CONNECTING THE AUKUS INNOVATION ECOSYSTEM

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INTRODUCTION

The AUKUS security partnership was established in 2021 to strengthen existing alliances between the United States, Australia, and the United Kingdom, further integrate their militaries to augment deterrence capabilities within an increasingly contentious global order, and to support a combined fight in a potential conflict.

The premise is that only by coming together and sharing technology and capabilities can the countries more effectively compete and fight against emerging and persisting threats. Military collaboration is the first pillar in the AUKUS framework. The second pillar centers on collaborating on the critical technologies positioned to become advanced capabilities—these include undersea capabilities, quantum technologies, artificial intelligence (AI), advanced cyber capabilities, hypersonic capabilities, electronic warfare, innovation, and information sharing. Pillar II will succeed only if all stakeholders within the innovator ecosystem connect and work together at the speed of urgency to meet critical and impending global threats. The stakeholders include start-up companies and researchers developing new technologies, the end users with critical mission requirements, the accelerators and institutions focused on transitioning technology, the defense industrial base (i.e., primes and small companies across the supply chain), and private capital.

A fundamental connection must be solidified between the sources of the emerging and critical technology and the owners of the requirements—the military end users who collectively have gaps in deterrence and conflict capabilities. Investors, both private and those connected to government entities, must have insight into the right technologies that can meet these critical mission needs. Once there is greater awareness about the most effective (often dual-use) technologies to meet end user needs, connections are essential to moving these technologies along the phases of the Technology Readiness Level (TRL) to ensure they can transition to capabilities. Accelerators and test centers, either funded through government resources or private, can help with this process, particularly if “meta-accelerators” can help connect all the necessary parties in a flexible manner. AUKUS parties can benefit from learning about, and potentially partnering with, established examples like the NATO Defence Innovation Accelerator for the North Atlantic (DIANA). Foundational to these necessary connections are supportive policies that ease collaboration among the players in all three countries.
Connecting Investments to Requirements

AUKUS Pillar II has eight focus areas across broad areas of technology that are grounded in joint AUKUS government mission requirements but need more granularity to guide the private sector toward targeted investments. Understanding the specific capability gaps and associated supporting technologies—on both the AUKUS side (through official requirements or government investment strategies) and the competitor side (i.e., where China is focusing)—within these eight sectors will support smarter, targeted investments into companies developing technologies that will most effectively fill these gaps. AUKUS partners have committed to establishing trilateral requirements to focus on key shared capability gaps, which will help streamline priorities and are intended to be managed through the new International Joint Requirements Oversight Council.3,4
Securely communicating these joint requirements to the private sector is a necessary next step. This communication can occur through a variety of means—the industry forums that are being set up under the AUKUS structure, other public-private meetings, or working groups that involve end users and technology creators. A successful activity-based partnership to reference is the Naval Postgraduate School’s Joint Interagency Field Experiment (JIFX). It’s open for use by the school’s faculty and students, along with private companies and academia, to test, demonstrate, and evaluate new technologies in an operational environment at no cost—with participation open to U.S. and foreign nationals.5

The Munich Security Conference and Boston Consulting Group in February 2024 published an insightful report on innovation, stressing that “best-in-class innovation partnerships apply an agile, iterative approach, constantly soliciting and integrating real-world input from real-world users during the design phase.”6 Australia’s newly released Defence Industry Development Strategy highlights the importance of integrating industry with defense innovation entities and instituted a new program to second defense industry personnel into defense organizations.7 The U.K.’s 2021 Defence and Security Industrial Strategy similarly emphasizes the need for government to work with industry to “drive research, enhance investment, and promote innovation.”8 Connection in the initial stage between requirements owners and technology creators will support more effective and efficient investment strategies, for both government investment arms and private investment funds.

AUKUS government investment entities are not organized or managed identically across each of the three nations, which is a critical blocker. However, the nations have a shared mission in furthering innovation within their respective defense industrial bases. Grants-based U.S. government offices provide funds in early stages of technology development within national priorities. These offices include entities like the Service S&T organizations like the Office of Naval Research Global, Army Research Labs (ARL), Service innovation organizations like AFWERX9 (Air Force Work Project), the Defense Innovation Unit (DIU),10 National Science Foundation Technology, Innovation, and Partnerships (TIPS),11 and the Department of Energy (which also has authorities to act as an accelerator).

