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AJRC Working Paper No. 04/2024

May 2024

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Keywords

Japan, nuclear-powered submarines, AUKUS, Indo-Pacific, defence capabilities

Suggested citation:

George Mulgan, A., 2024. "Can Japan contribute to AUKUS?". AJRC Working Paper No. 4, May 2024. Australia-Japan Research Centre, Crawford School of Public Policy, The Australian National University.

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ISSN 0 728 8409

Can Japan contribute to AUKUS?

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Following public advocacy by former Japanese prime minister Taro Aso, Japan's potential involvement in the two key pillars of the AUKUS partnership — acquiring nuclear submarines and the sharing of 'advanced capabilities' — has come under scrutiny. The logistics of Japan's potential acquisition of US nuclear-powered submarines would at the very least significantly delay Japan's formal participation in the AUKUS agreement by way of Pillar 1, while the political context in which Prime Minister Fumio Kishida and the ruling Liberal Democratic Party (LDP) are currently operating would complicate matters even more. However, the drawbacks of nuclear submarines notwithstanding, Japan's domestic R&D advancements and technology-sharing development in fields considered 'non-traditional security', as well as reform of its security clearance system and unique position in a deteriorating security climate — underscore the case for close collaboration between Japan and the AUKUS triad on Pillar 2 advanced capabilities. As both AUKUS partners and the Japanese government continue to explore avenues for deeper cooperation, this paper assesses Japan's technological advancements and strategic priorities against the criteria for participation in AUKUS as the country sits poised to make further significant contributions to defence capability-building and innovation in the Indo-Pacific.

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Former Japanese prime minister Taro Aso's speech to the Australian Institute of International Affairs in Canberra in November 2023 strongly advocated the idea of Japan's joining the AUKUS partnership — turning it into 'JAUKUS'. Although he provided no detail about what Japan's actual role might be, he clearly supported the notion of the group sending a strong message of deterrence to China as well as 'contributing greatly' to Australia's submarine capabilities (George Mulgan, 2023).

Aso is also an outspoken advocate of the use of submarines in a China–Taiwan conflict. In a January 2024 speech in his own constituency in Fukuoka, a local newspaper reported him as asserting that in the event of a Taiwan contingency, his country's role would be to use submarines to fight in the Taiwan Strait and that Japan needed to make the necessary preparations. He followed this up with a visit to Washington DC, where his speech to a US think tank argued pointedly not only for putting in place international deterrence against a Chinese attack on Taiwan but also for the need to expand cooperation with allies such as Australia. Aso's comments are particularly significant given that he is a powerful player in the current administration as LDP vice-president and an influential voice in the country's international relations.

Japan's options for becoming an AUKUS partner are potentially twofold. First, like Australia, it could apply for full AUKUS membership by seeking to acquire conventionally armed, nuclear-powered submarines, thus participating in Pillar 1, as well as sharing developments in 'advanced [military] capabilities' with its AUKUS partners (Pillar 2). These capabilities encompass eight separate subcategories: 'undersea capabilities', 'quantum technologies', 'artificial intelligence (AI) and autonomy', 'advanced cyber', 'hypersonic and counter-hypersonic capabilities', 'electronic warfare', 'innovation' and 'information sharing' (Prime Minister and Cabinet, 2022). Japan's second option is to limit its participation to Pillar 2 only.

In terms of Pillar 1, from Japan's own standpoint, its membership of AUKUS would depend on two major factors: political will and strategic imperatives. The former is primarily shaped by Japan's current government led by Prime Minister Fumio Kishida, a prominent figure and campaigner against the use of nuclear weapons, both domestically and internationally. Although he reportedly welcomed the creation of the new AUKUS framework in his first month in office in October 2021, this was not in the context of active consideration of Japan's acquiring nuclear-powered submarines. Kishida has publicly questioned whether nuclear submarines are a 'good idea' for Japan, citing 'the difficulty of using nuclear power for military purposes under Japan's atomic energy law as well as high operating costs' (Kyodo News, 2022a). Domestic discussion of Japan's participation in AUKUS has thus focused almost exclusively on Japan's potential participation in Pillar 2. Nevertheless, it is still relevant to ask whether Japan could optimise its military capabilities by acquiring nuclear-powered submarines.

Does Japan need nuclear-powered submarines?

