AUKUS and the quest for advanced capabilities

Politea

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Politea is an analysis company focusing on international political risk, geoeconomics, and technology, based in Stockholm, Sweden. With research, foresight, and strategy development, Politea helps companies and authorities to navigate in an increasingly turbulent environment and position themselves for the future.

About the report

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Executive summary

AUKUS, the agreement between Australia, the United Kingdom and the United States to cooperate on advanced capabilities and supply the Australian Navy with nuclear propelled attack submarines (SSN) has faced certain obstacles: industrial capacity in all three countries is stretched, political support is fragile and the nature of highly enriched uranium as a fuel is problematic.

Faced with a gap between the life-expectancy of Australia's current fleet of Collins submarines and the new AUKUS class, three scenarios are suggested in this report:

- Supercharged AUKUS where the submarine component of the pact is given strategic priority and Australia's submarine gap is managed by the speedy delivery of freshly produced SSNs.
- Protracted development where the AUKUS class takes decades to arrive and Australia has to find an interim solution to fill the gap.
- AUKUS adjusted where the SSN contract is deemed not feasible, and cooperation is refocused on advanced capabilities while Australia procures a new class of submarine outside of AUKUS.

SUPERCHARGED	PROTRACED	ADJUSTED
Quick access to SSN	Protraced access to SSN	Alternative to SSN
Political will as driver	Industrial capacity as barrier	Costs outweigh benefits
LOTE + → SSN	LOTE- → Gapfiller →SSN	LOTE+ → Xboat
Tech cooperation tied to AUKUS SSN	Tech cooperation as separate pillar	Tech cooperation as core of AUKUS

All these scenarios offer different opportunities for third party actors to engage in cooperation, regarding both the supply of submarines and the cooperation on advanced capabilities.

AUKUS and the quest for advanced capabilities

On 15 September 2021, Australia, the United Kingdom and the United States announced a new security pact to be known as AUKUS. At the core of the cooperation, and indeed the political fury that followed, was an agreement whereby the UK and the US would supply Australia with a class of nuclear-powered attack submarines (classified as SSNs). This marked the sudden death of a French-Australian contract, signed in 2016, by which the Naval group would help Australia to replace the Royal Australian Navy's (RAN) conventionally powered Collins class submarines with new conventionally powered submarines. While French anger, US attempts to manage the fallout and former British prime minister Boris Johnson's jibe that France ought to "prenez un grip and donnez-moi un break" ensured that media attention was focused on the submarine row, the planned cooperation stretches far beyond the undoubtedly important submarine contract.

Scope of cooperation

The official statement on AUKUS by the establishing partners states that the arrangement will "significantly deepen cooperation on a range of security and defense capabilities".[1] The first initiative within this framework was for the US and the UK to support Australia to acquire nuclear-powered submarines for the Royal Australian Navy. This would commence with an 18-month trilateral effort to establish a credible plan that reflected US and British responsibilities with regard to non-proliferation and Australia's obligations as a non-nuclear weapon state under the 1968 Treaty on the Non-proliferation of Nuclear Weapons. Initial comments suggested at least eight SSNs would be delivered, starting in 2040.

In addition to the plan for advanced technology transfer in the submarines domain, the initial statement spelled out other areas of cooperation. The three states would enhance joint capabilities and interoperability in the areas of cyber capabilities, artificial intelligence, quantum technologies and additional underseas capabilities. In April 2022, four additional areas of technological cooperation were added in a jointly distributed fact sheet: hypersonic and counter-hypersonic capabilities, electronic warfare, innovation and information sharing.[2]

To submarine affairs and the eight adjacent areas of joint capabilities can be added the more informal area of strategic policy coordination. The fact sheet suggests that AUKUS will "develop and provide joint advanced military capabilities to promote security and stability in the Indo-Pacific region". While political leaders have put slightly different emphases on the "anti-China" purpose of the pact, it is clear that it aims to increase cohesion and provide a joint posture in a geographical region of key importance to US-Chinese rivalry. Box 1 summarizes the scope of cooperation under AUKUS.

