STRATEGIC INSIGHTS

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Australia's offshore patrol vessels

Missing an opportunity?

122

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Introduction

While much public attention has been given to the acquisition of Australia's new submarines and frigates, the acquisition of offshore patrol vessels (OPVs) to replace the Armidale-class patrol boats under Project SEA 1180 has attracted much less scrutiny or comment. It deserves more. Although an OPV is a much less complex platform than a modern frigate or submarine, Project SEA 1180 will produce a significant element of the ADF structure and have a major role in Australia's national security efforts, and some aspects of the project construction arrangements are certainly unusual.

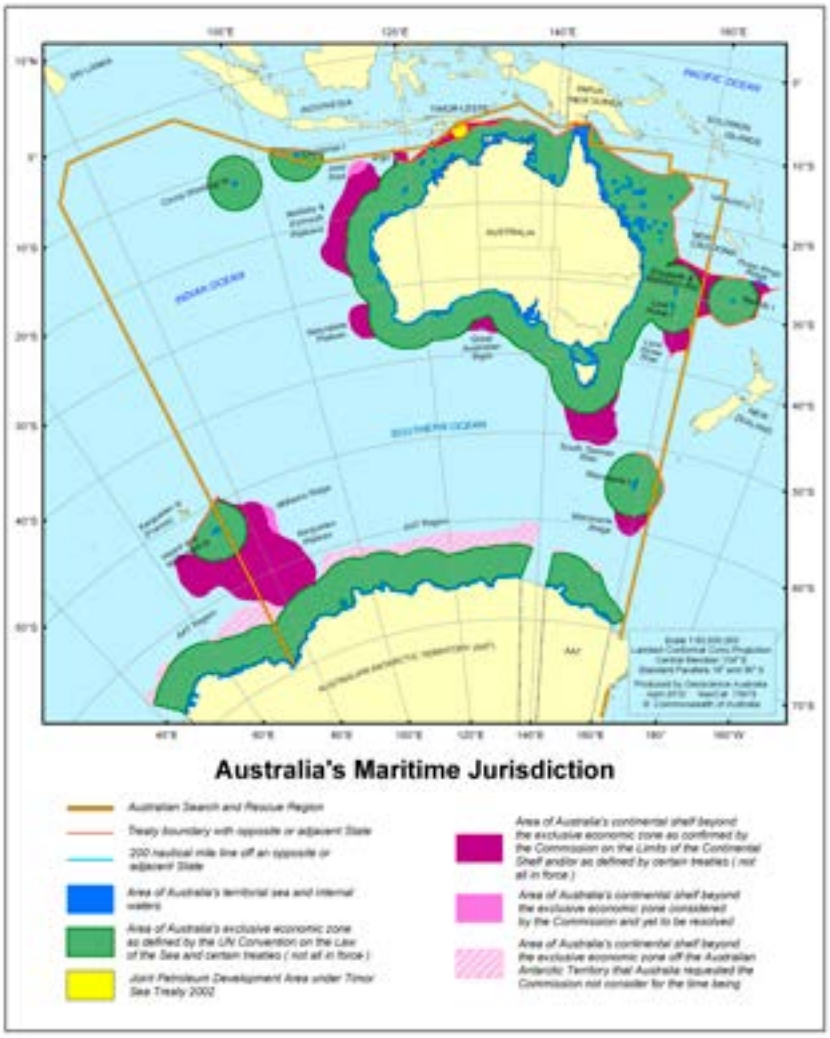
HMAS *Adelaide* conducts boarding party training with her two rigid hulled inflatable boats and a landing craft, while in Jervis Bay © Image courtesy Australian Department of Defence.

The background to SEA 1180

According to Defence's 2016 Integrated Investment Program,[1] Project SEA 1180 will replace the 13 Armidale-class patrol boats with 12 larger OPVs. The OPVs will be 70–80 metres long, carry maritime unmanned aerial vehicles (UAVs) and carry larger sea boats (which are carried on the deck and used for operations such as boardings) than the Armidale-class patrol boats.