Japan's major strategic imperative is to defend itself in a possible conflict with China over Taiwan. This is the dominant factor currently shaping the evolution of its defence policy and the development and expansion of its military capabilities. It might also influence Japan's political will to acquire nuclear-powered submarines. The question is, therefore, whether Japan actually requires nuclear-powered submarines to help achieve its military objectives in such a conflict. Would Japan gain a substantial military advantage if it deployed nuclear-powered submarines in addition to the submarines that it produces domestically? Here, the answer is debateable. Given that the current expansion in Japan's own submarine force substantially meets its immediate security needs, an argument can be made for Japan continuing to rely on its own submarine capabilities.

Submarines have been a key focus of recent developments in Japan's military capabilities. As Moriyasu argues, the nation has been engaging in 'quietly upgrading its submarine capabilities, adding some of the stealthiest boats in the world to its fleet to maintain a competitive edge over China' (Moriyasu, 2023a). Japan's newest Taigei-class diesel-electric attack submarine — the Hakugei (meaning 'White Whale') — was delivered to the Ministry of Defence (MOD) by Kawasaki Heavy Industries in March 2023. It is specifically intended for operational deployments by the Maritime Self-Defence Force (MSDF) (Vavasseur, 2023) and with a capacity for 'longer underwater operations' (Moriyasu, 2023a).

The Hakugei adds to Japan's developing submarine capacity of Taigei-class submarines, with the first in this class built by Mitsubishi Heavy Industries and commissioned into service in March 2022. The MOD has allocated funds for the construction of four more, for a total of six Taigei-class submarines that will replace the existing Oyashio-class submarines over the next decade. With the launch of the Hakugei, Japan's total submarine fleet grew to 22, a figure that will be maintained by replacing each retiring submarine with a new vessel coming into service (Moriyasu, 2023a).

In a significant respect, the Taigei-class Hakugei has a competitive advantage over nuclear-powered submarines insofar as it operates like a hybrid vehicle — charging the lithium-ion battery system while running on a diesel engine then switching to battery power when in operational mode in deep waters. In this mode, unlike the nuclear-powered submarines that cannot turn off their reactors, the Hakugei is virtually silent (Moriyasu, 2023a). Indeed, the Taigei-class submarines have the quietest diesel-electric engines in the world (Moriyasu, 2021). Moreover, as naval technology experts point out, the submarines have a 'new acoustic absorbent material and a floating floor structure to ensure quiet operation … [These] … increased stealth capabilities … reduce the chances of enemy forces discovering the ship' (Verdict Media Limited, 2022).

The Taigei-class submarines thus meet Japan's specific defence needs in the immediate sea environs of the Japanese islands. Given their stealth capacity and ability 'to travel longer and at higher speeds under water than conventional diesel-electric submarines' (Wikipedia, 2024), they are ideal for defending chokepoints in an island chain such as the Nansei Islands — which consists of around 200 islands stretching southwest from Japan's Kagoshima and Okinawa Prefectures towards Taiwan — China's so-called 'gateway' to the Pacific. They could, for example, defend chokepoints in the East China Sea in a potential Taiwan crisis by attacking Chinese submarines seeking to 'break out into the Pacific Ocean' (Moriyasu, 2023a). As Hornung argues, 'If you're looking at the Nansei Islands, there are so many chokepoints that with the combination of the Maritime Self-Defense Force's submarine capabilities and defensive mining, Japan could plug that up completely, and it would force the Chinese either all the way around Taiwan, or basically right into the battle space in the East China Sea, where the U.S. and Japan can plan for this and control it'.[1]

[1] Quoted in Ken Moriyasu, 'US eyes using Japan's submarines to "choke" Chinese navy', *Nikkei Asia,* 5 May 2023, https://asia.nikkei.com/Politics/International-relations/Indo-Pacific/US-eyes-using-Japan-s-submarines-to-choke-Chinese-navy.

Another competitive advantage of the Taigei-class submarines is their strengthened steel hulls that are more suitable for deeper waters because they provide 'high water pressure resistance' (Verdict Media Limited, 2022). They could, therefore, be deployed for anti-submarine warfare in the deeper waters of the South China Sea with an average depth of more than 1,000 metres,[2] where China now has the capability to deploy conventionally armed, intercontinental-range ballistic missile submarines in order to strike targets in the continental United States, Alaska and Hawaii with the aim of deterring the United States from entering a China–Taiwan conflict (Moriyasu, 2023b).

