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# **Deterrence and alliance power: Why the AUKUS submarines matter and how they can be delivered**

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**ANALYSIS**

**ROSS BABBAGE**

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Cover image: Virginia Class attack submarine New Jersey (SSN 796) undergoes initial sea trials to test the boat's systems and components, 29 February 2024 (Ashley Cowan/Courtesy of Huntington Ingalls Industries)

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## Key findings

- Significant progress has already been made in the program to deliver advanced nuclear-powered submarines to Australia. The AUKUS partnership with the United States and the United Kingdom is well placed to deliver on its objectives in a reasonable timeframe.
- A largely unrecognised near-term benefit of AUKUS is that Australia will host up to five allied nuclear-powered submarines (SSNs) within three years. These jointly crewed submarines will make a significant contribution to joint deterrence and theatre defence.
- By the mid-2030s, the AUKUS partners will have more than doubled the number of forward-deployed allied SSNs that can be operational in the critical first ten days of any Western Pacific crisis or conflict.
- Personnel expansion for the Royal Australian Navy will be one of the greatest challenges for the AUKUS program. Nevertheless, provided that upskilled Australian engineers and technical specialists are supplemented by British and American experts, this task will likely prove manageable.

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# Executive summary

The AUKUS program to deliver eight nuclear-powered conventionally armed submarines to Australia is a large, technologically challenging, and industrially demanding venture.

Many doubts have been raised about its practicality. This report addresses each of those critiques squarely. It concludes that some concerns are warranted but others have been ill-informed or driven by outdated assumptions.

The United States, the United Kingdom, and Australia have all committed substantial resources to ensure that the submarine program succeeds. Progress in most areas is impressive. Project planning is in an advanced state, programs of industrial expansion and modernisation are well underway, personnel recruitment and training are advancing, and the AUKUS submarine design should be finalised within 18 months.

AUKUS should deliver a powerful new level of deterrence to Australia. It will force any aggressive major power considering an assault across a major water gap in the Western Pacific to re-think their plans. And many of the strategic benefits will be delivered in 2027 when up to five jointly crewed allied nuclear-powered submarines commence routine operations from Australia.

Although there will be bumps along the way, Australia's new submarines are likely to be delivered broadly as planned.

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# Introduction

When AUKUS was announced in September 2021, the political and strategic enthusiasm was tempered from the outset by the enormity of the challenge and the realisation that the modernisation and expansion of the allies' submarine industries would need to be markedly accelerated.

In the almost three years since, substantial progress has been made in reorganising, modernising, expanding, and securing the required funding for the submarine industries of the three countries, as well as completing the new AUKUS submarine design, and launching recruitment and training programs. The level of allied cooperation has been exceptional and is continuing to expand.

Serious doubts about AUKUS have been expressed in Australia, the United States, and Britain. Some have been ill-informed and several have been driven by outdated assumptions. But other concerns are real, and mostly being addressed by remedial action.

## AUKUS questions

There is lively debate about the joint Australian, American, and British plan known as AUKUS to provide Australia with eight nuclear-powered, conventionally armed submarines over the coming three decades.

Many questions have been raised. Is it possible for the United States to sell three and possibly five Virginia Class submarines to Australia without seriously weakening the US Navy? Should Australia be trusted with the highly classified secrets embedded in allied nuclear-powered submarines? Can Australia afford to purchase and operate a force of nuclear-powered submarines? Is Australia capable of manufacturing AUKUS submarines in Adelaide? Will Australia be able to recruit and train the large number of skilled personnel the Royal Australian Navy will need? And why are cheaper and less complex diesel-electric submarines not adequate for Australia's needs?

This paper addresses all of these questions and more. But there is a basic issue that needs to be addressed first. Is the AUKUS submarine program really that important for Australia? This paper argues that it is. A powerful presence in the underwater environment is core to Australia's future defence and security.

As a remote continent surrounded by seas, most types of serious attacks on Australia and our neighbours must cross large expanses of water. Advanced

nuclear-powered submarines (SSNs) can patrol under the seas for months. They are hard to detect and because of their powerful missile, torpedo, mine, special force, and other loads, they can hold at risk a wide range of seaborne and land targets with little danger to themselves. They are exceptionally difficult and very expensive to counter. And because Australia's close allies possess underwater technological and operational superiority that is likely to be enduring, the AUKUS program promises to provide much more than just replacement submarines. It should give Australia a new and highly potent strategic deterrent.

Advanced underwater systems force any aggressor, even a major power, to take pause and rethink their options. If an aggressor ignores those underwater capabilities and attacks Australia or another Western Pacific ally or partner, they are likely to pay a heavy price. Should they attempt to launch a major assault across the sea or if they try to fight a long war when their economy depends on shiploads of imported goods, they are unlikely to prevail. Alternative courses of action will likely be preferred.

The high strategic leverage and strong deterrence power AUKUS can deliver make it attractive to Australia, the United States, and the United Kingdom. Dominance of the maritime domain promises a level of conventional deterrence that is difficult to obtain by other means. It should contribute substantially to preserving peace in the Indo-Pacific for at least a generation.



Australian Deputy Prime Minister Richard Marles (C) visits HMAS Stirling, Western Australia, on 16 March 2023 following the announcement of the AUKUS “Optimal Pathway” for Australian submarine capability development (Ernesto Sanchez/Royal Australian Navy Images)



However, AUKUS is about much more than delivering a few modern submarines to Australia. The United States and the United Kingdom also plan to operate up to five of their own nuclear-powered submarines from HMAS Stirling near Perth from 2027. This will substantially increase the military presence of Australia's closest security partners in its maritime periphery. When combined with the large US Marine rotational force in Northern Australia and the growing scale and frequency of US Air Force operations in the country, the signal to the international community is clear. The United States, the United Kingdom, and other security partners are determined to provide greater deterrence and security to the Western Pacific and Indian Oceans, and Australia's own security is being strongly reinforced in the process. Because of AUKUS, the prospect of Australia needing to stand alone in the face of coercion or military attacks — a recurring nightmare since the Second World War — is now almost inconceivable.

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# The AUKUS agreement

The AUKUS agreement has two parts.<sup>1</sup> The focus of this report is Pillar One — the partnership between Australia, the United Kingdom, and the United States to support Australia’s acquisition of eight conventionally armed, nuclear-powered submarines (SSNs).

Pillar One has four major phases.

