

## RISKS AND IMPLICATIONS OF UPGRADING THE COLLINS CLASS SUBMARINES

Felicity Millar

### SYNOPSIS

**In April 2016, Australia announced that it had awarded France’s Naval Group the AU\$50bn contract for the construction of a new fleet of 12 French Shortfin Barracuda Class submarines, to replace the ageing Collins Class fleet. This article will explore the issues faced by the Collins Class submarines throughout the 1990s to 2000s, demonstrating the need to minimise the risk of similar problems occurring with the Shortfin Barracudas. Lessons can be learnt from implementation of the current fleet to offset future risks with the new submarines to ensure the delivery of a potent and agile naval capability to protect Australia’s national interests.**

In April 2016, Australia announced that it had awarded France’s Naval Group (formerly known as DCNS) the contract for the construction of a new fleet of submarines to replace the ageing Collins Class submarines. Australia will spend AU\$50bn on 12 new French Shortfin Barracuda Class boats (as opposed to the Barracuda boats presently commissioned by France) as the preferred tenderer over the two alternative options – the Japanese Sōryū boat and the German Type 212 class. There were notable issues faced by the Collins Class Submarine fleet between the 1990s and 2000s. The impact of these issues, and the resultant additional expenditure, demonstrates the need to minimise the risk of similar problems potentially occurring with the Shortfin Barracuda boats. Lessons can be learnt from implementation of the current fleet to limit risks with the new boats and improve project outcomes. Policy suggestions – such as access to information relating to sea trials of the French version of the

boats, single site construction with full involvement of Australian expertise, better access to changing combat technology and increased oversight – look to how past mistakes can be harnessed to improve the design, construction, and maintenance of the future fleet.

Australia's history of naval and military construction dates from the building of the HMAS Bataan destroyer in WWII; yet, to date, the Collins Class has been the first submarine to be built on Australian shores. The Shortfin Barracuda Class will be initially constructed in France, but the assembly and the warfare combat system fit-out will occur in Adelaide, which helps create jobs in Australia. This decision sought to address the lack of faith in Australia's shipbuilding industry, particularly Australia's inability to construct and maintain the new fleet that has lingered since the 1999 McIntosh-Prescott Report into the Collins Class problems. This mentality was evident when former Minister for Defence David Johnston [declared](#) in 2014 that he would not trust ASC Shipbuilding (which is currently maintaining and sustaining the Collins Class Submarines) to "build a canoe."

## DECISION TO UPGRADE THE COLLINS CLASS

Australia's current Collins Class Submarine fleet is ageing, and a new class is needed to update and expand naval capacity through the introduction of contemporary combat systems and engineering to address strategic requirements and face emerging threats. Although highly effective, the Collins Class is in its last two decades of commissioned life within the Royal Australian Navy (RAN). Nonetheless, the Turnbull Government [announced](#) in October 2017 that the Collins Class Submarines would undergo a \$540m enhancement, further rectifying issues and removing it from the Department of Defence's Projects of Concern list.

The Turnbull Government [selected](#) the design by France's Naval Group for reasons that include the neutrality of Australia's position in the Indo-Pacific and a desire to solidify regional influence and power. Choosing a submarine design is political and replacing a fleet is highly expensive and so this large investment in Australia's security will significantly influence the policy-making decisions within the political landscape in the region. The building of submarines has been a subject of controversy in Australia, partly because of the Government's [decision](#) to purchase the much more expensive French option, as opposed to the \$20 billion off the shelf German model. Of further concern is the transparency surrounding the Government's decision-making processes, Australia's submarine building capacity and the merits of a nuclear submarine fleet (as raised by significant political figures, such as former Prime Minister Tony Abbott) – which Australia does not have the capability to manage.

The key disadvantage in purchasing the Shortfin Barracuda Class is that the first of the Barracudas for the French Navy is only expected to be launched in 2017-18 with sea trials and commissioning for the

first French vessel delayed by 12 months. This means that there is no current knowledge of how the submarine will function or any problems inherent within the original design. The functionality of the design platform on which the Shortfin Barracuda design is based is not yet available and delays and issues with the French design will automatically delay progression of the design for the Australian fleet. This lack of available foresight or advance in knowledge of potential problems means that this contract is a higher-risk option because it is difficult to predict or manage potential problems when commissioning and building this untested design.

The proposed construction process for the boats – the initial stages built in France and then shipped to Australia for assembly and completion – parallels the processes undertaken by the [Collins Class](#), one of the first submarines to be fully computer-designed. An overview of the known history of the Collins Class suggests that there were several major teething problems in the pursuit of a new submarine system. These problems include construction issues experienced during the welding of the forward hull sections of HMAS Collins by Kockums in Sweden. The modular approach meant individual components were constructed in Sweden and then transported to Adelaide for assembly. The use of unfamiliar materials and inaccurate measurements caused numerous problems – particularly the ineffective welding of the submarine hull. The management of these issues required Australian rectification of the welding, both at the time of assembly and again during a major service of the boats. The RAN expressed concerns with the level of noise that the fleet produced as issues with the propulsion system and the noise signature of the Collins design had resulted in a boat that was too noisy and recognisable – a shortcoming that undermined the stealth required for submarine warfare. This also required design modification of the hull and additional application of carbon fibre/fibreglass sheets to alter the flow dynamics of the hull and reduce the excessive noise signature.