In fact, Japan's Taigei-class submarines could wait at choke points across the entire first island-chain — the 'imaginary line that stretches from the Japanese archipelago to Taiwan, onward to the Philippines and eventually Borneo and the Singapore Strait' (Geobukseon, 2023) — thus embracing both the East and South China Seas. Such a military capability 'would pose a significant threat to Chinese submarines attempting to pass these islands to reach the safer waters of the deep Pacific Ocean' (Moriyasu, 2021).

[2] This compares with around 300 metres in the East China Sea.

As Fish points out, ‘Japan’s fleet of diesel-electric powered submarines are “excellent platforms for operating in the Sea of Japan, Yellow Sea, East China Sea, the South China Sea and the wider Western Pacific and Indo-Pacific theatre”’ (Takahashi, 2021). While they do not have the speed and ability to stay submerged for longer periods like nuclear-powered submarines, they do meet the requirements of Japan’s basic submarine strategy which ‘is to lurk in the straits and attack the enemy’ (Yahoo Japan Nyūsu, 2023). They would, therefore, be an important way in which Japan could contribute to joint US–Japanese military operations in a regional contingency.

In April 2023, the MOD also announced that it would start developing submarine-launched, long-range cruise missiles, which would be hypersonic weapons capable of travelling at five times the speed of sound (Takeuchi, 2023a). They would be fired from submarine-based vertical launch systems (VLS), have an extended range of around 1,000km and would be deployed in the 2030s (Iwama, 2023). They would, therefore, constitute one of the major pillars of Japan’s so-called ‘counterstrike capabilities’ centring on standoff missiles designed to deter an attack on Japan.

The MOD has already been developing an upgraded version of the Ground Self-Defence Force’s Type 12 surface-to-ship guided missile to extend its range and which can be launched from the ground, or from naval vessels and aircraft, but by adding submarines as possible launch platforms, particularly the new diesel-electric Taigei-class submarines known for their quiet operation underwater (Iwama, 2023), the MOD aims to diversify launch modes and thus increase deterrence.

In addition to developing the onboard vertical launching system, the MOD has revealed that it is also considering modifying existing torpedo tubes on submarines for a horizontal launch system, which will speed up the deployment of underwater counterstrike capabilities while the VLS is being developed (Takeuchi, 2023a). This will make it possible for Japan to deploy submarine-launched standoff missiles with a 1,000km range as early as 2028, enabling it to better prepare for possible missile attacks by North Korea, China, or other adversaries (Iwama, 2023). The vertically launched missiles require entirely new equipment and extensive modifications to the submarines, but by deploying horizontally launched missiles from torpedo tubes, Japan's submarines will end up being equipped with both vertical and horizontal launch systems, enabling them to fire multiple missiles against enemy targets such as enemy ships and land-based targets in a short period of time (Iwama, 2023). The MSDF already possesses anti-ship missiles that can be launched from torpedo tubes, but their range is shorter than the standoff missiles (The Yomiuri Shimbun, 2021).

Significantly, the expanded range of the new missiles will give Japan the capability to attack China and North Korea, even from Japanese waters. By having long-range missiles on submarines that are difficult to track will also pose a significant challenge to Japan's enemies trying to figure out where to direct a counterattack (Takeuchi, 2023a), thus representing a more effective deterrent (Takeuchi, 2023b).

These recent and future developments in Japan's submarine capabilities suggest that the military advantages to Japan from acquiring nuclear-powered submarines — and thus participating in Pillar 1 — would not be compelling, quite apart from issues relating to difficulties of supply and cost (Clark, 2024); (Moriyasu, 2024). The significant domestic political opposition that pursuing such a policy option would face is also an important factor. Not surprisingly, any active discussion of Japan's potential participation in AUKUS has largely centred on Pillar 2.

Japan's potential contribution to Pillar 2

There are some areas of AUKUS high-tech trilateral cooperation where Japan could contribute and thus where it would be an asset to the trio. One field, for example, is electronic warfare capabilities, which Japan is boosting in an attempt to catch up with Russia and China. All branches of the Japanese Self-Defence Forces (SDF) are reportedly acquiring and enhancing the necessary 'electronic warfare equipment to strengthen their capabilities' (Narushige, 2023).