The new OPVs will have a primary role of providing border security and maritime security protection, with a secondary role of conducting military patrol and response tasks. They'll be able to conduct more extended operations than the Armidale-class boats; their longer range and endurance will allow them to operate further afield in maritime Southeast Asia and the Southwest Pacific—from the equator to 50 degrees south (Figure 1).

Figure 1: Australia's maritime jurisdiction.



Source: Commonwealth of Australia (Geoscience Australia) 2017.

Construction of the first vessel is planned to commence in 2018, and the last vessel is expected to be delivered by 2030. The cost band for the project is $3–4 billion, which sounds a lot, but is about a third of the project cost to build three air warfare destroyers and less than a tenth of the provision for the new frigates and associated projects.

The project's schedule of milestones is aggressive, and Defence's project team is commendably on track so far. A competitive evaluation process to select the vessel type commenced in late 2015. The government has already made some decisions about the industrial arrangements for the project, including the build locations—it gave first pass approval in April 2016 to construct the first two OPVs in South Australia starting in 2018, and construction of the remaining 10 vessels will transition to Western Australia when Future Frigate construction begins in South Australia. The government also approved three designers for short-listing: Damen, Fassmer and Luerssen, all of which are internationally recognised as ship designers with established track records in OPV design and construction. The request for tender was released to the short-listed designers on 30 November 2016, and the competitive evaluation process is expected to choose a single design and construction team in the fourth quarter of this year. For the construction phase, all the designers have formed connections with local firms: Damen and Luerssen have each set up separate subcontracting arrangements with a joint venture between ASC and Civmec, while Fassmer has formed a joint venture with Austal.

Capability issues

It's necessary to view SEA 1180 in the broader strategic context. The *2016 Defence White Paper* conveys a clear sense that the future strategic environment is both more uncertain and challenging for Australia's strategic interests. International relations between major powers in the Indo-Pacific carry heightened potential to produce tension and conflict, regional military capabilities are growing, and weak states and transnational groups are likely to continue to pose challenges that need to be accounted for in future capability planning.

The OPV project is one manifestation of the Defence White Paper's goal of a more potent maritime force out to 2030, to be achieved by acquiring more capable systems and better integrating sea and air platforms. The OPV force should not only perform the maritime constabulary role better than the Armidales, but it's also intended to free up the destroyers and frigates to deal with high-risk and high-intensity tasks beyond Australia's coastal areas.

There's little publicly available detail about the capabilities required or the underpinning operating concepts. Quite properly, the responses to the request for tender are being tightly held by Defence and the contenders during the evaluation. At the Pacific 2017 conference, Defence briefed that an internal evaluation of the responses had been completed, so it's likely that Defence and the National Security Committee of Cabinet (NSC) will consider the bids over the next six weeks or so.

The little information we have about the requirements is that the key capability characteristics for the OPVs are:

- larger size (70–80 m) than the Armidale class
- longer endurance
- larger sea boats (+8 m), with communications and data links to the parent OPV
- UAVs for aerial intelligence, surveillance and reconnaissance.[2]

As for the operating concept that drives these capability characteristics, the Integrated Investment Plan (Paragraph 4.36) doesn't provide any explanation beyond a sketchy description of the role, which is to provide border security and maritime security protection, with a secondary role in maritime patrol and response. If the NSC doesn't get a strategic operational concept as part of the cabinet submission, it should ask for one. For the purposes of this paper, I infer that the operating concept for the OPV is very similar to the real-world operations that the patrol boat force has conducted over the past two decades. This involves fishery patrols up to and beyond the boundaries of Australia's 200 nautical mile (nm) exclusive economic zone,[3] patrols around offshore resource platforms, and interdiction patrols against people-smuggling vessels at a distance from Australian territory (including our offshore territories). These patrols would be planned according to assessments of patterns of activity and in reaction to intelligence cues and incident reports.

Note that these types of maritime security operations, while typical of the past decade or two, don't represent the whole spectrum of constabulary missions that the OPVs could be tasked to perform over the *next* two decades. More on that below.

While details of the OPV designs for SEA 1180 are scarce in the public domain, each of the short-listed designers has real-world exemplars that can provide a rough—if inexact—guide to what may have been offered to Defence. With that important caveat, Table 1 outlines some key characteristics of the current Armidale and Cape classes of patrol boats, together with some approximate exemplar designs from the three short-listed design houses. Note that, at 67 metres, the Damen design is smaller than the 80-metre Fassmer or Luerssen designs. However, Damen has several larger OPV designs, so an 85-metre Damen exemplar is included for comparison.