1. Additional Australian military and civilian personnel are already being posted into the US Navy and British Royal Navy to undertake accelerated training. The US Navy has also started to boost SSN visits to Australia. The Royal Navy plans to increase its submarine visits from 2026.
2. Beginning in 2027, the US Navy and Royal Navy will commence longer-term rotational deployments of submarines to Australian bases, further accelerating the training of Australian personnel. Up to four US Navy Virginia Class boats and one Royal Navy Astute Class boat will operate for extended periods from Western Australia. These forward-staged submarines will be known as Submarine Rotational Force — West.
3. Starting in the early 2030s, the United States will sell Australia three Virginia Class submarines. The first two will be used but refurbished Block 4 boats with 23 years of remaining life and the third will be a brand new stretched Block 6 boat fitted with the 84-foot-long payload module permitting the carriage of greatly increased weapons loads.<sup>2</sup> There is also the potential to transfer an additional two Virginias if the new-design AUKUS submarines are delayed.
4. The Royal Navy will commission the first of the new-design AUKUS SSNs into service in the late 2030s, with others following to replace its Astute Class boats. This first AUKUS Class boat will be built by BAE Systems at Barrow in the United Kingdom and is expected to uncover and de-bug any faults. With the advantage of this experience, the first Australian AUKUS submarine will be built in Adelaide in a joint venture between BAE Systems and ASC, and is expected to be commissioned in the early 2040s.

SSNs are the apex predators of the sea, so Australia’s new submarines should deliver a powerful operational and strategic capability. But they will be even more formidable when they are networked with off-board sensors, uncrewed underwater vessels, anti-submarine frigates and destroyers, anti-submarine aircraft, and various satellite-based communication and other systems.

Advanced underwater operations are becoming “team games”, with SSNs the “team captains”.

This is where Pillar Two of the AUKUS agreement has great relevance.<sup>3</sup> It calls for the joint development and deployment of stronger capabilities in eight key areas of advanced technology, almost all of which have applications supporting SSN operations. They include, for example:

- Undersea capabilities, particularly the development of autonomous underwater vehicles.
- Quantum technologies, with a strong focus on generation-after-next sensors and communication systems, potentially delivering new levels of capability, including for underwater systems.
- Artificial intelligence and autonomy, using these technologies to improve the speed and precision of decision-making that is critical in fast-moving combat.

Judging from the rapid progress being made by specific projects in several of these fields, and informal comments made by senior officials, significant trilateral advances are already being achieved. Notable examples include the very rapid development, testing, and fielding of the Ghost Shark long-range uncrewed submarine and the coordinated progress being made on the new-generation joint battle management systems of the three countries.<sup>4</sup>

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# Criticisms of AUKUS, and responses

Several commentaries have been published that raise doubts about the AUKUS submarine program.<sup>5</sup> The main issues discussed in Australia, the United States, and the United Kingdom are addressed briefly below.

## Australian doubts

**1. We do not need nuclear-powered submarines. Diesel-electric (conventionally powered) submarines offer many of the same capabilities as SSNs but are simpler, cheaper, and easier to operate and could be bought in larger numbers.** <sup>6</sup> **If conventional submarines are now not favoured, why was the Australian Department of Defence so committed to the French conventionally powered boats before that project was cancelled?**

SSNs deliver a far higher level of capability than diesel-electric boats. They are in a completely different class in terms of speed, range, endurance, sensor scale, weapons loads, and operational flexibility. Because SSNs have almost unlimited power, they are freed from the battery limits of diesel-electric boats, can manoeuvre in hostile waters with far greater freedom, and can perform a broader range of tasks.<sup>7</sup> SSNs are also equipped, in a way that smaller diesel-electric boats cannot be, to serve as command-and-control nodes for underwater networks comprising off-board sensors, uncrewed autonomous submarines, and other new-technology systems.

Because of their ability to dominate large maritime spaces, SSNs deliver levels of deterrence that cannot be approached by diesel-electric boats. When deployed, SSNs would likely force the leaders of even major adversarial powers to rethink their maritime options.

The case for diesel-electric submarines was stronger in the 1970s and '80s when the Indo-Pacific was a strategic backwater and Australia and its regional allies and partners were not directly confronted by an assertive authoritarian power brandishing the largest naval forces on the globe. Australia is now proximate to one of the world's centres of global tension and potential conflict, and its defence needs are much more demanding.<sup>8</sup>

The primary reason why SSNs were not considered prior to AUKUS was that successive defence ministers directed the Department of Defence not to

consider them.<sup>9</sup> The French Attack Class conventional design was considered the best of the options available at the time but was expensive for what it could deliver.

## **2. New technologies are rendering the seas more transparent, making submarines more vulnerable.**

The most prominent report arguing this case was titled *Transparent Oceans? The Coming SSBN Counter-Detection Task May Be Insuperable*, published by a group of scientists at the Australian National University in 2020.<sup>10</sup> They used computer modelling to project technology trends several decades into the future and reached two main conclusions. First, that some regions that have been favoured for submarine operations in the past may not have the same “salience” in the future. And second, that future progress in counter-detection systems on submarines will not have the “same salience as in earlier times”.

This is a professionally produced report, but in projecting technology trends forward several decades, it relies for its key judgements on a set of embedded assumptions in the modelling. Further, the authors did not have access to the extensive research and development efforts that will likely change the trajectories of technology developments in the submarine/anti-submarine competition in the period ahead.



Vice-Admiral Jonathan Mead speaks at the Australian Submarine Agency launch in Canberra, 30 June 2023 (Rodney Braithwaite/Royal Australian Navy Images)



There have certainly been improvements in the capabilities of some underwater sensors, but the laws of physics remain unchanged and the detection and tracking of quiet submarines remains difficult. It is notable that the authors of the *Transparent Oceans* report do not assert that ways have been found to make all objects visible in vast areas of ocean, just that detection may become more likely in some regions. The scale of the investments being made in next-generation underwater systems by the United States, the United Kingdom, Australia, and others suggests that governments in these countries have concluded that technological advances are unlikely to seriously inhibit their submarine operations for many decades to come. The Director-General of the Australian Submarine Agency, Vice-Admiral Jonathan Mead, stated this plainly in May 2024 when he said: “We’ve done our analysis and we see that crewed, nuclear-powered submarines will be the leading war fighting capability [for advanced navies] for the next 50 to 100 years.”<sup>11</sup>

### **3. Under AUKUS, Australia will be buying British-designed submarines that will not meet our needs.**

The “SSN AUKUS” submarine is being designed and developed as a joint UK, US, and Australian effort.<sup>12</sup> While this new submarine will draw on a decade of design work conducted in the United Kingdom under what was previously labelled the SSN(R) project, the AUKUS Class boats will be different and feature many American and some Australian technologies and systems.<sup>13</sup> US technologies proven in the Virginia Class will drive the propulsion plant, the common vertical launch system, and the weapons suite. The AUKUS partners are also developing a joint combat system that will expand the US–Australian system currently operational on Australia’s Collins Class boats. Through these means, the AUKUS partners are striving to maximise interoperability and minimise risk and cost.

### **4. Adelaide will not be able to build AUKUS submarines.**

Among the people who have expressed such doubts is former Australian foreign minister Alexander Downer, who reportedly said the plan to build nuclear-powered submarines in Adelaide was “a fairytale”.<sup>14</sup> Such statements reflect a limited understanding of modern industrial practices and how almost all advanced technology submarines are built.