In October 2023, the Japanese media disclosed that the United States and Australia had 'joined hands' with Japan to develop next-generation military drones in the form of so-called 'collaborative combat aircraft' (CCA) or 'unmanned aerial vehicles' (UAVs), which will fly alongside fighter jets and draw on developments in Japan's AI and robotics technology (Moriyasu, 2023c). A January 2024 report also revealed that the MOD had concluded an agreement on AI and aerial drones with the Pentagon, which will facilitate Japan's participation in joint research on what it described as 'artificial intelligence-piloted autonomous aircraft' (CCA), for Japan (Nakamura, 2024a). Indeed, sharing of such advanced technology is emerging as 'a priority area of cooperation' for the United States and Japan (Nakamura, 2024a). These UAVs could also operate alongside the next generation fighter aircraft that Japan will co-develop with the United Kingdom and Italy under the Global Combat Air Program (GCAP) (Kyodo News, 2024a).

Another example is autonomous underwater vehicles (AUVs) — a category of unmanned underwater vehicles (UUVs) (George Mulgan, 2023) also known as underwater drones — where Japan is undertaking unprecedented advancements in its capabilities. In November 2022, plans were revealed for the country to develop underwater drones to lay and remove sea mines — adding to Japan's existing underwater drones that can detect mines — with the objective of achieving maritime superiority in a contingency near the Nansei Islands and deterring an enemy from invading using weapons such as naval vessels and submarines. These plans were finalised in 2023 with a government roadmap for the development of domestically produced AUVs by 2030 (Yomiuri Shimbun, 2023a).

In January 2024, Japan also signed a bilateral agreement with Australia to 'collaborate on autonomous and robotic systems related to undersea warfare' (Naval News Staff, 2024). This will involve joint research on unmanned underwater drones to be used for detecting sea mines and for other missions, which was made possible by a June 2023 agreement between the two countries 'to simplify procedures for joint technical studies on defense equipment' (Kyodo News, 2024b). The research will be conducted over four years until 2028 with the aim of developing underwater acoustic communication technology. The larger objective is to develop technology for underwater acoustic communication between the two countries' UUVs (Yomiuri Shimbun, 2024), and to 'contribute to strategic capabilities in undersea communication and interoperability between Australia and Japan' (Naval News Staff, 2024). It also suggests that Japan is already involved in a JAUKUS-type arrangement, given that 'undersea capabilities' are an important component of Pillar 2.

In fact, the MOD has plans to increase the use of drones across all SDF branches — ground, maritime and air — given their ability to destroy enemy forces and assets at a relatively low cost (Kyodo News, 2022b). In May 2023, a plan was announced to establish a consortium of some 40 government agencies, commercial enterprises and academic institutions to domestically produce AUVs for monitoring foreign vessels and submarines operating around Japan and also for non-military tasks in order to catch up with leading US, UK and Chinese developments in this field (Yomiuri Shimbun, 2023b). One project beginning in 2025 will develop an underwater drone that can withstand a depth of 7,000 metres, enabling it to dive to the bottom of the Japan Trench, one of the deepest in the world (Kodama, 2023).

Other developments are also taking place in Japan's security upgrade, which are potentially relevant to Pillar 2. The government is incorporating into its defence budget framework broader security domains such as space and cyber programs. In May 2023, it announced that it would expand the use of outer space for defence, particularly to ensure the safety of its intelligence-gathering satellites, given China and Russia's increasing use of space for military purposes, including their development of capabilities to destroy or disable other countries' satellites (Kyodo News, 2023a). Small satellite constellations will be deployed to speed up information transmission along with improvements in analysing imaging through AI in order to detect Chinese hypersonic weapons (Kyodo News, 2023a). This will add substantially to Japan's counter-hypersonic capabilities.

The Japanese and US defence forces have also agreed to develop technology to intercept hypersonic weapons at a great distance, including the planned 2024 launch of a jointly developed new missile known as the 'Glide Phase Interceptor' (GPI) to intercept hypersonic weapons being developed by Russia and North Korea as well as by China, with 75 billion yen requested for this purpose in the FY2024 Japanese defence budget and with a target date of the 2030s for completion. The missile will be deployed by the MSDF on their Aegis destroyers as well as on other naval ships and will target hypersonic weapons at the gliding stage of their irregular trajectories at lower altitudes (Jiji Press, 2023a).