Table 1: Available OPV designs

Type	Length × beam × draft (m)	Displacement (tonnes)	Key effector systems	Performance: Speed Range Endurance	Accommodation
Armidale class	• 56.8 × • 9.7 × • 2.7	300	• 25 mm main gun • 2 × 0.50 cal. machine-guns • 2 × 7.2 m sea boats	• 25 knots • 3,000 nm @ 12 knots • 21 days	21
Cape class	• 58.1 × • 10.6 × • 3.1	300	• 2 × 7.3 m sea boats • 2 × 0.50 cal. machine-guns	• 26 kts • >4,000 nm @ 12 knots • 28 days	22 + holding area accommodation
Damen 6711 (data based on UAE *Arialah*)	• 67 × • 11 × • 5.4	Unknown	• 57 mm main gun • 2 × 30 mm cannon • Mk 49 RAM surface-to-air missiles • UAV deck (unable to land helo) • 2 × 11 m sea boats	• +20 knots • 9,000 nm @ economical speed • >21 days	42 crew + austere accommodation
Damen 1800 ('Sea Axe' bow)	• 85 × • 13.7 × • 4	1800	• 30 – 76 mm main gun • deck for 11 t helo + hangar • 2 x 9 m sea boats • space for 3 × 20 ft ISO containers	• 25 knots • 5,000 nm • 30 days	60 + 36 embarked
Fassmer OPV 80 (data based on Chilean *Piloto Pardo*)	• 80 × • 13 × • 3.9	1850	• 30 – 76 mm main gun • deck for 7 – 10 t helo + hangar • 2 × 7.5 m sea boats • 1 × 11 m interceptor boat • stern boat ramp • space for 3 × 20 ft ISO containers	• 20–23 knots • 12,000 nm @ 12 knots • 30 days	40 + 30 embarked
Luerssen OPV PV 80 (data based on Bruneian *Darussalam*)	• 80 × • 13 × • 3.0	1625	• 57 mm main gun • 2 × 20 mm cannon • 4 × Exocet anti-ship missiles • deck for 11 t helo (no hangar) • 10 m and 6 m sea boats • stern boat ramp • space for 2 × 20 ft ISO containers	• 22 knots • 7,500 nm • 21 days	40 + 18 embarked

Sources: RAN website; Wikipedia; company brochures.

Some observations can be made at this point.

The increase in size over the 57-metre Armidale-class patrol boats (particularly for the 80-metre designs) is a game-changer for capability in several areas.

First, the larger size provides improved endurance and seakeeping, which are further enhanced by hull designs that are optimised for seakeeping (at a trade-off of lower top speed). Damen also claims that the 'Sea Axe' hull, which is in its 6711 design, provides better fuel efficiency and better seakeeping at higher speeds than conventional OPV hull designs.

The increased size of the SEA 1180 contenders continues a trend in which successive classes of patrol vessels have been larger than their predecessors (1967 Attack class, 33 m, 146 t; 1980 Fremantle class, 42 m, 220 t; 2005 Armidale class, 57 m, 300 t). This trend is also replicated in the Australian Customs Service/Border Force patrol boats (Bay class, 35 m; Cape class, 58 m) and in the Pacific Patrol Boats (ASI, 31 m; Guardian class 41 m).

This trend is driven by the Navy's experience of the demanding oceanographic environment in Australia's maritime area of operations, the vast size of the area and the long duration of constabulary operations. The requirement for increased size and endurance is also driven by evolving operational concepts over the past two decades, which have focused on conducting border protection tasks well offshore.

Second, the larger size also allows each vessel to be better equipped for maritime constabulary tasks, including with the larger sea boats and maritime UAVs that are known to be a requirement of SEA 1180. The maritime UAVs offer a particularly significant capability increase for surveillance tasks. They are being acquired under the separate Project SEA 129-5 at a cost of between $500 million and $750 million over 2018–30.