The new AUKUS submarines will not be manufactured from beginning to end in Adelaide. Large parts of each submarine will be built elsewhere as modules, with many of the boats’ systems pre-fitted and tested before the modules are shipped to Adelaide. The reactor propulsion modules will be built by Rolls Royce in the United Kingdom incorporating proven American technologies.<sup>15</sup> The command and communications centre modules will likely be built elsewhere, possibly in another part of Australia or in the United States. The weapons launcher modules and the accommodation modules could be built in yet

another location, and so on. Modules for the AUKUS Class boats can be built in those parts of Australia and allied countries that already have strong engineering workforces. The main tasks for Adelaide will be to fabricate each submarine's primary structure and hull, slide the modules into the submarine structure, connect, integrate, and test all the systems, and finally launch and trial the complete boat prior to its commissioning.

This approach is not revolutionary. It is simply a modified version of the process demonstrated in the long-running Virginia Class program and now in the much larger Columbia Class ballistic missile-firing submarine program in the United States.

The Australian AUKUS submarines will be built in a joint venture between BAE Systems and ASC. Both of these companies have built advanced submarines before, and they will have the benefit of drawing on the lessons learned from construction of the first boat of the class in the United Kingdom.



UK Labour leader Keir Starmer (L) and John Healey, Shadow Defence Secretary, visit BAE Systems in Barrow to confirm the party's commitment to nuclear deterrence, 12 April 2024 (Keir Starmer/Flickr)

Much larger challenges will be posed by the need to build the new submarines at the same time as Australia builds six Hunter Class anti-submarine warfare frigates (also in Adelaide) and then in the 2040s probably a class of follow-on

destroyers. In addition to all of this activity, a new class of at least seven general-purpose frigates is scheduled to be built in Perth. The numbers of naval architects, engineers, systems managers, and other specialist personnel required for these projects will far exceed the workforce currently employed in the Australian maritime industry. Moreover, this much larger skilled workforce will be needed at the same time as the Royal Australian Navy will be driving to recruit, train, and retain larger numbers of skilled personnel to crew the submarines and provide on-shore maintenance and support.

Informal advice from American and British industry executives suggests that some experienced personnel from these countries will be willing to take up positions in Australia. However, many more are likely to be required. A national maritime skills training and development program will be essential. Some initiatives have already been launched, but in order to generate the numbers of people with appropriate levels of skill and experience in the right timeframes, new initiatives will be needed soon.



Artist's impression of the new AUKUS Class nuclear-powered submarine for the Royal Australian Navy and the Royal Navy (BAE Systems/Wikimedia Commons)

Hence, some of the greatest stresses will be caused by the need to progress the submarine program concurrently with other major maritime initiatives. Nevertheless, provided that the new submarine dockyard facilities are

completed in Adelaide, relevant education and training programs are significantly expanded, and upskilled Australian engineers and technical specialists are supplemented by British and American experts, the task of assembling, testing, and setting the new boats to work will probably prove manageable.<sup>16</sup>

**5. The AUKUS program will require Australia to simultaneously operate three classes of submarine. This will be difficult and expensive.**

The service lives of Australia's six currently commissioned Collins Class diesel-electric submarines are to be extended to the late 2040s. The details of this life-of-type extension program are still being determined as the upgrade requirements of each of the boats differ. Update work on the first submarine is scheduled to begin in 2026, with the last Collins update to be completed in the mid-2030s.<sup>17</sup>

The first of three Virginia Class submarines being purchased from the United States is scheduled to be introduced into Royal Australian Navy service in 2032 and the last of the three in the mid-to-late 2030s. The first Australian-built SSN AUKUS submarine is expected to be commissioned in the early 2040s and the last of the five in the early-to-mid 2050s.<sup>18</sup>

If this schedule is maintained, Collins and Virginia Class boats will be in Royal Australian Navy service from the early 2030s until the late 2040s, and the Collins, Virginia, and AUKUS Class boats will all be in Royal Australian Navy service at the same time from the early 2040s. But all three classes of submarine will only be in service for four or five years in the late 2040s, when the Collins Class is being retired. The interoperability of these submarines' systems, and the fact that all three classes will be operating closely related American combat systems and weapons suites, should make this phased transition manageable. Nevertheless, the intellectual, skill, and programmatic challenges of operating three classes of submarine in the late 2040s and two classes of nuclear-powered submarine from the early 2040s until the late 2050s will be very demanding. Special preparations and exceptionally close cooperation with the US and British navies and associated agencies will be essential.

**6. A less risky and cheaper plan would be for Australia to buy all of its SSNs from the United States.**

For a number of reasons, this option is impractical from both the American and Australian perspectives. The US Navy has been buying Virginia Class submarines since 1998, with a total of 40 ordered and 21 currently in service.<sup>19</sup> Following a period of reduced production during the Covid pandemic, when only 1.3 boats were delivered annually (discussed in more detail on following pages), Virginia Class production is scheduled to rise to two boats per year by 2027–28 and increase further to about 2.33 boats per year or even 2.5 per year in the early 2030s. The US Navy has recently indicated that further Virginias



may be ordered until the early 2040s, when the first order for the Next-Generation Attack Submarines, SSN(X), is expected to be placed.<sup>20</sup>

Echoes from the markedly slowed Virginia production during Covid will be felt until the early 2030s. The US Navy's SSN inventory is expected to fall to 46 boats in 2030 and only recover to 50 boats in 2036. Indeed, to prevent operational SSN numbers falling even lower, the US Navy plans to refuel and extend the service lives of up to seven earlier-generation Los Angeles Class SSNs.<sup>21</sup> Clearly, the United States is unlikely to be in a position to sell Australia more than three Virginia Class boats until at least the early 2040s.

Australia will probably not want to buy some of America's new-generation SSN(X) submarines because these boats will not be mature until the mid-2050s, they will be much larger than the Virginias, and they will cost at least twice as much.<sup>22</sup> Moreover, many of the advanced systems mooted for the SSN(X) are expected to be fitted to Australia's AUKUS Class boats.

Attempting to buy more Virginias would tie the Royal Australian Navy to a class of boats that will be running out of life in the 2050s. It would also preclude Australia gaining the long-term sovereignty, operational, and industrial support advantages of building, maintaining, and upgrading advanced SSNs domestically.

#### **7. The Royal Australian Navy will not have adequate numbers of fully trained personnel to operate these much larger nuclear-powered submarines.**

The Royal Australian Navy does not yet have the trained personnel to operate large nuclear-powered submarines, but it is striving to obtain them by the early 2030s.<sup>23</sup>

The normal crew size of the Collins boats is 58, and that of the Virginia boats 120, depending on the operational missions at the time. The AUKUS Class boat's crew size is currently unknown but is likely to be similar to the Virginia's. Minimising personnel requirements has been one of the drivers of the SSN AUKUS submarine design, but any crew savings from automation and improved layout will likely be more than cancelled out by the demands of the new war-fighting systems that will be aboard the new-generation boats.