Building a submarine, let alone a fleet, is a time-consuming process, resulting in technology warfare becoming rapidly out-dated. This issue was evident at the completion of the Collins Class production, given that the Rockwell combat warfare system used for sonar detection and maritime strategy was already out of date. Management of this out-dated combat system required configuration and retrofitting of a newly developed system under the Fast Track program – an AU\$1bn program to replace the systems, whilst simultaneously improving stakeholder cooperation and reducing negative media and public perceptions. This further delayed Australia's access to an effective fleet. As new combat warfare systems become available in the next decade, policy on the construction of these submarines must be flexible enough to accommodate these changes, unlike the experience with the Collins Class. For example, one major issue identified in the 1980s by ASC Shipbuilding and the RAN was the change in the operating environment of the boat, and how the differences in the temperature of the water greatly affected the materials used and the noise signature. The design and

material for the Barracuda therefore needs to be adaptable to the altered geo-physical environment found in the waters around Australia.

Australia will need to redesign the vessel for Australian purposes as a diesel-electric submarine because the original design specification for the Barracuda Class is as a nuclear-powered vessel. The RAN has not previously attempted such a fundamental redesign. The capacity, deployment and utility of nuclear and diesel-electric submarines are intrinsically different; the major changes that will be required could create a myriad of issues. The key risk in changing the propulsion system through such extensive redesign is that there will be a loss of coherence in the construction and commission phases of the resultant boat and the potential for delays like those seen with the current fleet. Lack of direction and integration with the contractors of the Collins Class contributed to a seven-year delay between the 1993 launch of HMAS Collins to eventual operational deployment in 2000.

## ADVANTAGES OF THE SHORTFIN BARRACUDA

There are many advantages to choosing the French design, particularly its ability to be specifically modified for Australia as a diesel-electric boat. A diesel-electric submarine is the obvious choice for the RAN because this technology ensures that they are very quiet, stealthy and hard to track. Australia's fleet commanders are also highly aware of the capabilities of such a boat and experienced in how to effectively use it as part of naval strategy and warfare. The proposed use of jet propulsions, rather than propellers, will ensure that the Shortfin Barracuda Class is a more viable strategic weapon while maximising fuel efficiency. This benefit [addresses the need](#) for Australia to expand the geographical areas in which our submarines can obtain intelligence, especially in turbulent areas in our geo-political region such as the South China Sea and the Middle Eastern reaches of the Indian Ocean.

A complete redesign of the Barracuda Class enables Australia to have its own custom built and designed fleet rather than an 'off the shelf' format designed for the needs of another country. The potential for the boats to be able to revert to [nuclear propulsion](#), should Australia wish to acquire and develop the technology, is a further benefit of Shortfin Barracuda.

## POLICY RECOMMENDATIONS FOR AUSTRALIA

The introduction of new submarines over the next three decades will be an exciting time for both the RAN and for defence forces in general within the Indo-Pacific Region. As Australia moves towards a new submarine fleet, however, the key questions are what can we learn from our past and how can we create new strategies and policy to minimise problems. A major update in our naval capabilities would suggest that there will be technical issues and that addressing these issues will be expensive. To lessen this blow, the Australian Government must implement strict contracting structures with significant penalties for effective and efficient project management of these submarines.

The miscommunication and lack of transparency between ASC Shipbuilding, the Australian Government, and the RAN during the construction of the Collins Class Submarines led to significant delays and mistakes in the budgetary requirements for the building of the boats. The Collins Class and the Shortfin Barracuda Class have similar construction methods; therefore, the Australian Government, ASC Shipbuilding, and Naval Group need to implement effective project management principles consisting of transparency and whole-of-government leadership to ensure maximum efficiency whilst maintaining long-term relationships between stakeholders. Australia needs to identify potential issues of the Shortfin Barracuda fleet from planning phases, with a sufficient budget set aside to combat emergent problems. The more expensive design option has been chosen so Australia must effectively manage and plan the next 20-50 years of construction and maintenance.

The lessons learnt from the initial construction of the Collins Class in Sweden and their shipment to Australia suggests the need for the boats to be constructed within one country, or implementation of better oversight and communication between the sites. To minimise risk, the project requires sufficient Australian design and construction expertise involvement and collaboration from the outset – ideally including in the project team personnel that witnessed and managed the problems seen in the Collins Class development and implementation.

As technology is rapidly changing, the requirements for effective warfare will change with it. A solution to manage the inevitable change in the combat warfare system in the first few decades of its commission is to design for the removal and replacement of such equipment. Providing the project team with authority and flexibility to quickly adapt to changing technology, warfare requirements, operational environments and strategic policy changes will be essential to managing the currency of the fleet. Providing the Australian ship building industry with a level of oversight and policies will assist in maximising efficiency whilst building capacity through experience in building the fleet whilst providing Australian jobs. Effective project management and risk identification are also fundamental to the success of the Shortfin Barracuda Class in Australia.

Australia must also conduct negotiations with Naval Group and the French Government to ensure Australian access to design modifications identified during sea trials and commissioning of the French Barracuda vessels. To ensure effective and strategic warfare capabilities and value for money, the Australian Government must look back to past mistakes to mitigate risks and convince the Australian public that Australia's shipbuilding industry can deliver a potent and agile submarine capability to protect Australia's interests in the region.