Finally, larger vessels inherently have greater capacity and space for more specialist crew and passengers (such as rescued mariners or detainees) and stores for specific missions, such as search and rescue or humanitarian assistance and disaster relief.

So far, so good; all the contenders' bids substantially improve on the capability of the Armidale class. The options all provide better range, endurance and seakeeping by virtue of larger size, and the maritime UAVs will provide a much greater surveillance capability than an Armidale patrol boat without 'eyes in the sky'.

Defence is understandably very focused on giving the government what it's asking for—a vessel that can perform the tasks currently undertaken by the Armidales but further away, for longer, and in rougher seas. This is very commendable, but is an opportunity being missed?

A missed opportunity

Perhaps the biggest opportunity to add extra capability to the fleet is to build in the capacity to embark a helicopter. It appears that Defence hasn't included a requirement for this system (or a hangar).

While a helicopter capability isn't cheap, its benefit is significant for the maritime constabulary role. Depending on the aircraft, helicopters can carry a much larger payload over a greater range than current maritime UAVs and, unlike UAVs, they can carry personnel for boarding operations, search and rescue, medical evacuation and general transport. These characteristics make helicopters a far superior capability in the maritime constabulary role compared to maritime UAVs.

To be sure, a fleet of helicopters for the OPV force would come at a non-trivial additional cost for acquisition, personnel, training, infrastructure and sustainment. For a rough illustration, consider that the cost of acquiring 24 MH-60R maritime warfare helicopters for the destroyers and frigates is $1.9 billion.[4] The MH-60R is expensive because it's well equipped with expensive sensor and weapons systems to deal with submarines, among other things. The US Navy operates the MH-60R together with a simpler stablemate, the MH-60S. While the MH-60R is specialised for antisubmarine warfare, the MH-60S is used for general transport, search and rescue, combat search and rescue, antisurface warfare and mine countermeasures. The MH-60S costs about

two-thirds as much as the MH-60R (US$28 million per aircraft versus US$44 million). So a rough guesstimate is that a fleet of 24 Australian MH-60S could be obtained for two-thirds of the $1.9 billion it costs to acquire MH-60Rs, or $1.2 billion. That's hardly cheap, but there are other cheaper (and smaller) helicopters that could be considered, and the Integrated Investment Plan includes $90 billion for investment in maritime capability.

A fallback option would be to embark a helicopter and associated personnel only for specific missions, drawing on resources available in the existing MH-60R and MRH-90 helicopter squadrons. Note that there would still be a cost to train helicopter crews to operate from the OPVs.

Even if future UAVs come to narrow the capability gap with helicopters (as Andrew Davies and James Mugg have argued)[5], large UAVs will still need the kind of deck and hangar space that helicopters require. So the decision not to require the deck and hangar capacity that would enable the OPVs to embark helicopters will also prevent the OPVs from operating larger more capable UAVs, such as the Northrop Grumman Firescout B and C.

Interestingly, as a perverse consequence of Defence's unambitious aviation requirement, the Damen 6711 design being offered for SEA 1180 has been modified from its United Arab Emirates parent by including a landing platform that can carry the weight of only UAVs. The other designs have landing platforms that can handle helicopters the size and weight of the MH-60 or MRH-90, and the Fassmer design also has a hangar, which is necessary for the environmental protection and maintenance of the helicopter. Note that the other designs have hangars that can accommodate UAVs.

Defence's highly rigorous and disciplined approach to managing SEA 1180 capability requirements would normally be cause for praise, but perhaps this is a case of 'preparing to fight the last war' by focusing on the kind of border protection tasks that typify the past two decades. Those tasks have involved a low level of threat from small fishing vessels, only low levels of non-cooperation and no risk of disciplined or lethal force. The interdiction and boarding of the North Korean freighter Pong Su in 2003 was the most potentially serious example of border protection in the past two decades.

It seems risky to design the project capability requirements based on this low level of potential threat. In fact, Australia's strategic policy explicitly warns of a more complex and challenging security environment in coming decades. This doesn't mean just the sexy high technology of space and cyberwarfare and advanced submarines. The demands on constabulary missions could also be much more taxing compared to what the ADF has dealt with over the past two decades.