U.K. Research and Innovation offers a variety of grants across research, innovation, doctorate programs, and fellowships across a range of disciplines and sectors that ultimately impact national security and defense. Australia’s Office of Defence Industry Support is tasked with supporting small and medium businesses’ engagement with Australian Defence through services such as direct linkages to procurement programs and tailoring grants to assist development. Venture investment funds like In-Q-Tel (IQT), which has offices in all three countries, take stake in companies and support their transition to government procurement. Sovereign wealth fund–type organizations, like the U.K.’s National Security Strategic Investment Fund (NSSIF), invest in advanced technology firms and in funds that share a focus on national security. Government offices that operate at the nexus of national security priorities and private investment decisions include the U.S. Office of Strategic Capital (OSC), a new organization that aims to attract and scale private capital to critical component technologies, many of which align with those stated in AUKUS Pillar II. It does so by offering incentives (e.g., loans and loan guarantees) while establishing, maintaining, and growing this network of investors to sustain innovation from development through production and fielding.
Successfully connecting investments to requirements also requires understanding government investment strategies and government-funded start-up companies. Companies that have already received funding from government investment organizations have been vetted for meeting end user capability requirements and have gone through due diligence checks. Because funding from government entities is generally smaller in the initial phases of the TRL, further funding needs to come from the private sector. Ideally, patient capital sources could invest in early-stage technologies to lower the risk levels before further investment from private capital. Deliberately sharing the portfolios of government organizations (e.g., DIU) and government-funded investment groups (e.g., OSC), or sovereign wealth funds (e.g., IQT and NSSIF), with private industry can target significant resources to companies that are more likely to produce technology to meet mission requirements.

Connecting with the right private capital is just as important as sharing insight into requirements and mission needs. Private capital providers should be interested in investing in national security-related industries, and they must be committed to the concept of “trusted” or “clean” capital, meaning funds that do not receive backing from adversarial countries or have boards with members or problematic connections to adversarial countries. Some private capital funds with these values have been organized into defense investor networks in the United States, United Kingdom, and Australia and have recently come together in a loosely organized AUKUS investor network that has begun monthly meetings and is offering an open exchange of information on companies and technologies from AUKUS government entities.

Private capital, including venture capitalists and hedge funds, have voiced to Australian Strategic Policy Institute (ASPI), a think tank based in Australia that’s engaged in cooperative efforts within the U.S. and U.K., the criticality of enhancing ties with governments to have frequent engagements on government objectives and challenges. Providing information on specific companies, when appropriate, or technology subsectors could help scale advanced technology and ensure it transitions to higher TRL. However, in the shift from technology development to production and fielding, additional metrics beyond TRL—like Manufacturing Readiness Level—are less frequently used, creating another challenge to getting mission critical capabilities in the hands of the warfighter.

Understanding a competitor’s technology focus is of equal importance. Using publicly available data on research funding, patents, and journal articles, technical approaches leveraging AI mechanisms like large language models and Generative AI can help make sense of a country’s research priorities. For example, knowing where China is focusing its research within quantum technologies or AI can help AUKUS parties understand technology areas of high importance and technology companies that may need to be protected against intellectual property transfer threats, which are increasing among both early-state and advanced technology companies in the U.S.

New AI research efforts can harness the explosion of publicly and commercially available data on research and patents to help understand technology trends—for example, identifying the prioritization of technology research and development based on relative technology capabilities and identifying critical nodes within technology ecosystems, as illustrated in Figure 2 and Figure 3.
Figure 2. Samples of Technology Competition Analytic Views. (Left: Quantum) Example of automatic decomposition of strategic technology area (e.g., quantum sensing) into subfields enabling granular, tactical execution of tech-focused strategies through analyzing data at scale. (Right: Artificial Intelligence) After learning a tech field decomposition (e.g., artificial intelligence), automated analysis can reveal ex post facto national relative priorities within subfields, calculated at any level of strategic or tactical depth within a learned hierarchy. The goal is to determine how adversaries are pursuing tech advancements by revealing their de facto portfolios.

Figure 3. Emerging Technology Dynamic Prioritization Tracking. Additional insights generated help track the increase and decrease in a technology focus over time, also revealing the key characterizing concepts and how they evolve. Shown above, fully automated analysis learns these categories from the data in any tech area, assigns labels like “Generative Adversarial Networks (GANs),” and tracks defining concepts over time. Data reveals a trend already known to the image generation community that diffusion models overtook GANs in popularity in 2022 with the advent of DALL-E from OpenAI.
Connecting to Build a Supportive Innovation Ecosystem

Connections between the influencers and the risk capital are critical. However, this network also must include a support system that can help technology innovators obtain contracts with industry. A meta-accelerator can create the necessary relationships within this innovation ecosystem to reduce the threat of the valley of death within the TRL scale by brokering or connecting technology developers to end-users and investors. It can help identify the technology needed by the end users, foster a support system to allow the technology to mature, and make the connections needed to facilitate successful transition.

One exemplar stands out from NATO. In 2021, NATO leadership realized that they were not fully accessing the innovation available to the collective alliance from academia and industry. In response, they leveraged the existing partnerships across the alliance and established an independent body that could better access, mature, and field capabilities using accelerators and test institutions across the alliance. This became DIANA. DIANA’s goal is to enhance and accelerate transatlantic cooperation on critical technologies and help NATO work more closely with and build a network around government end users, relevant private-sector entities, academia, and other non-governmental entities. In essence, DIANA connects related but disparate parties as a meta-accelerator through a novel platform that allows enhanced and secure information sharing as well as virtual training and connection opportunities.

