Australia's future submarines

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Introduction

Australia’s Future Submarine project (SEA 1000) was first announced by the Rudd Government in May 2009 at the unveiling of the Defence White Paper. SEA 1000 seeks to acquire 12 new submarines to replace the Royal Australian Navy’s six Collins Class submarines making it ‘Australia’s largest ever single defence project’. ¹ Given the scale and the long lead times required for this project, the Government has attracted criticism for delaying key decision points. This has led to speculation that there will be a significant capability gap in Australia’s submarine force.²

The 2009 Defence White Paper (2009 DWP) originally forecast that the Future Submarine fleet would be developed by the mid-2030s.³ Some commentators have since flagged, however, that the mid-2030 timeframe has now been pushed out due to Government delays in progressing the SEA 1000 program.⁴

This Background Note aims to consolidate publicly available information on SEA 1000 and highlight the project’s progress and current status to date, in light of the Government’s recent announcements about the next stages of SEA 1000.

Background

The 2009 DWP announced that the existing fleet of six Collins Class submarines would be replaced by a more superior class of 12 submarines, pledging they would:

• be assembled in South Australia

• be capable of conducting a variety of complex operations; long-distance endurance and mobility; and conventionally powered (not nuclear), and

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• employ a land-attack cruise missile capability.\(^5\)

The 2009 DWP also indicated that the construction program would allow the Government to continue building additional submarines beyond the initial fleet of 12 boats.\(^6\)

Shortly after the release of the 2009 DWP, the Government published the Defence Capability Plan (2009 DCP) emphasising that SEA 1000 would provide Australia ‘with a new and more potent defence capability with greater range, longer patrol endurance and increased capability’ in comparison with the Collins Class submarine. The main capabilities will include ‘anti-submarine warfare; anti-surface warfare; strike; intelligence, surveillance and reconnaissance; electronic warfare; mine warfare; and support to both Special Forces and advance force operations’.\(^7\)

Since the 2009 DCP’s release, the proposed staged acquisition program for SEA 1000 has changed. This is because the 2011 DCP Update indicated there were delays with SEA 1000. The Initial Definition Phase had already commenced when the 2009 DCP was published. It originally anticipated that the next phase, concept design, would receive final Government approval (second pass approval) in 2009–10 to 2010–11; the subsequent preliminary design phase in 2011–12 to 2012–13; and the detailed design phase in 2013–14 to 2015–16, with construction commencing in 2016.\(^8\)

The 2011 DCP Update restructured the program by removing all references to the planned schedule for all phases, except the Initial Definition Phase (Phase 0), which was amended to an ‘estimated completion’ date of 2011–12.\(^9\) Phase 1 (initially the design phases) was incorporated with Phase 2 and renamed the ‘acquisition’ phase and the original anticipated construction date of 2016 was removed and not replaced with a revised expected construction date.\(^10\)

The Minister for Defence, Stephen Smith, commented in July 2011—in the context of announcing the Coles Review into the sustainment of the Collins class submarines\(^11\)—that plans for the Future

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6. Ibid., p. 71.
8. Ibid., pp. 171–172.
Submarine acquisition program had been delayed. Mr Smith explained that until Australia’s existing submarine sustainment capacity can be improved, it is difficult to commence the SEA 1000 acquisition program beyond the initial planning stage. The Coles review is expected to consider, in part, the future submarine build program during its deliberations of Collins Class sustainment program and facilities.

The diagrams below compare the year-of-decision (second pass approval) for each phase of SEA 1000 as described in the 2009 DCP and 2011 DCP Update. The indicative timeline announced by the Government on 3 May 2012 is also included for further comparison.

Regardless of the delay, plans to assemble the Future Submarines in South Australia were established less than a month earlier when the Federal and South Australian Governments agreed to

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15. J Gillard (Prime Minister), S Smith (Minister for Defence) and J Clare (Minister for Defence Materiel), Next stage of future submarine project announced, media release, 3 May 2012, viewed 15 May 2012, http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;query=Id%3A%22media%2Fpressrel%2F1607911%22
secure a section of land in a burgeoning defence district near Adelaide specifically for work on the Future Submarine project.\textsuperscript{16}

The Future Submarine program has also been the subject of high level talks between Australia and the United States. As such, both countries are expecting to work closely during the acquisition stage of SEA 1000 to ensure that Australia’s Future Submarines will be interoperable with US systems and technical cooperation maintained throughout the process.\textsuperscript{17} This pledge was confirmed during 2011 AUSMIN talks.\textsuperscript{18}