At present, there are about 900 trained people in the Royal Australian Navy's submarine workforce. In order to deliver fully trained crews for each of the new boats, provide scope for some crew rotation, and generate the required number of shore personnel, the submarine workforce will need to grow to 3,000 from the late 2020s to the mid-2040s. Achieving the Royal Australian Navy's personnel expansion and retention goals when the Service will be competing for



highly skilled personnel against rapidly growing maritime industries will be one of the greatest challenges for the AUKUS program.

Fortunately, Australia is not beginning its nuclear-powered submarine program from a zero base. Royal Australian Navy submarine commanders have long been trained on the US Submarine Command Course and many personnel have served on American and British nuclear-powered submarines in exchange postings. Since the AUKUS agreement, the tempo of deploying Royal Australian Navy personnel on American and British boats has increased rapidly. These postings now include positions involving the control and maintenance of the nuclear propulsion systems and other sensitive areas of the boats.

In mid-2024, there were 94 Royal Australian Navy personnel participating in the US submarine training program, and in coming years the number of Australian crew serving on American submarines is planned to rise to 440.<sup>24</sup> Additional Australian naval personnel are participating in the Royal Navy's submarine training system and serving on British submarines.



Australian submariners are serving on Royal Navy and United States Navy submarines to broaden their experience and strengthen cooperation under the AUKUS agreement (LPhoto Kevin Walton/UK MOD © Crown copyright 2022)

This means that when the Royal Australian Navy receives its first Virginia Class boats in the early 2030s, it should be able to operate the boats with almost all billets filled by Royal Australian Navy personnel. By the time Australia commissions its first AUKUS Class submarine in the early 2040s, its personnel will have had a decade of experience operating nuclear-powered Virginia Class

submarines and there should be at least one fully trained crew, and possibly 1.5 trained crews, for each boat. This should be adequate to maintain a high operational tempo for a few months. If there are any specialist shortages at that point, both the US Navy and the Royal Navy would likely be able to assist.

It is sometimes asserted that Australia has no personnel experienced with nuclear reactors and related technologies. This is not true. Australia has an unblemished record of operating nuclear reactors and conducting nuclear research for more than 70 years.<sup>25</sup> Certainly the type of nuclear reactors fitted to submarines differ from the land-based reactor at Lucas Heights near Sydney.<sup>26</sup> Nevertheless, the country has developed a highly respected cohort of civilian nuclear engineers and, together with the exceptionally deep wells of nuclear expertise available in the United States and the United Kingdom, there are sound foundations for building nuclear reactor and propulsion expertise for Australia's SSNs.

#### **8. Australia cannot afford to buy eight nuclear-powered submarines.**

When Australian Prime Minister Anthony Albanese joined US President Joe Biden and the then UK Prime Minister Rishi Sunak to launch the AUKUS "Optimal Pathway" in San Diego in March 2023, he revealed that the Australian government's estimate of the total cost of Australia's 30-year submarine acquisition program was AU\$268–\$368 billion.<sup>27</sup>

This spending needs to be considered in context. Firstly, it will be partially offset by the savings won from cancelling the French submarine program, estimated to be about AU\$86 billion. Secondly, over the life of the project, the cost of the AUKUS submarine program will average about \$10 billion per year. This will be one of the primary drivers for taking annual defence spending from about 2 per cent of GDP to 2.5–3 per cent of GDP, not high by Australia's historical standards nor in comparison with the current spending of the United States and some other security partners. In spending this money, the country will be buying substantially increased security for the next 60 years — something of great value to all Australians.

Moreover, the 30-year cost of the AUKUS submarine project is dwarfed by the extraordinary cost growth of some other federal programs. AUKUS will, for instance, probably cost less than one-tenth of the National Disability Insurance Scheme during this period.<sup>28</sup>

#### **9. The AUKUS nuclear-powered submarine program will breach Australia's obligations under the international nuclear non-proliferation regime.**

Australia is buying nuclear-powered submarines and has no wish to acquire nuclear weapons. The nuclear reactors for the AUKUS submarines will be delivered to Australia as complete, welded power units that will not need to be

refuelled during the lifetimes of the boats. The International Atomic Energy Agency (IAEA) says none of Australia's plans contravene the country's non-proliferation obligations.<sup>29</sup>

## American doubts

### **1. America's shipyards are struggling to meet the US Navy's submarine needs and there is no scope to sell three, and maybe five, Virginia Class boats to Australia.**

America's shipyards were allowed to run down as the United States enjoyed a "peace dividend" after the Cold War, and during Covid many more skilled engineers and tradespeople left the industry. When, in recent years, key dockyards tried to regain momentum, they launched over-sized recruitment and training programs. Then, to cope with a tsunami of new submarine orders received from the US Navy during the last decade, they have needed to simultaneously modernise their facilities and production processes.

A further complication has been that the US Navy's highest priority in the early 2020s has not been manufacturing Virginia Class SSNs but building the new Columbia Class of ballistic missile-firing submarines, which are needed to replace the aging Ohio Class boats that form the sea-based leg of America's strategic nuclear arsenal. At the same time, the US Navy wanted to buy more Virginia Class boats but generally not in their standard form. Most Virginias now being ordered will be stretched to include an 84-foot-long payload module, enabling a much larger number of missiles and other combat payloads to be carried.<sup>30</sup> While this makes operational and strategic sense, the switch to stretched Virginias has further increased the workload for already-pressed submarine shipyards. From an annual output of about 1.3 standard Virginia boats in 2020–21, the US Navy now expects industry to produce one very large Columbia Class boat as well as two stretched Virginia Class boats each year from 2026. This workload is equivalent to five standard Virginia Class boats per year — in effect nearly quadrupling submarine output within five years.<sup>31</sup>

To further complicate the situation, Covid markedly slowed the submarine maintenance output of America's four government-operated naval repair and overhaul shipyards so that the number of SSNs either in depot maintenance or idle pending dockyard admission rose from 21 per cent of the SSN force in 2012 to 37 per cent in 2023. This reduced the total number of operationally ready SSNs in the US Navy to 31 in mid-2023.<sup>32</sup>

This is the industrial context for the AUKUS commitments. If the strength of the American SSN force is to be maintained during the early-to-mid 2030s, US industry will need to deliver two Virginia Class boats every year and a third every second year. Initially, many doubted that this could be done.

The good news is that the US Navy is rapidly implementing a credible “get well” program for America’s submarine manufacturing and support industries with the strong backing of the US Congress and key American companies.

To achieve the steep rise in output, funding has been substantially increased, a fast-paced program of dockyard and supplier modernisation has been launched, and a much larger workforce is being recruited and trained. This program of submarine industrial base expansion began in 2018–19 with the US Navy investing US\$2.3 billion to fund upgrades through to 2023. This was followed by a further US\$1.6 billion extension of the program. Now an additional US\$11.1 billion is proposed in the Biden administration’s current budget to be spent during 2025–30. The Australian government has also committed US\$3 billion over four years to help accelerate Virginia production.<sup>33</sup> Further funds are being contributed by the two prime submarine builders — General Dynamics Electric Boat and Huntington Ingalls Industries — as well as by many of the 16,000 companies that supply systems and components for American submarine manufacture.