Box 1 Overview of AUKUS

AREA OF COOPERATION	FUNCTION[3]
STRATEGIC ALIGNMENT	Common positions and strategy in the Indo-Pacific domain
NUCLEAR SUBMARINE PROCUREMENT	Provide Australia with a conventionally armed, nuclear-powered submarine capability at the earliest possible date.
CYBER	In the light of the importance of the cyber domain to advanced capabilities, the AUKUS partners will focus their efforts on strengthening cyber capabilities, including protecting critical communications and operations systems.
ARTIFICIAL INTELLIGENCE	Trilateral cooperation on artificial intelligence (AI) and autonomy will provide critical enablers for future force capabilities, improving the speed and precision of decision-making processes to maintain a capability edge and defend against AI-enabled threats. Early work will focus on accelerating the adoption, and improving the resilience of, autonomous and AI-enabled systems in contested environments.
QUANTUM	The AUKUS Quantum Arrangement (AQuA) will accelerate investments to deliver generation-after-next quantum capabilities. The initial focus will be on quantum technologies for positioning, navigation and timing. The participating states will integrate emerging quantum technologies into trials and experimentation over the next three years.
UNDERSEA CAPABILITY	The participating states will collaborate on autonomous underwater vehicles in the AUKUS Undersea Robotics Autonomous Systems (AURAS) project. Initial trials of and experimentation on this capability are planned for 2023.
HYPERSONICS	The AUKUS partners will work together to accelerate development of advanced hypersonic and counter-hypersonic capabilities.
ELECTRONIC WARFARE	The electromagnetic spectrum is increasingly contested. The three countries will work together to share understanding of tools, techniques and technology to enable their forces to operate in contested and degraded environments.

INNOVATION	The work on innovation aims to accelerate partners' respective defence innovation enterprises and learn from one another, including on how to more rapidly integrate commercial technologies to meet warfighting needs.
INFORMATION SHARING	AUKUS partners will expand and accelerate the sharing of sensitive information, including as a first priority enabling workstreams that underpin work on agreed areas of advanced capabilities.

Depth of cooperation

Listing areas of possible cooperation, however, says little about how deep such cooperation will go; that is, how much the participating actors will adjust their behaviour in ways that they would not have done in the absence of cooperation. In case of AUKUS, ambitions clearly go beyond coordination to aims for collaboration and to some extent integration.

The need for strategic alignment can be seen as an overarching aim of AUKUS and a driver of the more technical aspects of cooperation. For Australia, AUKUS is indicative of its journey from an ambition to largely stay out of Sino-US rivalry to the very frontline of conflict. Direct economic coercion and regional geopolitical assertiveness by China had clearly pushed Australia into a position where it was keen to seek more direct US protection and alignment. For the US, a more aggressive Chinese regional stance together with ever increasing technological prowess have increased the need to form more stable alliances. For the UK, strategic alignment with the US and Australia, as well as a reinforced focus on the Indo-Pacific theatre, have an important role in achieving post-Brexit global ambitions. Nonetheless, the overall regional strategic alignment in itself amounts to little more than coordination as the actors had already reached similar positions prior to the establishment of AUKUS and the pact does not entail any defence guarantees.

The submarine contract, if it proceeds, constitutes a fairly deep form of cooperation in which all actors will adjust their behaviour and take on risks to secure gains. For the US and the UK, this could be about letting Australian needs trump national priorities, for examples regarding production plans. For Australia, cooperation could run even deeper as its submarine capacity would be fully dependent on another state's capacities and support structures in order to function, which is essentially an act of integration.