**Current status**

Just prior to the 2012–13 Budget, the Government noted in a response to a Question on Notice that funding allocated to SEA 1000 had reached almost $19.4 million.\textsuperscript{19} On 3 May, the Government announced an additional allocation of $214 million for the design and studies phase of SEA 1000. Other details released on the day included the Government’s consideration of four options:

1. An existing military-of-the-shelf (MOTS) design, ‘modified only to meet Australia’s regulatory requirements’
2. An existing MOTS design ‘modified to incorporate Australia’s specific requirements’
3. A design developed to enhance ‘the capabilities of existing’ MOTS designs, ‘including the Collins Class’
4. ‘An entirely new developmental submarine’\textsuperscript{20}

Nuclear powered submarine options are not being considered by the Gillard Government. First-pass approval is expected around late 2013–early 2014. Construction is not expected to commence until after the Government makes a final decision (second-pass approval) in 2017.\textsuperscript{21}

The Government’s 3 May announcement highlighted the following major initiatives:

- the $214 million in funding for the design and studies phase of the project involves:

\textsuperscript{16} J Clare (Minister for Defence Materiel) and M Rann (SA Premier), \textit{Land reserved for Future Submarines}, media release, 30 June 2011, viewed 15 May 2012,
\texttt{http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;query=Id%3A%22media%2FPressRel%2F888598%22}
\textsuperscript{17} S Smith (Minister for Defence), \textit{Opening address to the fifth biennial conference of the Submarine Institute of Australia}, Fremantle, transcript, 10 November 2010, viewed 15 May 2012,
\texttt{http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;query=Id%3A%22media%2FPressRel%2F352441%22}
\textsuperscript{18} S Smith (Minister for Defence), \textit{Australia–United States Ministerial Consultations (AUSMIN)}, media release, 16 September 2011, viewed 15 May 2012,
\texttt{http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;query=Id%3A%22media%2FPressRel%2F1416907%22}
\textsuperscript{19} C Evans, ‘Answer to Question on notice: Submarines’, [Questioner: D Johnston], Senate, \textit{Hansard}, 8 May 2012, viewed 15 May 2012,
\texttt{http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;query=Id%3A%22chamber%2Fhansards%2F4322b0e3-bbbe-4665-b84d-b19622791374%2F0130%22}
\textsuperscript{20} J Gillard (Prime Minister) et al., \textit{Next stage of Future Submarine project announced}, op. cit.
\textsuperscript{21} Ibid.
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- design studies based on MOTS options from European ship builders DCNS (Scorpene submarine designer, France), Howaldtswerke-Deutsche Werft (Types 212 and 214 submarine designer, Germany) and Navantia (S-80 submarine designer, Spain). Navantia is currently involved in the delivery of two other major Australian capability projects—two Canberra Class Landing Helicopter Docks and three Hobart Class Air Warfare Destroyers.

- design studies by Kockums (Swedish designer of the Collins Class submarine) looking at an updated version of the Collins Class submarine.

- analysis of the submarine designs by a submarine design company to assess the ‘cost and capability trade-off’ options.

- capability modelling, under a Foreign Military Sales arrangement, by United States submarine companies Systems Performance and Analysis and General Dynamics Electric Boat, and

- establishment of an Expert Industry Panel to assess ‘the need for skilled workers for the Future Submarine Project’ and develop a Future Submarine Industry Skills Plan (headed by David Mortimer AO). The Panel’s findings are expected to be presented to the Government by the end of 2012.22

- the appointment of Mr David Gould as General Manager Submarines, within the Defence Materiel Organisation (DMO), and the scrapping of the Associate Secretary Capability position previously announced in the Government’s response to the Defence Accountability Framework review (the Black Review) in August 2011.23

The $214 million allocated to this project did not feature in the 2012–13 Budget and further funding allocations are unlikely to appear in future budgets until the project receives government approval.

