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AUKUS Advanced Capabilities:
New Capability Acquisition Needed for a New Partnership

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Exercise Solo Flight

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AUKUS Advanced Capabilities: New Capability Acquisition Needed for a New Partnership

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AUKUS ADVANCED CAPABILITIES:
NEW CAPABILITY ACQUISITION NEEDED FOR A NEW PARTNERSHIP

The security environment in the Indo – Pacific and globally is deteriorating. Within this landscape the Australia, United Kingdom and United States partnership (AUKUS) was signed on 15 September 2021 strengthening credible deterrence.[1] Inexactly, AUKUS seeks to counter the increasing threat of China along two distinct lines of effort, Pillar 1 – nuclear submarines and Pillar 2 – advanced capabilities.[2] Moreover, AUKUS has been described as an accelerator of technological development and "will require new approaches to well-worn institutional arrangements within the AUKUS nations".[3]

While the announcement of nuclear submarines dominated AUKUS headlines, it is argued that the advanced capability line of effort is of more value.[4] [5] Examples of advanced capabilities identified as part of AUKUS include undersea capabilities, artificial intelligence and hypersonic capabilities.[6] It can be argued that many of the advanced technologies identified in AUKUS are emerging and unproven. Therefore, how can these unproven technologies be brought into service in a timely manner to address the deteriorating security environment?

This essay will address selected advanced capabilities in greater detail, then provide contrasting examples of pathways for bringing into service new capabilities. This will be followed by the key risks relating to advanced capabilities in AUKUS and brief commentary on legal and regulatory considerations. Finally, a recommendation on priority of focus will be provided. This will demonstrate that the successful implementation of unproven advanced capabilities within the context of AUKUS Pillar 2, will rely on innovative pathways for successful implementation.

Advanced capabilities within AUKUS are based on technology that is unproven and emerging. The Oxford dictionary simply notes capability as 'the power or ability to do something' and advanced as 'modern and recently developed'. Therefore, advanced capabilities are the ability to do something modern and recently developed. The advanced capabilities of AUKUS are undersea capabilities, quantum technologies, artificial intelligence and autonomy, advanced cyber, hypersonic and counter hypersonic capabilities, electronic warfare, innovation and information sharing.[7] To clearly demonstrate the emergent and unproven status of advanced capabilities in

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[1] Michael Shoebridge, *"What is AUKUS and What is it not?",* Australian Strategic Policy Institute, (December 2021): 167
[2] Department of Prime Minister and Cabinet, *"Fact Sheet – Implementation of the Australia – United Kingdom – United States Partnership (AUKUS)"*, accessed May 2024 https://pmtranscripts.pmc.gov.au/sites/default/files/AUKUS-factsheet.pdf
[3] Shoebridge, *"What is AUKUS and What is it not?",* (2021): 170
[4] Harlan Ullman, *"Start Thinking Now about Alternatives to AUKUS Pillar1"*, Barton, Last accessed 30 April 2024 https://login.cfc.idm.oclc.org/login?url=https://www.proquest.com/blogs-podcasts-websites/start-thinking-now-about-alternatives-aukus/docview/3048259434/se-2
[5] Thomas Corben, *"AUKUS: A year on what to make of AUKUS after 365 days?"*, United Service Volume, (June 2023): 13
[6] Department of Prime Minister and Cabinet, "*Fact Sheet – Implementation of the Australia – United Kingdom – United States Partnership (AUKUS)"*, https://pmtranscripts.pmc.gov.au/sites/default/files/AUKUS-factsheet.pdf
[7] *Ibid*

AUKUS, undersea capabilities, hypersonic capabilities and artificial intelligence will be explored further.

Undersea capability development within AUKUS is relatively well progressed. This aspect seeks to field autonomous underwater vehicles as a force multiplier.[8] The leading example is Ghost Shark, a "stealthy, long-range autonomous undersea warfare capability that can conduct persistent intelligence, surveillance, reconnaissance and strike."[9] The development of Ghost Shark is a partnership between the Australian Department of Defence and Anduril Australia. A United States based company, Anduril Industries expanded to Australia in 2022 with a commitment to design, develop and manufacture product lines in Australia.[10] The Anduril Industries mission is "Transforming US & allied military capabilities with advanced technology".[11] While the Ghost Shark program is scheduled to deliver a production variant in 2025, this advanced capability is unproven. However, the way in which this undersea capability has been developed to date, provides insight to a model that could be more broadly applied.

