

Submission to the Senate Economics References Committee Inquiry into Australia's Sovereign Shipbuilding Capability

18 December 2019

Dr Marcus Hellyer, Australian Strategic Policy Institute

Mr Michael Shoebridge, Australian Strategic Policy Institute

We welcome the opportunity to make a submission to the Committee's inquiry. This submission addresses the terms of reference through a set of thematic issues that cut across the individual items.

Ensuring we get the right capability

It is important to ensure that we collectively do not lose sight of the core purpose of the shipbuilding plan and shipbuilding industry. This is to provide military capability to the ADF to defend Australia and its national interests. While the vessels being acquired may provide an appropriate capability today, we should not assume they will throughout their lives, or even by the time they are delivered.

We are currently in an era of rapid technological transformation. Two areas of change are relevant to the shipbuilding program. The first is the development of threats to surface vessels. In addition to current threats such as anti-ship cruise missiles, submarine-launched torpedoes, and smart sea mines, China is bringing long range anti-ship ballistic missiles into service. Other ship-killing weapons that will enter service are hypersonic weapons, with rail guns likely to become practical weapons in the next 5-10 years (these can launch large number of extremely fast projectiles with range greater than traditional shells).

The second is the development of unmanned, autonomous systems. These offer the potential to flood the battlespace (whether space, air, surface or undersea) with large numbers of sensors and weapons. This will greatly increase the risk for manned platforms. Of course, by acquiring these systems ourselves, we can increase the risk imposed on the adversary and perhaps protect our own systems and people. Autonomous systems also offer a way to break out of exponentially increasing cost spiral that besets conventional manned platforms.

Those technologies are maturing much faster than many in Defence seem to assume. As Bill Gates wrote, 'We always overestimate the change that will occur in the next two years and underestimate the change that will occur in the next ten. Don't let yourself be lulled into inaction.' While fully autonomous systems do not yet exist, highly capable systems with narrow autonomy do already exist (e.g. unmanned aerial, underwater and surface systems) and are being rapidly improved. They will have proliferated in our region well before the first Attack class submarine enters service in the mid-2030s. We should not simply double down on investment in traditional manned platforms, but hedge our investment more broadly, particularly in autonomous systems.¹ Even now, semi-autonomous systems can greatly expand a military's surveillance reach and dwell

¹ Marcus Hellyer, Accelerating autonomy: Autonomous systems and the Tiger helicopter replacement, Australian Strategy Policy Institute, Canberra, 2019. <https://www.aspi.org.au/report/accelerating-autonomy-autonomous-systems-and-tiger-helicopter-replacement>

time, and add lethality to almost every type of force element. Other militaries, including potential adversaries, are acting more quickly than Australia.

The Minister for Defence has acknowledged that the strategic circumstances Australia is facing are very different from those predicted in the 2016 White Paper.² Therefore it is important to ensure that we do not adopt a plan that locks in the construction of particular platforms indefinitely. It is more useful to develop a plan that delivers the right maritime capabilities, not just ships per se. To do this:

- The funding streams in Defence's Integrated Investment Plan should be regarded as capability programs rather than platform projects. SEA 1000 should be an undersea warfare capability program, for example. In order to deliver a relevant undersea warfare capability, SEA 1000 should also be acquiring from within its budget (potentially through local design and build) unmanned underwater vessels in addition to manned submarines. This programmatic approach was the original intent of the Integrated Investment Program and can be achieved at this early stage of the ship and submarine programs should the government require it. It will involve reducing the capability requirements sought in the manned system in exchange for acquiring capability through complementary unmanned systems from within the program budgets.
- We need to invest more in the development of the technologies that will be crucial to future warfare, including artificial intelligence and autonomous systems.
- We need to be acquiring such systems now, even if they can't do everything we would like them to do, in order to develop an understanding of their strengths and weaknesses and determine how they should be further developed. Developing new concepts and ways of operating will be best done by putting novel systems into the hands of our servicemen and women, not by having demonstration days and waiting and watching while others experiment, adopt and learn.
- While both the ship and submarine programs are about building a class of vessels, each vessel will need to evolve through the long build phase to ensure they adapt to technological change and respond to adversary capability development.
- Design flexibility in the original design is essential – whether to accommodate the operation of a range of different types, sizes and shapes of autonomous systems, or to adopt other new technologies – such as battery types in the case of the submarine. Retrofitting platforms that have not had the flexibility for such changes 'designed in' will prove costly and difficult.
- The shipbuilding plan – and its enabling contracts – needs to have the flexibility to terminate particular platform builds should the government assess that they are no longer delivering a relevant capability. We must not commit ourselves to a contract to build 12 Attack class submarines, the last of which will be delivered in 35 years.