In addition, Congressional approval is being sought for a further US\$2.2 billion to expand America’s capacity to repair, overhaul, and sustain its submarine force. The US Navy is keen to reduce the number of SSNs in the maintenance system from the current 37 per cent of the force to a more normal 20 per cent.

On 13 March 2024, the Australian media reported that in the pending fiscal year, the US administration was planning to order only one new Virginia boat rather than two. Some commentators suggested that this was a sign that American submarine production was faltering and that the AUKUS program was in trouble.<sup>34</sup> This is not the case. Successive US administrations have been ordering two Virginia boats annually for more than a decade (since FY 2010/11), but for much of this period, industry has only delivered 1.3 boats per year. So, even accounting for the eight-year build-time for Virginias, appropriating funds for another two boats when industry is pushing hard to supply a substantial backlog of orders would not be sensible. In practical terms, allocating funding for a second Virginia this year would make little difference to what industry is able to deliver. Nevertheless, Congress may intervene to appropriate funding for a second boat anyway.

The more than US\$18 billion now committed to America’s submarine industrial base will pay for the extension and modernisation of the dockyards and key sub-contractor facilities, the installation of new plant and machinery, and the bedding-down of improved production processes. But this major industrial upgrading cannot be done while simultaneously increasing submarine completion rates. The industrial upgrades must be finished first. That is what is planned in the next couple of years with Virginia construction continuing at its current rate. However, output is expected to accelerate in 2026–27 and reach

two new boats per year by 2028–29 and 2.33 boats or more in the early 2030s.<sup>35</sup>

In the meantime, one of the mechanisms being used to accelerate submarine construction is sub-contracting the building of more submarine modules to other parts of US industry. A notable case is the success of Austal Limited, an Australian company with large-scale, highly automated ship-building facilities in Mobile, Alabama. This company is now contracted to build, fit out, and test the command-and-control system modules and the electronic deck modules for both Virginia Class and Columbia Class submarines.<sup>36</sup> As the pace of submarine construction continues to rise, the building and fitting out of more submarine modules is likely to be outsourced. At least initially, these contracts will go to companies operating in the United States, but it is possible that, in time, some might be built in Australia and Britain.

When the pace of AUKUS submarine construction starts to rise in Britain and Australia, some modules for these new-generation boats are likely to be built and fitted out in those two countries and some in the United States. Completed modules will then be shipped to the relevant boat assembly yards in each country. This business model has the potential to improve industrial efficiency, raise quality, and increase the speed of submarine completions.

US industry is modernising rapidly and is on track to significantly increase output by 2028–29. It now appears likely that production targets set for the 2030s and 2040s will be met. That should mean that Australia will receive its three Virginia Class boats on schedule without significant impact on the numbers of operational American SSNs.

**2. The United States will be unable to count on Australia's SSNs being there to help in the event of war to defend Japan, the Philippines, South Korea, Taiwan, or other democracies in the Western Pacific in coming decades. Australian ministers are unwilling to pre-commit the Australian Defence Force to future conflicts, which shows that American decision-makers cannot rely on Australian assistance when the United States will need it most.**<sup>37</sup>

Senior American policymakers who know Australia well fully understand that if China launched a major assault on an Indo-Pacific democracy such as the Philippines, Taiwan, Japan, or South Korea, Australia's interests and values would be engaged at least as strongly as those of the United States. If the United States moved to intervene, it is almost inconceivable that Australia would stand aloof. The Australian public and parliament would demand immediate action in close coordination with the United States and other partners. Australia has fought alongside the United States in every major conflict since the First World War, and a major Indo-Pacific conflict in the

period ahead would likely see even closer operational coordination with the United States.

Like their counterparts in the United States, the United Kingdom, and elsewhere, senior Australian politicians are usually cautious about committing their country to hypothetical contingencies well in advance. When such crises appear imminent, security and sovereignty issues must be weighed, domestic consultations undertaken, and authorisations issued to defence and other relevant agencies. In Australia's case, there is no need for votes in parliament. As a result, most government directives can be issued within hours rather than weeks.

American and broader allied planning should proceed on the assumption that Australia's SSNs would almost certainly be committed at an early stage to any major allied contingency of the type described above.

**3. The US Navy cannot be certain that the Royal Australian Navy will operate Australia's SSNs safely. Any Royal Australian Navy nuclear accident could impact the US Navy's own safety reputation and lead to constraints on American and British SSN port visits.**

This is a legitimate concern, but a serious nuclear accident with Australia's SSNs is very unlikely. Decades ago, Australia established appropriate nuclear safety arrangements for allied SSNs to visit several local ports, and it has a long record of safely managing civil nuclear reactors. Australia is working with its British and American partners to build on this experience and become a leader in the nuclear stewardship of SSNs.

**4. Australia may not be able to maintain security for the highly classified technologies and systems fitted to nuclear-powered submarines.**

Australia has an excellent track record of protecting its own classified information and that of its allies. For more than 80 years, the United States and Australia have had an exceptionally close partnership dealing with the most sensitive secrets that the two countries possess. Australia's close security partnership with the United Kingdom goes back even further. The level of trust and the degree of cooperation between the three countries are exceptional.

Australia is well aware that special measures are needed to protect SSN technology and is working closely with American and British agencies to embed a strong security culture in all aspects of its SSN enterprise. Mike Burgess, the Director-General of the Australian Security Intelligence Organisation (ASIO), has stated that Chinese entities have already launched a major espionage effort to access AUKUS secrets. Many protective steps are being taken, including the posting of ASIO officers to relevant entities.<sup>38</sup>



## **5. Future American presidents cannot be trusted to maintain the AUKUS deal as a priority.**

Some who express concern about the depth of the American commitment to AUKUS are especially worried that a re-elected president Trump might walk away from the agreement.

However, US support for AUKUS is widespread and it is especially strong in America's strategic and defence communities and in Congress. This is partly because of the level of friendship and trust between the two countries but also because nearly all members of the American strategic community see it as a good deal for the United States. There is a general recognition that in confronting China, Russia, and the other authoritarian states, America cannot do all the heavy lifting. A team effort is needed and most key Americans believe Australia's wish to do more for its own security and for allied interests should be supported. These views are held by Americans on both sides of the political fence, including those likely to be appointed to key positions in a future Trump administration. Moreover, when Donald Trump met former prime minister Scott Morrison on 15 May 2024, Trump reportedly spoke strongly in support of AUKUS and stated that "he believes AUKUS plays a critical role in deterring China".<sup>39</sup>

The more that American security analysts consider the benefits of the AUKUS arrangement, the more they will likely come to appreciate its strategic and operational plusses, many of which were not initially obvious. As is explained briefly below (see *The broader benefits of AUKUS*), there are more upsides to AUKUS than many have hitherto assumed.