Hypersonic weapons are a key priority of AUKUS. Travelling at mach 5 and above, it is recognised that it is technically feasible for hypersonic weapons to deliver conventional payloads.[12] Additionally, hypersonic weapons are envisaged to also be able to defeat current air defence systems.[13] In the context of AUKUS, hypersonic technologies will have the potential to seriously degrade Chinese nuclear capability.[14] However the hypersonic capability has been in existence for less than a decade, with the three leading nations, the United States, China and Russia most likely only having reached an interim level of operating capability.[15] It is recognised that this technology is developing quicker when compared to historical trends.[16] However this pace of development is offset by the hypersonic capability not being a single technology, rather a collection of interrelated technologies.[17] This complexity in technological development and progress to date demonstrates hypersonic capability is unproven.

Artificial intelligence is a key AUKUS advanced capability. Artificial intelligence continues to rapidly evolve since emerging in the 1940's.[18] One view is there is no clear definition of artificial intelligence.[19] It could then be argued this lack of

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[8] Department of Prime Minister and Cabinet, *"Fact Sheet – Implementation of the Australia – United Kingdom – United States Partnership (AUKUS)"*, https://pmtranscripts.pmc.gov.au/sites/default/files/AUKUS-factsheet.pdf
[9] Department of Defence, *"Undersea robots set to patrol and protect"*, last accessed 26 April 2024, https://www.defence.gov.au/news-events/news/2024-04-26/undersea-robots-set-patrol-and-protect
[10] Anduril Industries, *"Anduril Expands to Australia"*, last accessed 22 July 2022, https://www.anduril.com/article/defence-technology-company-anduril-expands-globally-to-australia/
[11] Anduril Industries, *"Mission"* accessed May 2024, https://www.anduril.com/mission/
[12] N Terry, *"Hypersonic Technology: An Evolution in Nuclear Weapons?"*, Strategic Studies Quarterly, (2020): 74.
[13] *Ibid. 87.*
[14] J. McFarland, *"The Development of Hypersonic Weapons in the US, China and Russia: An Incipient Arms Race"*, The RUSI Journal, (2023): 13.
[15] Ibid.18.
[16] N Terry, *"Hypersonic Technology: An Evolution in Nuclear Weapons?"*, (2020): 80.
[17] Ibid. 75-76.
[18] M. Haenlein, A. Kaplan, *"A Brief History of Artificial Intelligence: On the Past, Present and Future of Artificial Intelligence"*, California Management Review, (2019): 6.
[19] T. Taylor, *"Artificial Intelligence in Defence: When AI Meets Defence Acquisition Processes and Behaviours"*, The RUSI Journal, (2019): 73.

definition is evidence of the rapidly evolving nature of artificial intelligence. Therefore, a view is that artificial intelligence cannot be defined and is constantly evolving suggests that it can never be proven.

However, one definition of artificial intelligence notes it as a systems ability to interpret data, to learn from data interpreted, and apply those lessons to achieve an outcome.[20] This definition of artificial intelligence can be applied in a military context. Its role in militaries will likely be both in warfighting and deterrence.[21] However, the limited size of the defence sector globally is not attractive for private industry investment. This presents a challenge for the development of artificial intelligence for military uses due to reduced investment and momentum.[22] Moreover, private sector artificial intelligence companies have indicated hesitation in dealing with the militaries due to speed of procurement. AUKUS seeks to overcome these barriers with scale and priority on rapid development. Overcoming barriers to further development of artificial intelligence will be required to prove this technology as part of AUKUS objectives.

Analysis of the AUKUS advanced capabilities undersea, hypersonic technologies and artificial intelligence strongly suggest these capabilities are unproven. However, this analysis this has provided an indication of an approach to expedite development. In summary, although AUKUS does provide for the exchange of sensitive military technologies, it has not yet delivered a proven capability.[23]

To demonstrate complexity in bringing new technology to service within AUKUS, a traditional capability development process will be outlined. Briefly exploring contrasting case studies will add weight to a suggested model for development of AUKUS advanced capabilities.