The technical areas of cooperation are likely to vary in depth, ranging from coordination, such as forging common ethical standards on AI, to more intense collaboration, such as developing weaponry and underwater assets to support the new class of submarines. While it is too early to gauge the depth of this cooperation, a French official dealing with the issue testified to the partners' clear momentum in this aspect of cooperation.[4]

Openness of cooperation

Even if AUKUS in its design around an advanced weapons deal is quite closed, some level of openness has been touted. Kurt Campbell, US Indo-Pacific coordinator and one of the architects of the pact, suggested just a few months after its launch that AUKUS was "open architecture" and would in time be open to other countries in Asia and Europe.[5] Half a year later, Campbell argued that this was happening: "I think we've made, behind the scenes, quietly remarkable progress in areas associated with technology where not only the three countries (Australia, the UK and the US) are deeply engaged, but other partners are also supporting working groups".[6]

Prospects and key uncertainties

Given the broad range of cooperation within AUKUS, it is reasonable to assume that different areas will develop according to different paths. The depth of cooperation – and its results – might also differ among partners. In general, however, the prospects for AUKUS are dependent on a few critical uncertainties, that is, issues that can be assumed to be critical for cooperation but the outcomes of which are uncertain at the outset.

Submarine project feasibility

The ability to identify a feasible path to the delivery of an SSN capacity for Australia is clearly a critical uncertainty. The project faces similar difficulties to those that surrounded the now abandoned French–Australian contract, but with additional complexity due to nuclear propulsion. Long-standing issues with the USS Virginia class illustrate the difficulties of developing and maintaining a fleet of SSNs.[7] Finding a way to divide tasks, share risk and fund the full development of the new capability will present considerable challenges, to the say the least. As a US naval expert notes, we do not know how the bureaucratically powerful US government office Naval Reactors will shape any possible deal involving the transfer of highly enriched uranium.[8] Whether the US or British industrial base can accommodate the additional output that the AUKUS deal implies also remains open to question.[9] To long-term technical doubts can also be added the suitability of nuclear-propelled submarines to the littoral areas of the South and East China seas, and the ever-improving abilities of sensors to track the sound and hot water emitted from reactor cooling systems.

Domestic political support

Since AUKUS will be costly and involve risk, strong domestic support is essential for its success. This is not just the case at its inception. A complex arms agreement with technology transfers planned over decades will require support throughout the entire life of the project as new costs and risks arise that need to be shared. It is likely that AUKUS only saw the light of day due to the influence of the Biden administration, and it seems unlikely that a new US administration would provide as much support for—or be willing to take on the costs associated with—the programme. The new Australian government has announced a €555million settlement with the French firm *Naval* for the abandoned contracts and is supportive of but less politically invested in the AUKUS submarine deal. The new defence minister, Richard Marles, is focused on the risk of a capability gap and has stated that he will keep an open mind regarding future capabilities.[10]