### **British doubts**

**1. The United Kingdom's submarine dockyards have been allowed to run down and they now need to build Dreadnought Class ballistic missile-firing submarines at the same time as the AUKUS Class boats. In consequence, they will struggle to build the first AUKUS Class submarine on schedule and the entire AUKUS program could be derailed.**

The British submarine industry suffered a similar decline to that experienced by the United States after the Cold War. When, in late 1999, BAE Systems moved to build its first new nuclear-powered submarine in 20 years, the workforce at Barrow submarine construction yard had fallen from 13,000 to 3,000 and key skills in design and engineering had been lost.<sup>40</sup>

Nevertheless, the Royal Navy wanted to start building the first of a new class of SSNs, the Astute Class. So, in early 2001 the keel of the first boat was laid down before the design drawings were complete. Difficulties were encountered



almost immediately. After some months, the Ministry of Defence enlisted the advice of US-based General Dynamics Electric Boat, and an American was appointed Director of the Astute Project. In the months that followed, production processes were modernised and the build-rate started to rise. However, HMS Astute was delivered four years late. Seven boats of the Astute Class are planned, and at the time of writing, four were in active service, a fifth was on sea trials, and the final two were under construction. The last boat of the class is scheduled to be commissioned in 2026.

The resuscitation of the British submarine industry was further boosted in 2010 by the government's decision to build a new class of ballistic missile-firing submarines, the Dreadnought Class. Construction of the first of these boats got underway in 2016 and it is expected to enter service in the early 2030s.

The Astute and Dreadnought classes are both being assembled in the enclosed dock hall at Barrow. The first of the new AUKUS SSNs is scheduled to be built in extended and modernised spaces currently being used for Astute construction.

Several parts of the AUKUS submarine project have progressed surprisingly quickly, partly because of the early design work done for the next-generation British SSN(R) boat and partly because of the early decision to integrate thoroughly proven American systems into the AUKUS Class boats. In March 2023, Vice-Admiral Mead, the head of Australia's AUKUS task force, told the media that "SSN AUKUS is actually quite mature in the design, it's about 70% mature ... The US will incorporate key weapons and combat systems into that submarine."<sup>41</sup> Then in April 2024, the Royal Navy's second-in-command Vice-Admiral Martin Connell stated that the design of the AUKUS submarine is already "mature" and should be locked in within the next 12–18 months.<sup>42</sup>

The British government has now signed contracts worth £4 billion to design and manufacture the first components of SSN AUKUS. Rolls Royce is tripling the size of its nuclear reactor manufacturing site in Derby and BAE Systems is further expanding its site and its skilled workforce at Barrow. In addition, Babcock is investing heavily in modernised submarine maintenance systems and facilities.

The Australian government has agreed to contribute AU\$4.64 billion over ten years to help pay for the modernisation of Britain's submarine industry and to fund a portion of the design work required for the new AUKUS Class boats. New agreements between the three AUKUS governments on the international mobility of personnel and technologies should facilitate an unprecedented level of teaming and industrial cooperation.

In short, the British submarine industry has moved strongly in recent years to modernise and expand. Construction of the Astute and Dreadnought submarines at Barrow now appears to be progressing on schedule and the

transition to build the first AUKUS submarine should follow relatively smoothly. There are always risks in building the first boat of a new class of submarines. However, many of these risks should be mitigated by the advanced state of planning and preparations and the early decision to use systems, weapons, construction processes, and many technologies that have been proven in the long-running Virginia program.<sup>43</sup>

There will, inevitably, be glitches and unexpected events that cause delays. That is why the AUKUS build schedule will provide some time for contingencies. But overall, the three national teams are well placed to deliver a quality product in a reasonable timeframe.

Would an unexpected delay in the completion and commissioning of the first AUKUS Class boat in the United Kingdom derail the entire program to deliver SSNs to Australia? That seems unlikely. But if the British-built first submarine encounters significant delays, Australia has the option of drawing on the US government's offer to sell one or two extra Virginias so that the Royal Australian Navy's submarine force continues to be fully operational.

# The broader benefits of AUKUS

Most discussions of AUKUS focus on the merits of delivering a small number of nuclear-powered submarines to Australia. But the AUKUS Pillar One plan is about much more. There are substantial broader benefits flowing to all three countries.

## Establishing new semi-permanent US and UK SSN operations in the Western Pacific

The rotational forward deployments to Western Australia of up to five US and UK SSNs will help build Royal Australian Navy experience with SSN systems and operations. But deploying these submarines to Australia will also strengthen the operational capabilities of Australia and its closest security partners, and boost allied deterrence in the Western Pacific and Indian Oceans.

Figure 1  
**Estimated impact of AUKUS on numbers of operational SSNs/SSGNs in the Western Pacific and Indian Ocean in a crisis**

	2024	2028	2035	2050
Number of US SSNs/SSGNs operational in Western Pacific without AUKUS	8	8	6	8
Planned US/UK SSNs operational in rotational forces in west and east deployable within 5 days	0	4-5	4-5	5-6
RAN SSNs expected to be operational in Western Pacific and Indian Ocean within 5 days	0	0	2	6
Expected additional US/UK SSNs that could surge into Western Pacific and Indian Ocean within 14 days	20	16	16	18
Expected total allied SSN/SSGN force operational in Western Pacific after 14 days	28	28-29	28-29	37-38
% rise in allied operational SSNs in Western Pacific within 14 days as a consequence of the addition of RAN SSNs	0%	0%	8%	16-19%
% rise in allied operational SSNs in Western Pacific within 14 days as a consequence of AUKUS	0%	17-21%	25%	41-46%

Source: Author's calculations; see endnote 44

Note: SSN: nuclear-powered general-purpose attack submarine; SSGN: nuclear-powered guided (cruise) missile submarine; RAN: Royal Australian Navy

It is clear from the first two columns in Figure 1<sup>44</sup> that AUKUS will likely take the number of American and British nuclear-powered attack submarines (SSNs) and nuclear-powered guided (cruise) missile submarines (SSGNs) on active operations in the Western Pacific from about 8 to 12–13 by 2028. This is an increase of between 50 per cent and 63 per cent. This should bolster regional confidence in the allied commitment to the Indo-Pacific, strengthen allied deterrence, and increase options in future crises.

### **Providing more capable operational support facilities will enable larger allied deployments to Australia in future crises**

Partly through AUKUS and partly as a result of other programs, Australia and the United States have launched a substantial modernisation and expansion of naval, air, land, industry, and other defence support facilities across Australia.

Already mentioned is the expansion of support facilities at HMAS Stirling near Perth, but there is also the building of a major new naval base on Australia's east coast in the early 2040s and a substantial further development of submarine and ship-building operations and maintenance and repair capabilities in Adelaide, Perth, and elsewhere. Programs to manufacture a suite of US and Australian-designed uncrewed systems and munitions are also gaining momentum.<sup>45</sup> Significant upgrades are underway to Air Force bases across northern Australia, a number of Army bases, and the country's wide-area surveillance and intelligence systems.

In combination, these programs will strengthen Australia's national defence capabilities. But they will also boost the country's capacity to host much larger allied deployments to Australia should they be needed in future Indo-Pacific crises.