In the shadow of the AUKUS announcement the Australian Department of Defence updated the Defence Capability Manual in 2022. This manual describes high-level capability processes and integration to deliver the Australian Government's strategic intent. The manual delivers a principled approach to capability development, outlining foundations and governance, and four phases of development. The four phases see development of capability from a strategy and concepts phase, risk phase, acquisition phase and in-service and disposal phase. The manual notes fifteen committees and groups needed to ensure all requirements are met.[24] Intuitively, it can be concluded that the Australian Defence Capability Manual does not allow for innovative pathways for capability development. On the other hand, this manual suggests a highly bureaucratic approach that follows a linear, time-consuming trajectory.

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[20] M. Haenlein, A. Kaplan, "*A Brief History of Artificial Intelligence: On the Past, Present and Future of Artificial Intelligence"*, (2019): 5.
[21] T. Taylor, *"Artificial Intelligence in Defence: When AI Meets Defence Acquisition Processes and Behaviours"*, (2019): 75.
[22] Ibid.
[23] S. Khan, *"The AUKUS Alliance and its Implications on the Non-Proliferation Treaty"*, BTTN Journal, (2022): 84.
[24] Department of Defence, *"Defence Capability Manual"*, last updated 21 December 2021, https://www.defence.gov.au/business-industry/industry-governance/industry-regulations/defence-capability-manual

Building on observations about the Australian Department of Defence Capability Manual, it could be deduced that each AUKUS partner possess hefty processes that do not support timely capability development. The characteristics of these programs are designed to ensure Australia, the United Kingdom and United States meet respective individual national obligations. However, one options to deliver outcomes for AUKUS involves combining or modifying existing systems to form an agreed approach. Should the processes be combined or modified it is likely to result in a more complex process that would not deliver an outcome in a timely manner. Alternatively, an AUKUS partner could be nominated as lead for chosen advanced capabilities. Should this approach be adopted, other partners would have to cede elements of sovereign capability development that may have broader impacts in areas such as defence industry, security and their economies. Thus, it is reasonable to conclude that existing models for capability development are not suited to the timely generation of advanced capabilities outlined in AUKUS.

An example demonstrating time-consuming and ineffective nature of current capability acquisition undertaken by an AUKUS partner, is the Australian MRH-90 Taipan helicopter. First ordered in 2004 as part of the Air 9000 program, the Taipan was selected to fulfill a multi role, rotary wing capability for the Australian Army.[25] Having been designated a project of concern for a decade, the Taipan was scheduled to be replaced by the Sikorsky UH-60M Black Hawk.[26] However, the Taipan was abruptly withdrawn from service in 2023 after a fatal crash.[27] Arguably, the nineteen-year life span of the Taipan helicopter far exceeds the available time for advanced capabilities in AUKUS to be delivered, noting the deteriorating security situation underpinning the AUKUS partnership.

Further, the time-consuming, linear acquisition process undertaken for the Taipan had critical failings. It was noted that the maintenance system and number of bases where the airframe was located exacerbated availability issues.[28] The fundamental outputs of maintenance management and basing were either poorly recommended or poorly implemented. If recommendations did not suitably address maintenance, this suggests failures in the process. Similarly, if recommendations were poorly implemented, this suggests a lack of confidence in the acquisition process. Regardless, the outcome resulted in a substandard airframe availability. The example of the Taipan demonstrates that a traditional linear process not only takes significant time, it also cannot meet basic capability development requirements. Challenges highlighted in the example of the Taipan with traditional capability development are further exacerbated in AUKUS by the combination of unproven technologies and three partners. It is evident that there are significant challenges with traditional capability acquisition techniques for advanced capabilities in AUKUS.