The Minister for Defence also noted on 3 May 2012 that the Royal Australian Navy’s existing fleet of Collins Class submarines has a design life of 28 years. Given the last Collins Class submarine was commissioned into service (HMAS Rankin) in 2003, the life-of-type is expected to reach 2031. An assessment is currently being carried out into what ‘the actual lifecycle of the Collins Class will be’, in essence to test whether the lifecycle could be extended.24

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22. Ibid., and S Smith (Minister for Defence) and J Clare (Minister for Defence Materiel), Future Submarine industry skills plan, media release, 3 May 2012, viewed 15 May 2012; http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;query=Id%3A%22media%2Fpressrel%2F1607921%22


24. J Gillard (Prime Minister), S Smith (Minister for Defence) and J Weatherill (Premier of South Australia), Defence White Paper; Future Submarine project; Defence Force Posture Review; Budget; Joint Strike Fighter program, transcript, 3 May 2012, viewed 15 May 2012; http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;query=Id%3A%22media%2Fpressrel%2F1610185%22
Andrew Davies and Mark Thomson from the Australian Strategic Policy Institute (ASPI) recently speculated that should the Collins Class ‘have its life extended by eight years, a capability gap could be avoided, but the feasibility of such an extension remains unclear’. ASPI also noted that should the Government pursue a new design option, which would be the ‘logical consequence of the goals for the new submarines set out in the [2009] White Paper’, based on the Collins Class experience, the first boat would not enter operational service until 2027 and the sixth boat until 2033. As a consequence it is predicted there will be:

... a shortfall in nominal submarine numbers compared to the current fleet of six boats from 2022 (when HMAS Collins reaches the end of its second eight-year operating cycle) through until 2033—a decade long ‘capability gap’, in defence parlance.

Potential capability gap?

Back in October 2009, ASPI predicted that the acquisition strategy for SEA 1000 would take some time to develop due to the level of complexity involved with the project. Given the last of the Collins Class submarines will reach its life-of-type in 2031, ASPI urged that the first boat would need to be conducting sea trials by 2022 and in service by 2025. This would require the Government to make a final decision on the design and capability of the Future Submarines by 2016.

Following the release of last year’s Defence Budget, Defence commentator, Gregor Ferguson, warned that ‘time is running out’ for the Government to approve a Future Submarine design. He urged that given the expected retirement date of 2025 for the first Collins class submarine:

... every year which passes increases the pressure on the project, and reduces the number of options open to Australia. A time may come when Australia has no choice but to adopt a MOTS [Military-off-the-shelf] solution, possibly even a small batch of ‘interim’ submarines to maintain an operational and training capability pending arrival of an all-new design, because no other solution will be available in time.

Ferguson pointed out other key challenges that are likely to impact on the timing of SEA 1000, namely:

• maintaining the necessary professional expertise (engineers, submariners and naval architects) particularly given the skills needed to integrate the US torpedo system (Mk48 Mod7 CBASS) into the new platform

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26. Ibid., p. 9.
27. Ibid., p. 9.
• processes within the Defence Materiel Organisation that are geared towards MOTS purchases and therefore might not be adequate for SEA 1000

• an inherently risk-averse submarine community slowing the process down, and

• the strategic importance of ensuring intellectual property of the submarine design.\(^{30}\)

During the February 2012 Senate Estimates hearings, the Head of Australia’s Future Submarines project, Rear Admiral Rowan Moffitt, acknowledged that ‘there is a risk of a capability gap’ developing. However, this might be avoided depending on the submarine option that is decided by Government. Rear Admiral Moffitt explained that the process involved with a new submarine design could take around 20 years and other designs can vary depending on the type of submarine. He specifically noted that:

... from the point at which you begin to define the capability that you want until the point at which you deliver the first of those new design of submarines post operational test and evaluation is a period of around 20 years. In that 20 years there are four significant blocks of activity. The four blocks will exist in any submarine program. The length of each block will vary, depending on the submarine, and the first of those four blocks define what it is that you want. That is a block of some time—from a couple of years up to four years—and all of the experience that major program gurus and academics tell us of is that if you do not do that properly you are building problems. So that is a period of time. We are into that already.\(^{31}\)

Rear Admiral Moffitt went on to explain that the length of time required for the next phase, the design phase of SEA 1000, will depend on the option taken by Government—the timeframe will be relatively short if a MOTS option is chosen or it could take anywhere from seven to eight years for a new design. The first submarine might take close to eight years to build, but this timeframe is likely to be shortened as lessons are learned with each submarine built. The final phase, operational testing and evaluation, will vary again depending on the type of option chosen. Testing the first submarine is likely to take the longest, possibly around one to two years.\(^{32}\)

As previously mentioned, the Minister stated on 3 May 2012 that the Government is looking at whether the life of the Collins Class submarines can be extended. Therefore, predictions of a capability gap are premature until this work is complete.\(^{33}\)

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32. Ibid.
33. J Gillard (Prime Minister) et al., Defence White Paper; Future Submarine project; Defence Force Posture Review; Budget; Joint Strike Fighter program, op. cit.
Overall cost estimates

As a decision on the final design option is yet to be made, the Government has not released an official overall cost estimate for the Future Submarine program. However, the 2009 DWP states that SEA 1000 is one of two ‘multi-billion dollar decisions requiring very long lead-times for project development, acquisition and entry into service’. The 2009 DCP only provides a band costing for project proposals and therefore states that the expected overall cost of the program would exceed $1.5 billion. The most recent DCP update (2011) increased the acquisition cost estimate to a figure beyond $10 billion.