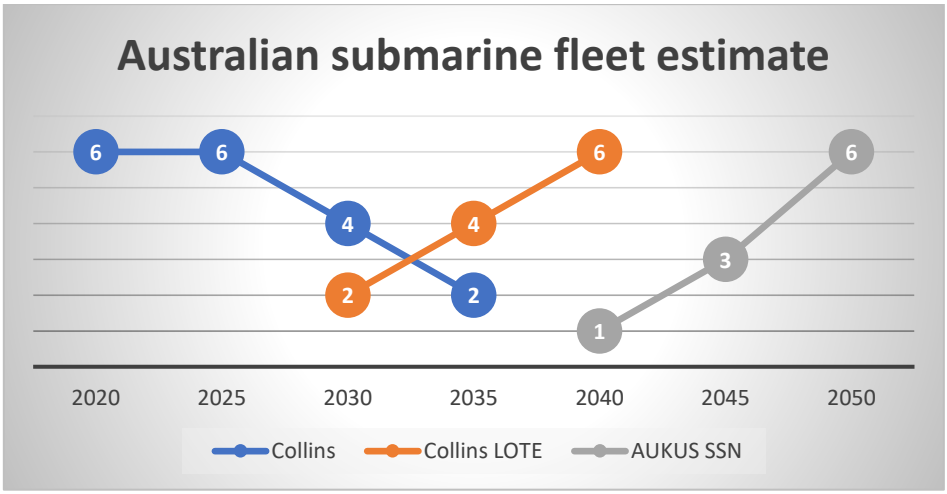
Strategic context

AUKUS is the child of an era in which China has grown more assertive and Chinese-US rivalry is spilling over into more and more areas. Australia would not have signed up to AUKUS if it had not perceived this global shift and itself been the victim of Chinese economic coercion in recent years. While structural conflict between a great power and a rival that will soon surpass it is more or less inevitable and will continue to play out in the decades to come, this could take different forms and Australia could shape its own path in relation to that conflict. If China, perhaps troubled by the grave economic costs Russia has drawn it into in their conflict with the West, aims for a more moderate challenge to the global order, Australia could return to a position of more constructive relations. It could also be the case that, as suggested by Kevin Rudd, China and the US could enter a phase of "managed strategic competition" by accepting a set of stabilizing, mutually agreed constraints.[11] The new Australian foreign minister's aim to stabilize relations stated in a recent meeting with the Chinese foreign minister could signal a new approach.[12] More generally, if Australia perceives that more constructive relations with China are possible, the likelihood increases that an approach to AUKUS that is less antagonistic vis-à-vis China – in both framing and substance – will be chosen. This could affect both the submarine component and the technology projects.

Baseline, development scenarios and opportunities

Depending on how the key uncertainties discussed above play out, it is possible to sketch various scenarios for the future development of AUKUS. While AUKUS goes beyond the SSN deal, the success of this element will certainly shape the direction of overall progress. Three scenarios are suggested in which the nature and timing of the delivery of the new class of submarines forms the key variable. Each scenario shares some baseline conditions:

- **The gap**. An estimate of Australia's current and planned submarine fleet forms the baseline for future developments. In 2021 it was decided that Australia's current six Collins class submarines would undergo life of type extension (LOTE). This process will start in 2026, take about two years per boat and prolong the lifetime of the Collins class by about a decade, depending on the upgrade. This means that all the Collins class submarines could have undergone LOTE by a few years into the 2030s and would probably still be in service in 2035, and some possibly in 2040. Even if additional upgrades keep the entire Collins fleet in service until 2040, however, this will still leave Australia with a gap as the first AUKUS SSN is only planned to arrive around this date.



This gap means that Australia would have few submarines in service between the mid- to late 2030s and the late 2040s. It also means that the Australian Royal Navy risks losing crew competence and industry will find it difficult to sustain the complex servicing infrastructure that maintains a submarine fleet. This gap risk has been acknowledged by Australian leaders. The current defence minister, after criticizing the previous government for putting the country in this situation, has made fixing this gap his "number one priority".[13] There are different ways in which this gap can be managed, and they are likely to affect AUKUS more generally.

- **Limited industrial capacity.** US industrial capacity is already hard-pressed to achieve its production targets for the updated Virginia class. A 2022 report to Congress outlines the difficulties of reaching national goals.[14] The pandemic and semiconductor squeeze have accentuated these industrial shortcomings. The UK needs to complete production of its Astute class SSN as planned in order to secure production capacity for the new Dreadnought class of ballistic missile submarines (SSBN), and thereby its nuclear deterrent.[15] While British defence industrial capacity could be boosted by Australian investment, it is far from clear that there are the human and technological resources for such an increase, given other development projects of more direct benefit to UK security.

- **Limits on how many different systems the RAN can sustain**. Fielding a modern submarine fleet is demanding in terms of budget, staffing and supporting infrastructure for development and maintenance. Variations and differences within a fleet will only increase complexity. It will be difficult enough for Australia to transition from a fleet of diesel electric submarines to SSNs. Adding further systems that are markedly different from both the Collins class and the AUKUS class SSNs would be extremely demanding. As the former head of the Royal Australian Navy, Vice Admiral Mike Noonan, has argued, an interim submarine would "bring more challenges than it would capability and it would seem inconceivable that a small navy such as ours could viably operate a transition [from] Collins, to an interim, to a nuclear".[16]

Scenario 1: Supercharged AUKUS

In this scenario the submarine component of AUKUS is given strategic priority and Australia's submarine gap is managed within the AUKUS framework. This would mean a Collins LOTE upgrade as stipulated above, in parallel with measures to speed up Australia's access to an SSN asset. The latter could be an off-the-shelf lend/lease arrangement of one or two existing US Virginia class SSNs; the production of one or two new Virginia class SSNs, essentially jumping the queue for the US building programme; or – perhaps least likely – a supercharged development of the new AUKUS class SSN with a delivery date in the mid-2030s. For the first decade, the new SSNs would be co-crewed by British and US submariners.