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[25] B. Felton, *"End of the Road for Army's Taipan"*, Australian Defence Magazine, published 29 September 2023, https://www.australiandefence.com.au/defence/land/end-of-the-road-for-army-s-taipan
[26] D. Perry, *"Canberra Calls Time on Taipan"*, Flight International, published January 2022, https://login.cfc.idm.oclc.org/login?url=https://www.proquest.com/magazines/canberra-calls-time-on-taipan/docview/2689220439/se-2.
[27] B. Felton, *"End of the Road for Army's Taipan"*, 2023, https://www.australiandefence.com.au/defence/land/end-of-the-road-for-army-s-taipan
[28] K. Bergman, "*The U.S. Army is moving to new generation helicopters, but not Australia"*, Asia-Pacific Defence Reporter, revised 30 March 2023, https://search-informit-org.cfc.idm.oclc.org/doi/epdf/10.3316/agispt.20230306084193

In contrast the rapid development of the Ghost Shark suggests an alternate model to deliver advanced capabilities identified in AUKUS. As a partnership between industry and the Australian Department of Defence, the program has delivered a prototype ahead of schedule and under budget involving 42 companies in Australia. The Royal Australian Navy has stated it is exploring "the potential for synergies between Navy's XL-AUV program [Ghost Shark] and future trilateral collaboration through AUKUS Advanced Capabilities."[29] This example demonstrates the added benefit of closer partnership with private industry in achieving strategic outcomes when compared with the process adopted with Taipan.

The unmanned aerial system 'OWL' has striking similarities with the development approach demonstrated by Ghost Shark. This system is designed to loiter and deliver munitions up to 200km from the originator. Development has occurred with a partnership between special operations units in the Australian Army and industry. The program commenced in 2022 and is being funded by the Department of Defence.[30] It is accepted that this is a simple technology when compared to Ghost Shark and Taipan. However, like Ghost Shark, the partnership between military and industry is the basis for the current success of the OWL program.

Success realised in both the Ghost Shark and OWL programs suggest a model of development for AUKUS advanced capabilities. These programs have been headlined by a closer development arrangement between industry and defence. In contrast, the Taipan program represents a traditional capability development and acquisition process. Therefore, a model more likely to succeed in delivering AUKUS advanced capabilities such as hypersonic and artificial intelligence is one where there is greater involvement of private industry.

An understanding of key risks, legal, and regulatory considerations related to advanced capabilities in AUKUS is required to inform any future approach to capability development. A key strategic risk that colours any development of advanced capabilities in AUKUS relates to nuclear non-proliferation. When Australia takes possession of nuclear submarines, it will be the only country globally to operate these platforms while not having nuclear weapons.[31] This has raised concerns and could jeopardise Australia's position globally in relation to nuclear non-proliferation. It could also suggest a pseudo increase in capability for the United States in particular, even though it has been made clear that new nuclear submarines will not be equipped with nuclear armament.

Advanced capabilities identified in AUKUS indirectly increase risks to nuclear non-proliferation. Specifically, hypersonic capabilities included in AUKUS are noted as being potentially useful in degrading an opponent's nuclear network. Moreover, it is possible that other advanced technologies could be used to further degrade an opponent's nuclear capability. In the context of AUKUS and its objects, advance capabilities could have the opposite effect of non-proliferation by threatening Chinese nuclear capability and encouraging the Chinese to increase their nuclear arsenal. Thus,

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[29] Australian Defence Magazine, *"Defence and Anduril unveil first Ghost Shark prototype"*, published 18 April 2024, https://www.australiandefence.com.au/news/news/defence-and-anduril-unveil-first-ghost-shark-prototype

[30] B. Felton, *"Army to introduce Owl loitering munition"*, Australian Defence Magazine, published 3 June 2024, https://www.australiandefence.com.au/news/news/army-to-introduce-owl-loitering-munition

[31] S. Khan, *"The AUKUS Alliance and its Implications on the Non-Proliferation Treaty"*, (2022): 93.

the AUKUS agreement poses significant risk to nuclear non-proliferation.[32] It is challenging to mitigate this risk beyond traditional dialogue as any advances in AUKUS capability is likely to be seen as a direct threat to China.