For example, counter-piracy, maritime counterterrorism and counterproliferation missions could involve a spectrum of non-cooperation, ranging up to lethal force using heavy machine-guns, light cannon, weaponised drones and portable guided weapons (US Army Javelin anti-tank missiles have been recovered from ISIL in Syria/Iraq). Operations to support neighbouring countries to restore order or to evacuate Australians from troublespots could also involve some risk of low-level threats.

Such missions don't necessarily merit the deployment of major naval combatants, which have different primary roles. Many coastguards use OPVs that are armed, helicopter-equipped, or both, to deal with low-level security threats as part of a constabulary role. These more demanding constabulary tasks, particularly if they entail some degree of opposition, increase the opportunity cost of constraining the capability of SEA 1180.

The systems that would make an OPV much better equipped for more demanding constabulary missions would build on what I've mentioned above in relation to more traditionally permissive constabulary tasks. The single most useful system would be an embarked helicopter. For more challenging tasks involving a higher level of risk, there would be also be value in command and control systems that can integrate with other ADF platforms and systems. The capacity to store and operate special mission equipment (for example, in containers that can be swapped out depending on the mission) would also be valuable. In addition, to deal with hostile armed opposition (such as armed coastguard vessels, state-sponsored harassment by fishing vessels, pirates and organised terrorist groups armed with portable weapons, UAVs and simple communications) it would be valuable to have helicopter/UAV weapons (such as rockets and machine-guns), a medium gun (such as 57 mm or 76 mm calibre) for the OPV, and fast-firing cannon (such as 20–40 mm) and sensors to deal with opposing UAVs and fast small boats. It's worth noting that the

Navy has operated 76 mm medium guns on the FFGs, so it should have training and infrastructure for that weapon system already in place.

Besides the benefit of these capability enhancements for more demanding constabulary missions, they open up potential roles for OPVs in more warlike conditions. The same capability enhancements to better optimise the OPVs for more demanding maritime constabulary missions would also be beneficial for many useful warlike tasks. Enhanced OPVs could contribute to missions such as:

- support to special forces or landing parties ashore in littoral environments
- close escort to high-value auxiliary ships (Armidale-class boats played this role in Exercise Talisman Sabre 17, but their warlike capability is extremely limited)
- guard ship for an offshore platform or offshore territory
- extra platform for maritime helicopters in company with a major surface combatant or task group[6]
- mother ship for unmanned offboard mine countermeasure systems
- mother ship for unmanned maritime surveillance or antisubmarine detection systems
- mother ship for hydrographic survey systems conducting rapid environmental surveys in areas where the threat is deemed too high for specialised survey vessels.

These missions are well suited to the capabilities that an enhanced OPV could bring to the force structure and would free up the small force of major surface combatants to tackle demanding and dangerous warlike tasks that require their more advanced (and scarce) capabilities.

It should be clearly recognised that an OPV, no matter how well equipped, is no substitute for a destroyer or frigate in high-intensity, high-threat tasks. Nevertheless, an OPV with embarked helicopter, medium gun, and self-defence systems and command and control systems equivalent to what is planned for the ADF's auxiliary refuelling and large amphibious ships could be a valuable supplement to the ADF force structure in many warlike tasks where the specific threat to surface ships is not too high, or where other ADF platforms and systems can provide warning and protection against high-level threats.

There are many exemplars of enhanced OPVs to be found in well-regarded organisations, such as the US Coast Guard (Offshore Patrol Cutter) and the Royal Netherlands Navy (Holland class large patrol ships). The Luerssen 80-metre OPV design constructed for Brunei is another example of an enhanced OPV, which in that case is even equipped with Exocet anti-ship missiles. The Damen 6711 design for the United Arab Emirates *Arialah* is equipped with Rolling Airframe Missiles and decoys to defeat anti-ship missiles. These are exemplars only and aren't necessarily appropriate in every detail for Australia's maritime security needs over the next three decades; however, if nothing else, they show that the capability requirement for SEA 1180 is much more modest than the designs can accommodate.