If this scenario materialized, it would be both a demonstration of enormous political will on the suppliers' side (the US and possibly the UK), as they would be risking their own procurement needs, and most likely an acceptance of high costs by the Australians. These circumstances would demand good political relations among the AUKUS partners, strong domestic support in these countries and, most likely, a strategic context that continues to add momentum to cooperation, meaning an increasingly assertive China in the Indo-Pacific theatre. The conditions that might trigger this scenario are also likely to produce deep cooperation in the adjacent technical domains and their working groups. It can be assumed that results would be tied closely to the new SSN capacity that is being jointly developed in the form of linked underwater sensors and systems, relevant weaponry and autonomous functions.

The LOTE upgrade in this scenario should be expected to be extensive as the Collins class will need to remain functional until sufficient SSN capacity has become operational. The increased lethality of the Collins class, with tube-launched Tomahawk missiles, possibly in cooperation the UK, would be a possible development in this respect.[17] It is likely that the Collins class will need to run in parallel with the first delivered SSNs, and some level of system integration is therefore to be expected.

Third-party perspective:

- One opportunity for a third-party actor in this scenario would be the thorough LOTE upgrade to enable the Collins class to bridge any potential gap and remain operational until the SSNs are delivered.
- Since a few Collins LOTE are likely to be in service in parallel with the first batch of SSNs, there will also be opportunities from systems integration, which demands knowledge of both submarine classes and their designs.
- As AUKUS is a priority architecture for cooperation in this scenario, it is imperative that ambitious third-party actors engage in the adjacent advanced capabilities working groups. In fact, select third-party participants could form a second tier AUKUS in this scenario.

Scenario 2: Protracted development

In this scenario, delivery of the new AUKUS SSNs take as much time as feared, with the first boats set to arrive a few years into the 2040s and the full fleet of eight becoming operational in the late 2050s. While the US and the UK stand by their initial AUKUS offer, they are unwilling to let Australia's procurement stand in the way of their own programme development. In addition to industrial capacity, the secondment of relevant human resources to Australia presents significant challenges. The painstaking job of establishing domestic production capacity in Australia takes time, pushing the AUKUS SSNs further into the 2040s. This scenario could play out in an unchanged strategic outlook. Domestically, it would allow the new Australian government to resolve the gap, putting its own mark on the deal without creating turbulence in relations with AUKUS partners. It would also reflect a US policy of putting its own industrial and security interests before any alliance gains.

Perceiving this growing gap at an early stage, the Australian government decides to procure an interim solution. Given the need for speedy delivery, these boats would need to be an off-the-shelf design or a mildly adapted version. Two tracks have been suggested that would fit this scenario. One is to produce new submarines based on the Collins design. This "Son of Collins" would share many systems with the Collins LOTE class but might also be equipped with abilities linked to the AUKUS pact, such as a US vertical launch system for missiles. A second track would be to buy or lease new submarines of an established or mildly altered design. President of France Emmanuel Macron has suggested production in France of the recently cancelled Attack submarine, while an alternative would be a modified version of Saab Kockums' (the designer of Collins) new A26 submarine.[18] Alternatively, the US might push for a Japanese submarine, thereby linking its two QUAD partners more closely together and forcing Japan to take on a more assertive role in the region. In either case, the submarines would need to share systems with the Collins LOTE class and/or be interoperable with the coming AUKUS SSNs in order not to exhaust the ability of the RAN to maintain the different systems.