A direct risk to the development of advanced capabilities in AUKUS is the way in which data relating to technology is classified. While the AUKUS partners have been sharing intelligence within the 5 Eyes framework for decades, there remains intelligence and information that is not shared between nations. This is evidenced by data relating to hypersonic trials not being available due to a likelihood it is classified.[33] There is as clear mitigant for this risk which is to entrust AUKUS based private companies with development responsibility. This would allow for information transfer between borders, within the confines of legally binding agreements.

One example of a legal barrier that will impede successful development of advanced capabilities within AUKUS is the International Trafficking in Arms Regulation (ITAR). ITAR continues to impede joint development between Australia and the United States. Designed to protect sovereign information, without resolution ITAR will significantly impede any sharing of information from the United States.[34] This is one aspect of the legal and regulatory environment that if not resolved will undermine the very best efforts to deliver advanced capabilities.[35]

The development of artificial intelligence as an AUKUS advanced capability presents unique regulatory challenges. The underlying question is how can this technology, that many leaders do not fully understand, and that is developing by itself, be regulated?[36] Two approaches could be adopted. Firstly, continued integration of artificial intelligence in the greater community will flow into military systems.[37] Secondly, rather than attempting to directly regulate artificial intelligence, focus should be applied to regulation of algorithms used to train the artificial intelligence.[38] The regulation of artificial intelligence is a challenge that must be overcome to realise this advanced capability in the AUKUS agreement.

AUKUS advanced capabilities are unproven. In a deteriorating security environment there must be demonstrable, timely progress to ensure a credible deterrent is maintained. Traditional capability development models are not suitable. They are too cumbersome and if combined will likely result in capability development paralysis. Traditional capability development models involve private industry as more of an end provider than leading development. It has been shown through examples of Ghost Shark and OWL, that greater industry involvement will result in more optimal outcomes. However, should this be adopted as a preferred model to deliver AUKUS advanced capabilities, significant attention must be paid by partners to risk management as some risks cannot be divested. Moreover, signatory states to AUKUS

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[32] *Ibid.*
[33] N Terry, *"Hypersonic Technology: An Evolution in Nuclear Weapons?"*, (2020): 90.
[34] Thomas Corben, "*AUKUS: A year on what to make of AUKUS after 365 days?"*, (June 2023): 15.
[35] Ibid. 17.
[36] M. Haenlein, A. Kaplan, *"A Brief History of Artificial Intelligence: On the Past, Present and Future of Artificial Intelligence"*, (2019): 13.
[37] T. Taylor, *"Artificial Intelligence in Defence: When AI Meets Defence Acquisition Processes and Behaviours"*, (2019): 75.
[38] M. Haenlein, A. Kaplan, *"A Brief History of Artificial Intelligence: On the Past, Present and Future of Artificial Intelligence"*, (2019): 11.

have responsibility to reduce the regulatory and legal burdens on private industry to ensure advanced capabilities are delivered as part of AUKUS.

This essay has shown that there must be greater involvement of private industry to successfully deliver advanced capabilities outlined in AUKUS. AUKUS partners cannot divest all risk and maintain responsibility to smooth the legal and regulatory waters for private industry. The Ghost Shark and OWL programs have thus far shown very good progress with a greater level of industry involvement than traditional capability development programs.

The foundation for this conclusion was selected advanced technologies in AUKUS being outlined. In doing so, a potential model for development of advanced technologies was identified. A traditional capability development approach was summarised and contrasted against two examples of development, highlighting greater industry involvement. An understanding of key risks, legal and regulatory challenges was then provided. This led to a recommendation of greater industry involvement. It has been argued that the successful implementation of unproven advanced capabilities within the context of AUKUS Pillar 2 will rely on innovative pathways for successful implementation.

AUKUS advanced capabilities remain unproven. In a deteriorating security environment, every effort must be made to advance these capabilities in the timeliest fashion possible. This is critical in ensuring the AUKUS partnership achieves the credible deterrence is strives for.

Significant investment must be made by Australia, the United Kingdom and United States to achieve AUKUS initiatives. Ensuring the regulatory environment is permissive, while mitigating risks is critical. Permissive regulation will enable industry and government to succeed, current regulation will only swamp the best of intentions with delay, confusion and additional cost.

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