One of the strategic questions for the NSC is whether the ADF will have enough surface ships for the geographical scale of its operations.[7] In the more complex and challenging strategic environment of the future, there's a clear risk of potential over-demand on Australia's surface fleet of 12 major combatants, which, though being modernised over the next two decades, is very small in comparison to the current (let alone potential) scale of demands. A force of 12 enhanced OPVs would make a significant contribution to the strategic goal of a more potent maritime force out to 2030.

This 'high–low mix' approach to a maritime force structure might seem a risky way of doing things on the cheap, but it's used by some respectable maritime forces, including those of such advanced economies as the US (notwithstanding the abundant capabilities of the US Navy, the US Coast Guard has large vessels that can be equipped with MH-60R helicopters, anti-ship missiles and anti-missile systems). The Royal Netherlands Navy's Holland class of large patrol frigates illustrates what can be done,

although the Hollands lie in the upper tier (109 m, +3000 tonnes) of OPV. Even the Royal Navy is looking at a general purpose frigate (Type 31e) that's deliberately less capable but a lot cheaper than its destroyers and frigates; the UK is making this trade-off in the capability of each individual ship precisely to make up the numbers in the fleet. And numbers matter for Australia, too, when our primary operating environment covers roughly 10% of the planet.

Project issues

Defence projects (at least the successful ones) deliver the required capability on time and on budget. The points that I've outlined above go to the strategic risks involved in an unambitious capability requirement that doesn't fully align with projected future strategic circumstances.

However, the upside—at least in terms of project execution—of a rigorously constrained capability requirement is that technology risk is reduced. This is helpful, given the tight schedule for the SEA 1180 project.

The build teams

Each team has a track record of similar designs that have been built and are in the water. Overall, while accepting that the designs will exhibit adaptations to Australian requirements, the designs can be regarded as proven.

Each team also has a track record of constructing vessels in different foreign countries. Each has a member with recent Australian shipbuilding experience (ASC and Austal). Each has experience in building large ships in steel in Australia (while Austal's reputation for designing and building aluminium vessels is well known, it also has experience in building steel offshore structures, 60-metre yachts and the 41-metre Guardian class patrol boat for Pacific island countries).

Splitting the build

The tight schedule for SEA 1180 is driven less by the capability need than by the needs of the naval shipbuilding industry in Australia. The Australian Government is using the OPV project to provide enough work to maintain a core naval shipbuilding workforce in the interval between the completion of the third air warfare destroyer and the commencement of the first frigate under Project SEA 5000.

This means that the OPV construction will be split between Adelaide (Osborne South) and Perth (Henderson). The government has announced that the first two OPVs will be built in Adelaide, after which the workforce will transition to the build of the SEA 5000 frigates, and the remaining 10 OPVs will be built at Henderson.

To be absolutely clear: there's no benefit for the OPV project in splitting the build. On the contrary, it will inevitably introduce inefficiencies into the construction process and increase the cost.

To be fair, the government makes no claim that the split build is advantageous to the project. Rather, the split build is designed to support the government's Naval Shipbuilding Plan by providing work to Adelaide to keep a small workforce engaged between the end of the air warfare destroyer build and the commencement of work on the SEA 5000 frigates.[8]

Given the risk that is being assigned to SEA 1180 by the split build, it behoves government to be sure that the Naval Shipbuilding Plan merits it. For a split build to be a viable strategy, the benefits that flow from continuity would have to outweigh the costs to SEA 1180. ASPI and other commentators have discussed the merits of that argument—and of the economics of local shipbuilding more generally—on several occasions and have raised a number of concerns.[9]

First, while we don't know the cost structures of the bids, it's very likely that building naval ships in Australia carries a cost premium compared to the most efficient overseas construction. This premium reduces the capability that can be delivered for a given amount of money. A rough indication of how much it would cost to build an OPV in an efficient way is provided by the $157 million

cost to acquire the 93-metre multirole aviation training vessel, *Sycamore*, which was built in Vietnam to another Damen design. At that price, 12 similar vessels would cost less than $2 billion (note that the project provision is $3–4 billion). This cost differential would go a long way towards enhancing the capabilities of the OPVs, compared to the modestly capable OPV that's being sought. This is a rough comparison but it provides an indication of the tangible opportunity cost of local naval construction if measured in forgone defence capability.