### **The strategic and operational benefits of adding AUKUS SSNs to allied forces in the Indo-Pacific**

The strategic and operational value of modern SSNs in major crises and conflicts is often not fully appreciated. For instance, in the event of a large-scale Chinese assault on the Philippines, Taiwan, Japan, or South Korea, most major military assets on the surface of the sea or on land in the theatre would likely be targeted. However, modern submarines will be much harder to detect, track, and target, giving them and their weapons loads special operational significance.

The nature of China's military culture, style of fighting, and force structure further underline the importance of the underwater domain for the United States and its allies. In the event of a major crisis in the Western Pacific, Beijing might select many different types of campaign — from intensified cyber and coercive political warfare operations to maritime blockades and economic

offensives. However, China’s military doctrine and missile-heavy force structure suggest that if Beijing decides to conduct a major military offensive, it will probably aim to take the allies by surprise by launching massive missile, bombing, and cyber strikes in the first hours of a conflict.<sup>46</sup> These will be designed to quickly destroy or incapacitate all important allied capabilities in the military theatre. Beijing’s goal will be to have the war effectively won within 7–10 days.

Figure 2  
**Estimated impact of Australia’s SSN force and AUKUS**  
 Total allied numbers of operational SSNs/SSGNs in the Western Pacific and Indian Ocean in the first 14 days of a major crisis in the Western Pacific

Crisis period	Estimate	2024	2028	2035	2050
Day 1	Total numbers of allied SSNs/SSGNs in Western Pacific and Indian Ocean	8	12-13	12-13	19-20
	% increase in operational allied SSNs/SSGNs in Western Pacific and Indian Ocean as a result of RAN SSNs	0%	0%	18-20%	42-46%
	% increase in operational allied SSNs/SSGNs in Western Pacific and Indian Ocean as a result of AUKUS	0%	50-62%	100-116%	137-150%
Day 5	Total numbers of allied SSNs/SSGNs in Western Pacific and Indian Ocean	8	12-13	12-13	19-20
	% increase in operational allied SSNs/SSGNs in Western Pacific and Indian Ocean as a result of RAN SSNs	0%	0%	18-20%	38-42%
	% increase in operational allied SSNs/SSGNs in Western Pacific and Indian Ocean as a result of AUKUS	0%	50-62%	100-116%	137-150%
Day 14	Total numbers of allied SSNs/SSGNs in Western Pacific and Indian Ocean	28	28-29	28-29	37-38
	% increase in operational allied SSNs/SSGNs in Western Pacific and Indian Ocean as a result of RAN SSNs	0%	0%	7-8%	18-19%
	% increase in operational allied SSNs/SSGNs in Western Pacific and Indian Ocean as a result of AUKUS	0%	16-20%	27-32%	42-46%

■ Day 1 impact ■ Day 5 impact ■ Day 14 impact

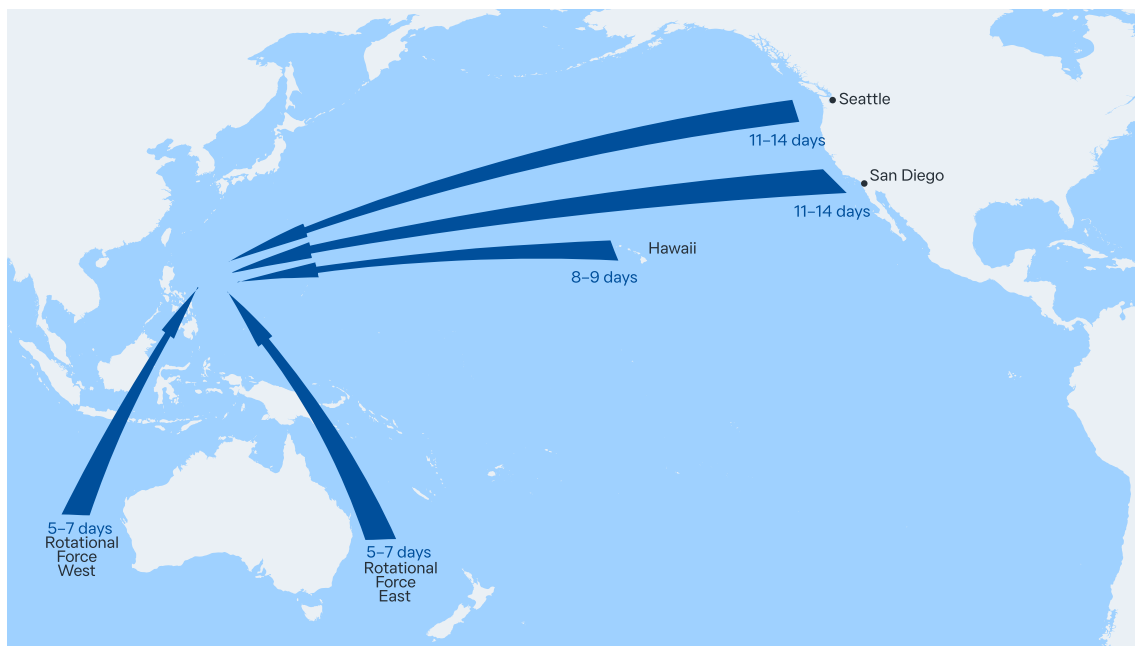
Source: Author’s calculations; see endnotes 44 and 49

Note: SSN: nuclear-powered general-purpose attack submarine; SSGN: nuclear-powered guided (cruise) missile submarine; RAN: Royal Australian Navy

In those circumstances, the allies would have few immediate response options. They might be able to launch some space, cyber, and long-range air strike operations. But within the immediate Western Pacific theatre, the primary remaining firepower is likely to be in the underwater domain. This is where the AUKUS capabilities have a crucial role to play.

Figure 2 explains this dynamic in more detail.<sup>47</sup> The top, blue shaded, sections show the estimated impact of AUKUS forces on Day 1 of a major conflict. As a baseline, it is assumed that US SSN and SSGN at-sea deployments to the Western Pacific (i.e. excluding boats in maintenance or unable to immediately deploy) approximate the boat numbers listed in the left-hand column for 2024. In 2028, the addition of the rotationally deployed boats adds more than 50 per cent to allied forward-deployed underwater forces on Day 1. In 2035, when the first Royal Australian Navy SSNs should be operational, the combined AUKUS force more than doubles the available allied underwater force in the Western Pacific on Day 1. In 2050, the AUKUS contribution should be even larger.

Figure 3  
Estimated transit times of allied SSNs to key  
Western Pacific operational areas in a crisis



Source: Author's calculations; see endnotes 44 and 49

The map in Figure 3 shows that surging American SSN numbers from Hawaii and US West Coast bases would take 9–14 days to arrive.<sup>48</sup> In the meantime, if it is assumed that three-quarters of the AUKUS Class boats could be at sea



within 24 hours, by Day 5 or 6 they should all be at or near their operational stations, and by 2027 they may be contributing more than half of the allied underwater fleet in key parts of the theatre during the critical early phases of the conflict (see the gold section of Figure 2). Moreover, from the mid-2030s, AUKUS should double the number of forward-deployed SSNs in the Western Pacific in the initial ten days of a major crisis.