While the Government remains hesitant to estimate an overall cost for SEA 1000, Sean Costello and Andrew Davies from ASPI estimated in 2009 that overall costs could reach around $36 billion. Brice Pacey, in a Kokoda Foundation publication, suggested the overall cost could be much less at around $18 billion.

In June 2011, Rear Admiral Moffitt stated that SEA 1000 goes beyond the acquisition of 12 submarines and the $36 billion estimated by ASPI:

Andrew Davies in ASPI talks of $9 billion for off-the-shelf submarines. That’s nonsense. That might be the capital acquisition cost of the hull. It doesn’t take into account the total program cost, not by a long margin. Let’s say that it’s the other end of the scale that he uses, which is $36 billion. Let’s round it for convenience’s sake. It’s $40 billion. That’s NBN. That’s eye-watering.

Rear Admiral Moffitt emphasised that in effect, the $36–40 billion figures that commentators have publicly stated do not adequately quantify the scale of SEA 1000 as it is a long-term project that seeks to establish a submarine building industry in Australia.

Future Submarine Industry Skills

Project SEA 1000 commenced a phased acquisition process in August 2009 and in November 2009 the RAND Corporation (US) was commissioned to undertake a domestic submarine design study. The public version of the RAND report, published in 2011, concluded that:

36. S Costello and A Davies, How to buy a submarine: defining and building Australia’s future fleet, op. cit., p. 2.
39. Ibid., pp. 9–10.
40. J Faulkner (Minister for Defence), Future Submarine project study, media release, 6 August 2009, viewed 15 May 2012, http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;query=id%3A%22media%2Fpresse%22FJIBU6%22 and G Combet (Minister for Defence Personnel, Materiel and Science), Future Submarine design capability study,
...Australia will need a domestic workforce of roughly 1 000 skilled draftsmen and engineers in industry and Government to create and oversee the design of a new, conventionally powered submarine for the Royal Australian Navy. Although a workforce of this size and capabilities does not exist in Australia today, under the right circumstances one could be cultivated over the next 15 to 20 years. However, the Commonwealth could shorten the duration and lessen the costs of designing a new submarine if it were to collaborate with foreign design partners rather than rely exclusively on a domestic workforce to design the vessel.41

The Government acknowledged the RAND report findings in December 2011 noting that Australia has gaps in expertise and that ‘a significant amount of help from overseas’ will be needed for the project. To address these issues, Defence contracted a study into establishing a ‘land based propulsion systems test facility’ in South Australia that is expected to assist in developing local expertise. Discussions to progress a Future Submarine Industry Skills Plan also commenced in December 2011, with the Government announcing further details about the plan, as previously mentioned, on 3 May.42

Conclusion

The Government has indicated its continued commitment to the goals set out in the 2009 DWP to acquire 12 new Future Submarines and assemble them in South Australia.43 Given this commitment, one might expect that the forthcoming update of two key documents, the 2012 DCP update and the 2013 DWP, will confirm the revised timetable for the program and any changes to the project’s requirements.44

41. Two versions of the report were produced; the Commercial-in-Confidence version went to Defence and the General Distribution version was made public on the RAND Corporation website. See J Birkler et al., Australia’s submarine design capabilities and capacities, RAND Corporation, 2011, p. xxiii, viewed 15 May 2012, http://www.rand.org/pubs/monographs/MG1033.html
42. S Smith (Minister for Defence) and J Clare (Minister for Defence Materiel), Progress of future submarine project, media release, 13 December 2011, viewed 15 May 2012, http://parlinfo.aph.gov.au/parlInfo/search/display/display.w3p;query=Id%3A%22media%2Fpressrel%2F1508756%22 and Future Submarine industry skills plan, op. cit.
43. J Gillard (Prime Minister) et al., Next stage of Future Submarine project announced, op. cit.