Local construction of warships is sometimes defended on the grounds that it provides a sovereign capability that is strategically necessary or advantageous, either to obtain or modify platforms and systems that are optimised to Australian requirements or to retain the ability to sustain platforms and systems in the face of threats to timely international supply. But that chain of logic is undermined by the fact that many major naval systems, including key sensor, combat management, communication, electronic warfare and weapons systems, are imported even when the ships are built in Australian shipyards. Moreover, as a close ally of the US, Australia has identified a strategic need to be interoperable with US forces, which militates against unique sovereign capability solutions. Australia's alliance is also claimed to have the benefit of enabling preferred access to US defence technologies, which undermines the strategic necessity of having a sovereign capability in naval shipbuilding.

The Defence Industry Plan 2016 promised a Sovereign Defence Industry Assessment Framework to be released in 2017. The framework will replace the priority and strategic industry capabilities (PICs and SICs). It will be interesting to see how the framework addresses these issues.

Another justification for local construction is that it provides broader economic benefit in the form of high-skill, high-wage jobs and high technology. However, the case for economic benefits is questionable when we take into account the opportunity cost of the resources that have been diverted from other areas of the economy that provide higher rates of return on investment.[10] The Naval Shipbuilding Plan has been approved by the government, and it would be useful to see what the plan's analysis of opportunity cost shows, or whether such analysis has been undertaken.

It's sometimes claimed that an Australian naval shipbuilding industry, once established, should aim to be commercially sustainable over the long term through exports.[11] However, exports of naval vessels are highly uncertain, given the tightness of the international naval export market. Australia (like other advanced nations) has relatively high wages, which will always place us at a disadvantage to lower-wage-paying shipbuilders elsewhere. And other advanced countries tend, like Australia, to want to build their own vessels. Even countries that are traditionally strong in naval shipbuilding, such as the UK, have struggled to win enough export orders over the long term to maintain their industries.[12]

Australia's experience in the 1990s with the Joint Offshore Patrol Combatant project, which sought to cooperate with Malaysia on a light patrol frigate, illustrates some of the risks involved in dealing with sovereign governments, despite the enormous and sustained political and bureaucratic effort that was devoted to achieving a successful outcome.

A potentially more promising variation of the export theme would see the shipbuilding industry export both civilian and naval vessels. Buyers of civilian vessels are less likely than foreign governments to be influenced by strategic and political factors that are beyond the control of the shipbuilder, and civilian buyers are more predictable, being influenced by the bottom line. Even for civilian vessels, the Australian shipbuilding industry's export record is mixed; apart from Austal and Incat, there aren't many examples of export success that's been sustained over time.

It will be interesting to see how these issues will be addressed and resolved in the Defence Export Strategy that the Minister for Defence Industry promised at a recent ASPI event.[13]

Conclusions

Project SEA 1180 seeks to deliver an OPV platform that will be more capable of doing the kind of maritime constabulary tasks that have been performed by the Armidale-class patrol boats. The NSC would be entitled to judge that Defence is well on track to deliver that. However, the increased capability provided by a more seaworthy vessel, with longer range and endurance, and equipped with maritime UAVs and bigger sea boats, is much less than could be obtained from the designs in contention, albeit at higher cost.

The NSC might like to ask Defence whether the deliberate decision to underequip the OPV seems risky in view of the demands of maritime constabulary, particularly more demanding constabulary missions. Strategic forecasts point to a more uncertain strategic environment with potentially more demanding tasks for maritime forces, which is the rationale for the major expansion of Australia's maritime capabilities. Because strategic policy warns of a more uncertain and challenging strategic environment, there's a case for a better equipped enhanced OPV force that would be better optimised for more demanding constabulary tasks and would also be a useful supplement to our destroyers and frigates on warlike tasks.

While there are grounds for confidence that the SEA 1180 project will deliver on the consciously constrained ambition, the adjustments to split the build that are required to support the Naval Shipbuilding Plan come with increased cost and risk to the project, and with the opportunity cost of higher capability.

Notes

1 Department of Defence, *Integrated Investment Program*, online.

2 The UAV system is being separately acquired under Project SEA 129 Phase 5 Maritime Tactical Unmanned Air System. The OPVs will receive the UAVs in the 2021–22 timeframe.