The advanced capabilities programmes could continue in this scenario but the temporal mismatch – probably decades between the delivery of submarines and advanced capabilities cooperation – would pretty much separate the two AUKUS pillars, making technical cooperation less focused on submarine capacity.

Third-party perspective:

- If Australia decides at an early stage on an interim submarine fleet as a gap filler, the LOTE upgrade of the Collins class will be lighter, mostly focused on keeping existing submarines in operation. While there would be opportunities for third-party actors in this upgrade, these would be fewer than in the extensive LOTE discussed in scenario 1.
- The most obvious opportunity would be presented by the interim submarines that would be bought or leased by Australia but most likely produced in established production centres elsewhere – both to save time and to keep Australia's industrial focus on its domestic capacity to produce the SSN class. The fact that the interim submarines would need to be interoperable with the later AUKUS SSNs opens up an opportunity to integrate the subclass with the AUKUS underwater ecosystem, and possibly to sell or lease the same units or same submarine class to other like-minded states in the region.
- The advanced capabilities programme will be less focused on the AUKUS SSN in this scenario, and hence more relevant and possibly more open to third-party actor participation.

Scenario 3: AUKUS adjusted

In a third scenario, the joint working group of AUKUS reaches the conclusion that the planned procurement of eight SSNs is not feasible within a budget and timeline that is acceptable to the Australian government. Facing continuous threats from Chinese naval power in different theatres, the UK and the US need to focus their production capacities on their own needs and designs, which leaves Australia with a lengthy production timeframe and little opportunity to share costs. The total price tag would be staggering, especially as the US is constantly upgrading its Virginia class SSN which makes any budget calculation for a joint design a fast-moving target. A global recession accelerated by continuing Sino-US trade spats hits Australia hard, limiting its ability to sustain the costs.

Australia instead decides to procure a new fleet of submarines, probably diesel-electric but possibly propelled by low-enriched uranium. These will to a large extent be built in Australia in order to maintain industrial capacity and autonomy regarding the maintenance of its assets. Efforts will be made to portray this as a new direction for AUKUS rather than a setback. A joint base in Australia for British and US SSNs and Australia's conventional submarines is touted as an important AUKUS outcome that enables the strategic interoperability of the pact's submarine forces. The advanced capabilities pillar is now touted as the main purpose of AUKUS cooperation. This is in line with Marles' suggestion in July 2022 that high-tech weapons such as

hypersonic missiles could be more important to Australia's security than the much discussed nuclear submarines.[19] The AUKUS working group on submarine acquisition is retrofitted to focus on making Australia's new conventional submarines interoperable with the new Virginia class and the British Astute class, and to ensure that the whole AUKUS fleet makes use of the new technology coming out of the other technical working groups.

This scenario would be more likely if relations between Australia and the US administration became strained, as it was at times during the Trump presidency. It might also be facilitated by if not a Sino-US détente, then at least a trajectory that suggests that China's challenge to the western order will mainly play out in the geo-economic realm. Declining support for Russia in its war with Ukraine or timid responses to US signalling of solidarity with Taiwan could be examples of such a development.

Third-party perspective:

- A cancelled SSN contract and the procurement of a new class of conventional submarines, probably built in Australia, make the gap a pressing issue once again. Hence, the Collins LOTE will, as in the first scenario, be extensive in order to increase both functionality and lifetime. This leaves considerable opportunities for third-party actors.
- The obvious prize is still the new class of submarine for the RAN. Here it should be expected that synergies will be sought and prioritized between the Collins LOTE class and the new submarines, involving considerable gains for any contract winner. It should be noted, however, that with increased geopolitical tension, the premium that any buyer will pay for political alignment increases, which makes competition less focused on technical aspects and costs.
- As in scenario 2, the new conventional submarine could present further export opportunities in the region, especially as it will be designed for full interoperability with US naval resources.
- Despite efforts to portray this as the core of AUKUS, advanced capabilities development might lose momentum when the SSN contract is cancelled. Even with less cooperative depth, however, there might be interesting opportunities for third-party engagement as these streams would now be more general-purpose technology cooperation without links to SSN development.

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