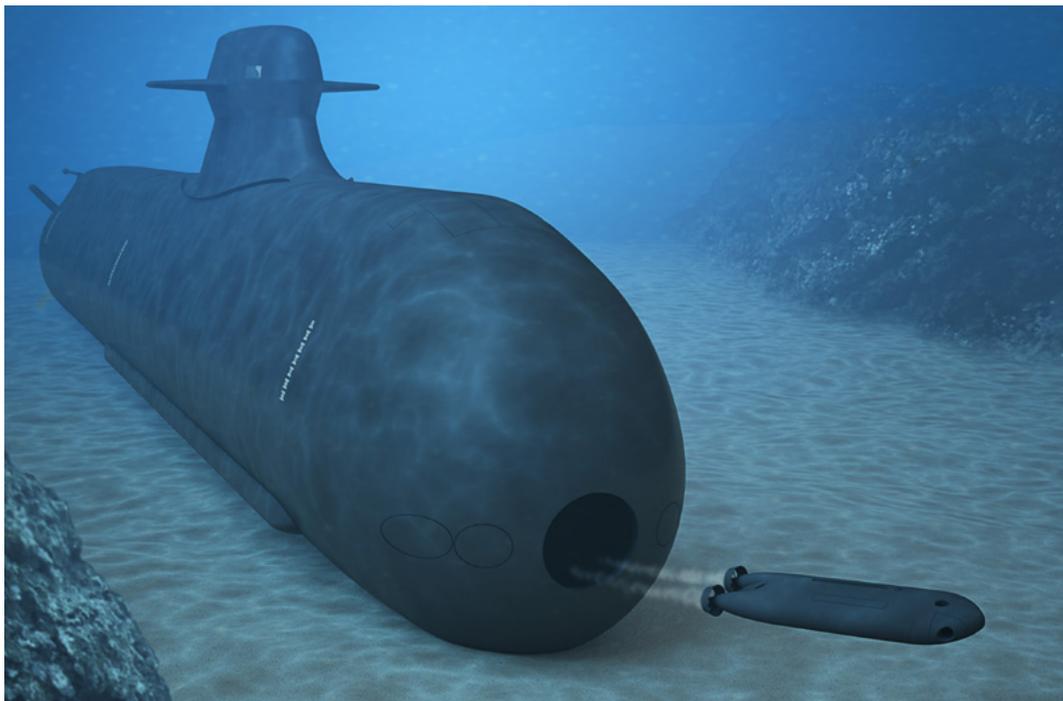
To prove the point, the authors ran simulations pitting an ASW frigate against a submarine to determine how the number of embarked helicopters impacted the frigate’s effectiveness.

A frigate with no helicopters lost every time; even if it detected the sub, its MU90 torpedo was out-ranged by the sub’s Mark 48. A frigate with one helicopter on-board was sunk 65 per cent of the time. A frigate with two helicopters reversed those odds; it sank the submarine 80 per cent of the time, and was itself sunk in 40 per cent (both were sunk in 20 per cent of scenarios, when an airborne helicopter sank the sub after the ship was hit).

The exact results are not realistic – the simulation favoured the frigate by boxing the submarine in. Nevertheless, the experiment does demonstrate that even one additional helicopter has a dramatic impact on the relative performance of an ASW surface vessel. It is worth noting here that Fincantieri’s FREMM is the only bid offering a double hangar built-in, although the Navantia and BAE bids can be modified to include the option.

ASW, of course, is about more than just helicopters (or sonar, as readers rightly [observed](#) following February’s special report). Yet the importance of helicopters is not limited to detection – in all scenarios run by ASPI, it was the always the helicopter that sank the enemy submarine. The authors even asked “whether a ship-launched ASW torpedo system is worth the space it occupies.” The importance of airborne helicopters in detecting and destroying submarines suggests that the number of embarked aircraft offered by each bid may be one of the most significant ASW capabilities influencing the Commonwealth’s decision. The distinction of whether the rotary wing platform was manned or not was not clear.

“Adapting to the future ASW battlespace will require significant investments in networks of our own”



Detecting a UUV will prove far harder than detecting a submarine..

SAAB

And tomorrow's answer?

That argument, however, assumes that submarines are likely to be the predominant underwater threat facing Australia and the Future Frigate. Whilst ASPI's experiment demonstrates the efficacy of helicopters in hunting a vessel as large as a Virginia or Collins-class sub, the lifespan of the Future Frigate will take it into an era where submarines are only one threat amongst many.

So what will those threats be?

If one of the first principles in ASW is to change the behaviour of the submarine crew in order to reduce the submarine's effectiveness in the battlespace, the obvious response is to remove the crew. Future undersea platforms are likely to be more autonomous, smaller (to a point – weapon size is still a limiting factor), much quieter, and able to undertake a range of conventional and non-conventional tasks.

China, for example, has [developed](#) autonomous undersea gliders capable of sonar countermeasures, target tracking, and network creation. The [Russian navy](#) is believed to have unmanned underwater vehicles (UUVs) that can manipulate objects on the ocean floor, and it is likely that the PLA is developing similar capabilities to tap or sever seafloor telecommunications cables.

There are still enormous challenges to be overcome in developing fully autonomous UUVs capable of ranging far from the mother ship (thanks to the difficulty of transmitting data through water). Nevertheless, the increasing prevalence of smaller, quieter platforms may reduce the relative efficacy of helicopters in disrupting undersea operations.

Instead, as ADM's readers have often observed, network-centric warfare may play a much larger role in detecting and destroying smaller, quieter, UUVs. In the words of GEN [Stanley McChrystal](#), "it takes a network to defeat a network." His writings on countering networks of jihadis in Iraq and Afghanistan are worth considering in the context of the future ASW fight:

"Decisions were decentralized and cut laterally across the organization. Traditional institutional boundaries fell away and diverse cultures meshed," McChrystal wrote. "The network expanded to include more groups, including unconventional actors. It valued competency above all else — including rank. It sought a clear and evolving definition of the problem and constantly self-analysed, revisiting its structure, aims, and processes, as well as those of the enemy. Most importantly, the network continually grew the capacity to inform itself."

We recently acknowledged that "[ASW is more than just sonars](#)". It will also be more than just helicopters, and if current research trends are anything to go by, it will be more than just frigates. Adapting to the future ASW battlespace will require significant investments in networks of our own.

This answer could include more unmanned platforms for the Navy, in the [air](#), on the [surface](#) of the ocean, and [underwater](#), acting as an integrated network of sensors and effectors in a layered approach. Which of the designs is best placed to integrate and grow to accommodate such advances?