3 Noting that Australia's offshore territories extend our exclusive economic zone to a great distance from the Australian continent; for example, the Heard and McDonald Islands are over 4,000 kilometres southwest of Perth.

4 Department of Defence, *Integrated Investment Program*, Table 6, p. 89.

5 Andrew Davies, James Mugg, 'At the pointy end, better is bigger', *The Strategist*, 20 March 2017, online.

6 Note the advantage of employing several helicopters in antisubmarine operations; see James Mugg, 'Simulating anti-submarine warfare', *The Strategist*, 4 July 2017, online.

7 It's to be hoped that Defence will be able to help answer this question with a clear operational concept for employing maritime power to protect Australia and our interests.

8 Mark Thomson, 'Building the future Navy: the OPVs', *The Strategist*, 28 April 2016, online.

9 See Andrew Davies and Mark Thomson, 'Naval shipbuilding in Australia: the case for regulatory overhaul' *The Strategist*, 14 December 2016, online; 'The national shipbuilding plan: a first look', *The Strategist*, 16 May 2017, online and Peter Luerssen, 'Girt by sea: Australia stands at the cusp of a golden era in naval shipbuilding', *The Strategist*, 24 July 2017, online.

10 Rob Bourke, 'Thrills, spills and industry spillovers', *The Strategist*, 18 August 2017, online.

11 Christopher Pyne, Minister for Defence Industry, 'Historical milestone for Australia's shipbuilding program', 26 April 2017, online.

12 See 'New UK shipbuilding strategy: do the numbers add up?', *Military Balance Blog: posts from the IISS Defence and Military Analysis Programme*, 7 September 2017, online.

13 Christopher Pyne, Minister for Defence Industry, 'Developing a defence export strategy', 24 July 2017, online.

Acronyms and abbreviations

ADF	Australian Defence Force
nm	nautical miles
NSC	National Security Committee of Cabinet
OPV	offshore patrol vessel
UAV	unmanned aerial vehicle

About the author

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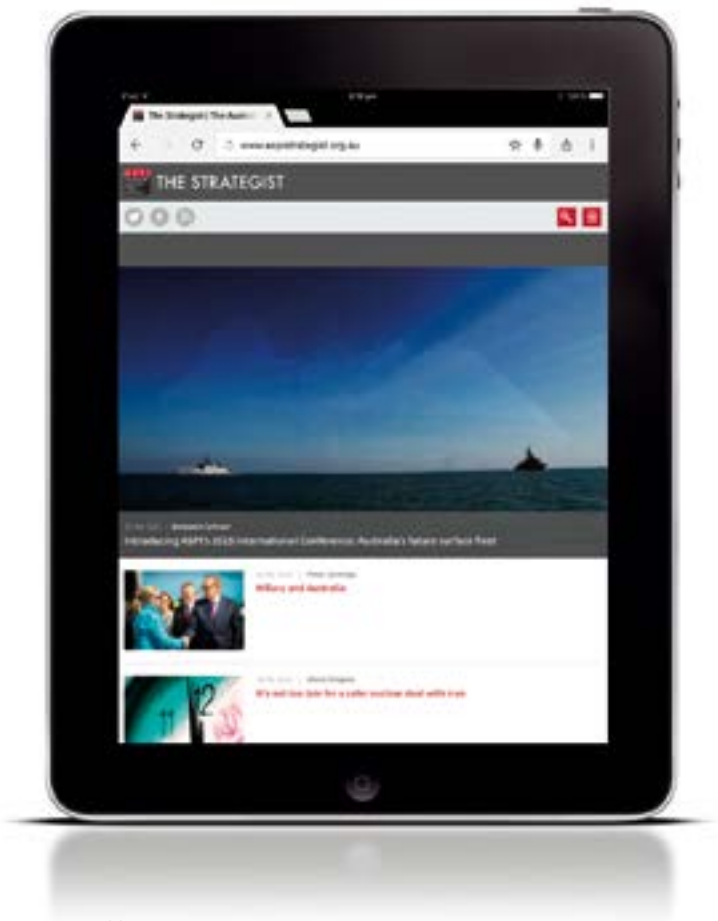

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