² <https://www.minister.defence.gov.au/minister/lreynolds/speeches/royal-australian-navy-sea-power-conference-international-convention>

Affordability

ASPI estimates that the domestic shipbuilding plan will reach around \$3.5-4 billion in annual expenditure before the middle of the 2020s. The plausibility of this estimate is reinforced by the fact that expenditure on domestic shipbuilding projects has reached \$2 billion in 2019-20—three years before the future frigate program cuts steel on the first ship and four years before the future submarine program cuts steel.³ The current workforce is small fraction of what it will grow to, and virtually no expenditure has yet been made on major subsystems.⁴ So \$3.5-4 billion could underestimate the annual cost.

That mature level of annual expenditure could consume around 30% of Defence's annual capital equipment budget on a continual basis. This amount is only for three projects (the submarines, the frigates and the offshore patrol combatants); it doesn't include Navy's other capability requirements such as future amphibious and replenishment ships, helicopters and future unmanned aircraft, weapons such as missiles and torpedoes, upgrade projects such as the suite of Collins upgrades and its life of type extension, and various enabling projects that knit the platforms together into integrated capability.

The Navy is essentially doubling in tonnage and a much larger Navy will cost a lot more to arm, crew and sustain.⁵ It's unlikely that this level of expenditure on domestic shipbuilding will be sustainable in the longer term without forcing substantial cuts to other areas of the force structure.

There are two ways to address this.

- Firstly, there must be a relentless focus on efficiency and productivity in the design and operation of the shipyards. The constant focus on job numbers created by shipbuilding projects is distracting and distorting. Productivity is about achieving the same output with less resources, or greater output with the same resources. We should be seeking to increase automation in the shipyards (and the 'digital shipyard' for the frigates at Osborne seems to enable this), even if that means fewer jobs are created than ministers have previously announced.
- Secondly greater use of autonomous systems by the military has the potential to lower the cost of military systems. Much of the complexity—and therefore cost and risk—of military platforms comes from the need to protect the crew, from both dangerous environments (like deep under water) and from enemy threats. So, removing the crew reduces the complexity and therefore the cost. This will likely require reviewing the number of ships and submarines to be delivered under the shipbuilding plan to create investment headroom to expand the volume of the autonomous force elements.

³ Marcus Hellyer, *The Cost of Defence. ASPI Defence Budget Brief 2019-20*, Canberra, 2019, Chapter 5.
<https://www.aspi.org.au/report/cost-defence-aspi-defence-budget-brief-2019-2020>

⁴ As of October 2019, 400 people were working on the future frigate with that number expected to grow to 2,500 by 2026. The future submarine project was at 322, expected to grow to 2,317 by 2032. *Senate Foreign Affairs and Trade Legislation Committee. Estimates*. Wednesday 23 October 2019.

⁵ The Chief of Navy has stated that operating the White Paper fleet will require growing from the 15,000 Navy personal in the White Paper personnel guidance to 20,000—essentially a 33% increase that is not funded. *Senate Foreign Affairs and Trade Legislation Committee. Estimates*. Wednesday 23 October 2019.