Japan's own hypersonic capabilities are a field that has been prioritised for development in boosting Japan's defence capabilities. The government revealed as early as 2018 that it was working on developing hypersonic missiles, with two classes of hypersonic weapons with a range of around 500km in mind: hypersonic cruise missiles (HCMs) and hyper-velocity gliding projectiles (HVGPs) that 'would be capable of attacking targets on land and at sea' (The Week Web Desk, 2022). The HVGP will have an 'armour-piercing warhead designed specifically for penetrating "the deck of the aircraft carrier" … [namely] China's growing fleet of aircraft carriers' (The Week Web Desk, 2022). In a related development, Japan also revealed that another weapon scheduled for development included an electromagnetic railgun that can counter hypersonic weapons being developed by China.

Other Japanese policy developments are also of potential relevance to AUKUS Pillar 2 collaboration. In June 2023, the MOD revealed plans to establish guidelines for key defence technologies that will be prioritised for development over the next decade with a view to countering advanced Chinese weaponry. The 12 areas chosen for priority development include miniaturised robotic technology, cyberattack detection, anti-drone lasers, electromagnetic barriers and capabilities for using large datasets to facilitate better strategic predictions (Kyodo News, 2023b). This approach aligns with Japan's official 2022 defence policy documents that called 'for protecting Japan from all directions … [meaning] not just air, land and sea, but space and cyberspace, economic security, etc' (Bosack, 2023).

The MOD is also actively liaising with the executives of business startups in the areas of outer space, cyberspace, drones, robots, AI and sensors to determine whether their expertise and products can be used by the SDF and to encourage these companies to enter the defence market (Yomiuri Shimbun, 2023c). Indeed, the MOD's proactive policy towards working with the private sector on joint research projects to hone technologies like drones and AI under its 'Advanced Technology Bridging Research' program outlined in its June 2023 Defense Technology Guideline aims to 'identify promising advanced technologies from outcomes of basic research and to nurture them for utilisation in defense applications' (Ministry of Defense, 2023, p. 9). This will continue to accelerate Japan's advancement in military-related fields (Takeuchi, 2024).

In August 2023, a meeting of Japanese cabinet ministers involved in the 'comprehensive bolstering' of defence capabilities also designated technological expertise in nine areas as conducive to ensuring national defence. The fields included energy, computing, information security, materials and automation technology. In line with this policy, the government will offer various incentives such as tax benefits and subsidies to support the research and development of technology such as high-capacity batteries, UAVs, quantum computers and AI to expand the scope of dual-use technology in defence (Baba & Takeuchi, 2023) (Jiji Press, 2023b).

This list of priorities only adds to the case that Japan's potential for collaborating with the United States, Australia and the United Kingdom in Pillar 2 remains strong, with the prospect welcomed by AUKUS members (Shetler-Jones, 2022). As Bassi points out, Japan 'already performs strongly in some key areas relevant to the AUKUS partnership' (Bassi, 2023).

While the lack of a security clearance system for information in technological fields (Sasaki, 2023) has made it difficult for Japan to share classified and intelligence-related technologies (Tarapore, 2021), this is now subject to government-driven reform. In February 2024, the Japanese cabinet approved draft legislation to establish a 'security clearance' system for newly emerging 'dual-use' technology being developed by private sector businesses but which could also be deployed for military purposes (Johnson, 2024). This so-called 'second tier' in Japan's security clearance regime will cover information where the lines between civilian and military applications are blurred, such as information on AI, cyberspace and outer space (Jibiki, 2024). It is designed to facilitate technical cooperation with overseas partners as well as an expansion in international business opportunities for Japanese companies (Fujita, 2024). It will, therefore, facilitate a positive response from Japan to an invitation for collaboration on projects aiming to co-develop cutting-edge defence technologies currently under consideration by the current AUKUS partners (Nakamura, 2024b).

In early May 2024, the Japanese Diet finally enacted the necessary legislation to establish a security clearance system. It will allow 'critical government information to be classified on economic security grounds … [and with] information related to cutting-edge technologies and infrastructure expected to be included' (Kyodo News, 2024c). Despite the successful passage of the new law, there remain 'lingering concerns about Japan's lack of strong cyberdefenses and tough rules for guarding secrets' (Dominguez, 2024), including its not being a member of the so-called 'Five Eyes' Anglosphere intelligence alliance, which encompasses the members of AUKUS Pillar 1.