The green section of Figure 2 shows estimates of the numbers of allied SSNs that might be able to reach operational areas in the Western Pacific within 14 days. As can be seen, even from the mid-2030s and beyond, the numerical contribution of AUKUS continues to be significant — probably between 27 per cent and 46 per cent.

These figures are only informed estimates, but modest changes in the estimates would not significantly alter the operational and strategic conclusions of this paper. The AUKUS program has the potential to contribute substantially to the numbers of allied SSNs that can be operational in key areas in the critical first ten days of any Western Pacific crisis or conflict. This is a much larger contribution to allied deterrence and theatre defence than most analysts have hitherto assumed.

#### **The strategic and operational benefits of building new SSN support facilities in relatively secure Western Pacific locations**

Support facilities for US Navy and other allied SSNs in the Pacific west of Hawaii are currently limited. The US Navy has bases at Yokosuka and Sasebo in Japan but American submarines are not based there.<sup>49</sup> There are better facilities at Guam where the four large Ohio Class guided missile submarines are based. But all of the US Navy facilities in Japan and Guam are well within range of Chinese theatre missiles and would likely be attacked early in a major conflict.

The strong SSN support facilities now being built near Perth, Adelaide, and the new base on the Australian east coast planned for the early 2040s will provide much larger and more modern support capabilities for allied SSNs beyond the range of most Chinese theatre missiles. These facilities will be especially valuable if a future conflict in the Indo-Pacific is prolonged because they will provide means of re-arming and maintaining much larger allied submarine and other forces in the Western Pacific for very long periods without requiring their return to distant home bases.

In April 2024, the Commander of US Submarine Forces, Vice-Admiral Rob Gaucher, said cooperation with Australia would help the US submarine fleet in important ways, including by increasing the number of allied boats working together on operations.<sup>50</sup> He said that having Australian personnel gaining experience on US boats would help ease a recruiting shortfall in the US Navy

and having access to the Australian base at HMAS Stirling in Western Australia would extend the US Navy's reach and maintenance options.

*We get the opportunity to leverage an ally, who can help us with manning and operating. We get surge capacity because now I have another area [where] I can do maintenance.<sup>51</sup>*



Vice-Admiral Rob Gaucher, Commander of US Submarine Forces, speaks to US, allied, and partner nation submarine force commanders during the third annual Submarine Conference of the Americas, 5 April 2024 (MCS 1st Class Justin E. Yarborough/US Navy)

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## Conclusion

With the security challenges in the Indo-Pacific growing more urgent during the last three years, the attractions of AUKUS have been strongly reinforced. Fortunately, some of the powerful benefits will be in evidence soon.

Some of the public unease has festered because of the absence of accurate and timely information. Much of the media has assumed that no news means bad news. While some aspects of AUKUS will need to remain classified, most of the public concerns relate to other matters. They could, and should, be addressed in periodic program briefings.

Australians will not have to wait a decade to have three SSNs operating from Australia and two decades to have five. Within three years, AUKUS will bring up to five jointly crewed allied SSNs to Australian bases on a semi-permanent basis. When combined with the 3–4 fully operational Collins Class boats and a rising number of Ghost Shark and other underwater systems, the maritime challenges that China and other authoritarian states will face in the Western Pacific will be much more daunting.

AUKUS will not meet all the defence needs of Australia and its close allies. But the power of AUKUS to boost allied deterrence is a key means of preserving peace and allied security for the medium-to-long term.

The AUKUS program is certain to face further bumps on the road. But with rapid progress being made, momentum is building and confidence and determination are on the rise. This is clear from informal comments by senior officials on both sides of the Pacific. In April 2024, Vice-Admiral Gaucher, the Commander of US Submarine Forces said:

*We're already embedding Australian maintenance workers at the Pearl Harbor shipyard. We're already putting sailors on the [submarine] tenders. The goal is to have an Australian submarine force that is fully trained when the United States is scheduled to start [delivering] Virginia Class nuclear-powered submarines to Australia in the 2032 timeframe. [At that stage] it's not something they have never operated before ... We already know the maintenance model. We already know the training model. We've already built the procedures and the tactics and everything else. We just hand them over. And then there will be an experienced nuclear-powered submarine force ready to operate the new purpose-built SSN AUKUS subs.<sup>52</sup>*

Vice-Admiral Gaucher is reported elsewhere to have added in his informal remarks that “by the time Australia is slated to field the AUKUS Class submarines, its forces will have a decade of experience operating the nuclear-powered Virginia Class submarine.”<sup>53</sup>

In May 2024, the then Chief of the Australian Defence Force, General Angus Campbell, expressed similar confidence:

*We are so good at telling ourselves what we can't do. We are delivering nuclear-powered submarine capability to this nation, full stop. We will deliver because I don't cringe when thinking about the defence of this nation and I don't think anybody else should either.*<sup>54</sup>

There are three central conclusions from this analysis. First, the AUKUS submarines will probably be delivered to the Royal Australian Navy broadly as planned. Second, the jointly crewed US and British submarines that will operate from Australia as part of the AUKUS program will provide a powerful deterrent against aggressive authoritarian regimes in the Western Pacific and Indian Oceans from 2027 — much earlier than most observers have hitherto assumed. And third, the AUKUS program will likely contribute much more to Australian and allied security than critics expect.

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will be either at sea on Day 1 or able to be put to sea within five days. This estimate of the number of US SSNs able to surge from Hawaii and the US West Coast at short notice is probably over-stated. If so, the percentage contribution of the AUKUS boats to deployed allied SSNs and SSGNs in the Western Pacific would be even higher than is displayed in Figures 1 and 2. Allied SSNs surging out of friendly ports in a crisis will transit oceanic distances at an average speed of about 22 knots. This figure takes account of the average time for crew assembly, the loading of stores, and the likely speed of progress in trans-oceanic deployments. This figure was determined following consultation with an experienced SSN commanding officer. The Royal Australian Navy's SSNs are commissioned according to the current schedule and some 50 per cent of its commissioned boats will be operational at sea, or able to become operational at sea, on Day 1 and a further 25 per cent able to deploy at sea within five days.

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- 48 Please note the assumptions made in calculating the data on Figure 3 are the same assumptions listed for Figure 1.
- 49 For details of these Western Pacific deployments, see *The Military Balance 2023* (London: IISS, 2023), pp.48–49.
- 50 See Vice-Admiral Gaucher's remarks quoted in: Brendan Nicholson, "Subs will be Bigger, Better and Faster", *The Australian, Defence Report*, 28 May 2024, <https://www.theaustralian.com.au/special-reports/subs-will-be-bigger-better-and-faster/news-story/96c7ae4e053e73debe3cc24c8479642f>.
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## About the author



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