Australian Industry Capability

Excessive focus on construction of a small number of major platforms can potentially distract from other areas where Australian industry supported by our universities can develop new, game changing capabilities. Australian industry already produces several world-leading capabilities, such as CEA Technologies' phased array radars and Saab's 9LV maritime combat system. Australian universities and industry also have centres of excellence in areas such as autonomous systems and materials research.

These are the capabilities that will be at the heart of warfighting in the future and this is where Defence needs to do more to promote both R&D as well as 'productionisation' of advances made through that R&D. A first step would be to double the size of Defence's two innovation funds, the Next Generation Technologies Fund and the Innovation Hub fund. Currently these two funds are around one-third of one percent of Defence's budget.

Economic studies show that major spillovers—that is, new knowledge generated by the project that flows over into the broader economy—occur when Australian industry is involved in designing, developing and producing the weapons, propulsion and operating systems and other technically advanced components and services required in military equipment. Many of these technologies and systems are dual use items, for example in Australia's growing space industry.

Can it be done? Yes, if four things happen. The first is that the partnerships between Defence, local industry and foreign prime contractors have to result in the transfer of key technologies to Australia.

The second, which is probably more important, is that the primes need to actively foster innovative Australian content rather than defaulting to their existing subsystems. The challenge is to ensure that the tens of billions of dollars going into the major platform megaprojects are used to foster Australian innovations that enter production. In light of the major overlap between military and civilian technologies that characterises high-tech industries today (for example, in areas such as autonomous systems, AI, space and sensors), those innovations have great potential to flow into the broader economy.

The third is that the government create a new 'fast cycle' acquisition organisation for Defence that complements the existing long-term capability development and acquisition model that is the existing force design, investment program and CASG acquisition machinery. Global airlines realized that to create a more agile, low cost airline offering, they needed to create a new organisation rather than expect the existing premium airline to reinvent itself (e.g. Qantas' Jetstar). In a similar way, trying to get the existing Defence machinery to continue its decades-long processes and also shift to a weeks and months model of fast cycle development and acquisition is likely to prove frustrating.

Australia needs something like an Australian DARPA (Defense Advanced Research Projects Agency) with an annual budget of around \$200-300 million (potentially sourced from the innovation funds discussed above) tasked with the specific purpose of identifying and bringing into ADF service fast moving technologies with powerful defence applications, many of which will be autonomous systems that complement the existing manned force structure.

Lastly, Defence needs to use this Australian DARPA and its defence industry policy machinery to foster a new 'middle' in the Australian defence industry eco-system made up of true medium-sized enterprises able to be prime contractors to Defence and to sell their products to international

militaries. The consolidation of companies like Marand and Levett Engineering by CHAMP Equity is an emerging example of this mid-sized defence industry actor.

Transparency and scrutiny

There is inadequate transparency and scrutiny around the key components of the shipbuilding plan. Without adequate information it is impossible for the Senate to perform its role of reviewing government expenditure, or for the Australian public to have confidence that the right capability is being acquired in the most efficient way possible.

The Australian National Audit Office's Major Projects Report is the only source of detailed performance information on the largest Defence projects, including cost, schedule and risk. It tends to be backward looking. To date the ANAO Defence Major Projects Report has not included SEA 1000 and SEA 5000, despite these two projects having the third and fourth largest approved budgets (in the order of \$6 billion each) in the Defence portfolio. Consequently, it has been difficult to assess how these projects are performing and even more difficult to assess how well they will develop into the future.

According to advice received from the ANAO, the 2019-20 MPR to be published in late 2020 will include them for the first time. This a welcome development. But at the current time, any public discussion of performance in the naval shipbuilding sector lacks a solid factual basis. This must be rectified, and that is probably best done through periodic parliamentary scrutiny focused on the shipbuilding program that requires Defence to provide candid and helpful testimony and data, brings in external experts and perspectives and looks forward to identify and address emerging challenges, with this complemented by audits of past activities.