Another significant development is the possibility that the Chinese military might deploy nuclear ballistic missile submarines to deter the United States from joining a conflict over Taiwan. These would seek out the safer and deeper waters of the Sea of Japan, which offers these submarines a place to hide given the AUKUS submarine presence in the South China Sea, which aims to contain Chinese submarines there and make it less safe for them by deploying a '"transparent sea" initiative that seeks to improve undersea surveillance capabilities using advanced technology' (Kosaka, 2024). This potentially new strategic threat posed by China's deployment of nuclear submarine-launched ballistic missiles in the Sea of Japan would require Japan to expand collaboration with the three AUKUS militaries in deep sea defence (Kosaka, 2024) in addition to improving its own sub-attack capabilities in order to defend possible chokepoints in the Sea of Japan with its Taigei-class diesel-electric submarines.

Conclusion

Given the formidable obstacles to Japan's participation in AUKUS Pillar 1 relating to cost and supply of US nuclear-powered submarines, as well as domestic political factors and Japan's deployment of a significant indigenous submarine capability, it will not be a participant in AUKUS Pillar 1 for the foreseeable future. On the other hand, Japan can potentially make a valuable contribution to Pillar 2 in critical areas of leading-edge military technology such as drones and AI. These are an important facet of Japan's unprecedented expansion in military and defence capabilities, which has accelerated to its highest level in the postwar period. Pillar 2 collaboration with Japan by the AUKUS triad will also facilitate their joining Japan on this trajectory.

The value of such collaboration is being increasingly recognised by the AUKUS partners who have begun talks on the possibility of inviting Japan to collaborate in the development of the advanced warfighting capabilities in which Japan is already excelling. Defence ministers of the three countries, for example, issued a joint statement saying 'Recognising Japan's strengths and its close bilateral defense partnerships with all three countries, we are considering cooperation with Japan on AUKUS Pillar II advanced capability projects' (Jiji Press, 2024), including in areas such as AI and hypersonic weapons. Australian Prime Minister Anthony Albanese later clarified that formally expanding the membership of AUKUS was not being proposed (Mehta, 2024). However, what was being proposed was 'to look at pillar two of AUKUS, and look at, project by project, whether there would be engagement, and Japan is a natural candidate for that to occur' (Prime Minister and Cabinet, 2024).

During Kishida's visit to Washington DC in early April 2024, US President Joe Biden also made the point that 'the AUKUS defence partnership was exploring "how Japan can join our work in the second pillar, which focuses on advanced capabilities, including AI, autonomous systems"' (Falconer, 2024), adding, 'All told, that represents a new benchmark for our military cooperation across a range of capabilities' (Nishimura & Kiyomiya, 2024). The Biden administration will reportedly identify 'a specific project for Japanese participation by the end of the year' (Johnstone, 2024). The Pentagon has also declared that the United States, the United Kingdom and Australia 'were considering including Japan in the AUKUS partnership' (The Associated Press, 2024).

The Japanese perspective on the issue was publicly revealed in the joint statement from the Kishida–Biden summit, which declared that ‘Japan would consider how it could cooperate with AUKUS’ (Nishimura & Kiyomiya, 2024). Kishida’s own words were that ‘specific areas of cooperation would be decided upon after further consideration’ (Nishimura & Kiyomiya, 2024). Japanese Defence Minister Minoru Kihara also commented on the prospect of further collaboration with AUKUS partners saying, ‘It is important for peace and stability in the Indo-Pacific region to strengthen defence cooperation between the United States, the United Kingdom and Australia by promoting AUKUS ties. Japan will steadfastly support these efforts’ (NHK World-Japan, 2024). These statements followed an earlier expression of interest in the possibility of Japan’s technical cooperation in the field of advanced military capabilities in an official statement from its embassy in Australia.

Thus, while Kishida has not yet formally committed his country to joining AUKUS, it is highly likely that Japan will participate in the ‘natural evolution’ of AUKUS as a military technology partnership.[3] This will involve its collaboration with the three AUKUS partners in Pillar 2 advanced capability projects where it is poised to make a significant contribution.

[3] Prime Minister of Australia, Anthony Albanese, described Japan’s joining AUKUS under a technology-sharing arrangement as ‘a natural evolution of the trilateral security pact.’ *The Canberra Times,* 12 April 2024, p. 20.

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