The need for DIANA was validated in its pilot year through high levels of interest across stakeholder groups within the alliance. Interest was measured in the number of applications received from both innovative companies and mentorship organizations. NATO DIANA received a staggering 1,300 applications across the three challenge areas. Through a rigorous down selection process, 44 startup companies were selected to participate in the program—that’s a 3% acceptance rate. Similarly, within weeks of launching its first call for mentors and experts to provide voluntary guidance to support startup success, NATO DIANA received more than 1,700 applications. NATO DIANA’s has expanded to include more than 200 test centers and accelerator sites within its network, with geographic representation offering proximate availability across the alliance. Each has affiliated to support the innovators advance their technologies, evolve their business models, and identify future customers and investors. Finally, during its first Outreach Day—hosted in March 2024 in Amsterdam—more than 300 startups, military end users, industry representatives and investors attended to learn more about the solutions these innovators are developing. Another Outreach Day is planned for Washington, DC in April 2024. The magnitude of interest expressed in the form of authentic engagement in this nascent community speaks volumes to the need it fulfills and perhaps indicates the pent up demand for this type of construct.

AUKUS should create a Pacific version of DIANA to capitalize on increasing awareness and interest surrounding AUKUS requirements to support accelerated development of critical technologies for military end users. The construct could be structured through an agreement between NATO DIANA and AUKUS, or even as a dedicated line of effort for emerging technology with dual-use applications under the Indo-Pacific Economic Framework for Prosperity (IPEF) to expand the technology base into the broader region.
Such a concept would follow the fundamental elements of the NATO DIANA model, building and expanding on existing bilateral and multi-lateral agreements:

1. Focusing on specific dual-use technologies (i.e., technologies that focus on commercial markets and uses but may also have defense and security applications)
2. Establishing multiple accelerator and test sites in strategic partnership with academia and industry
3. Working off-ramp fielding options to initiate joint development efforts or individual country acquisition programs

This Pacific DIANA would have the benefit of drawing upon the administrative management and coordination lessons learned across such a complex pool of stakeholders. Its value proposition to the region is to ensure the AUKUS countries are connected and coordinated on shared R&D objectives, potentially including entities in other critical Pacific countries, like Japan, South Korea, New Zealand, Singapore, and India. For example, Japan and South Korea both have expertise in centering innovation on end user requirements, which allows their emerging technology to have better insight into actual military needs. Both countries design their weapons to be compatible with U.S. and NATO systems. South Korea is the third-largest supplier of weapons to NATO, which supports rapid transitioning from promising technology to military end use. India has a role as a linchpin in emerging technology partnerships with the United States and long-standing bilateral efforts, such as the Defense Technology and Trade Initiative and India-U.S. Defense Acceleration Ecosystem. The White House Initiative on Critical and Emerging Technology highlighted significant areas of collaboration “in quantum communications, building a semiconductor ecosystem in India, accelerating defense collaborations, exploring commercial space opportunities, and catalyzing existing and forging new research opportunities and partnerships.”

A meta-accelerator like a Pacific DIANA could reinforce and capitalize on the efforts of several AUKUS entities, like the AUKUS dual-use critical technology BattleLab+ and Australia’s burgeoning Advanced Strategic Capabilities Accelerator (ASCA), which was established in 2023 and plans to invest AUS$3.4 billion over 10 years through targeted investments and acceleration support with fielded minimum viable capabilities. ASCA has teamed up with its U.S. and U.K. counterparts, DIU and Defence and Security Accelerator, to conduct first of its kind interagency innovation challenges in pursuit of AUKUS Pillar II advanced capabilities, the first challenge topics focusing on electronic warfare and electromagnetic spectrum technologies.
In addition to these government accelerator programs, private accelerator and test center activities within AUKUS, or the broader Pacific, would be key nodes to a meta-accelerator ecosystem.

Next steps to exploring this would be to:

1. Familiarize AUKUS leaders with the NATO DIANA program model to obtain buy-in and align to their respective, existing innovation infrastructure.

2. Determine whether a Pacific version would be most advantageously aligned to, or feasible within, NATO or IPEF.

3. Identify a tiger team to identify the most effective governance mechanism that not only represents all stakeholder nations, but also technological focuses and end-users. This governance structure will oversee the administrative stand up, target key challenge topics for innovation, and oversee accelerator performance assessments.

4. Create a roadmap to operationalizing accelerators and test centers within the Pacific ecosystem.
CONCLUSION

Foundational to these necessary connections are supportive policies that ease technology collaboration among the players in all three AUKUS countries.

Current defense export control mechanisms in the United States, specifically the International Traffic in Arms Regulations (ITAR), which controls and restricts the export of defense and military-related technologies, may hinder the ability to conduct open and efficient knowledge and technology transfers among the trilateral group, as has been widely analyzed. The U.S. Department of State, which administers the ITAR, is reviewing reasonable limits for a new AUKUS exemption and has advised that parties should use existing ITAR exemptions to facilitate defense trade under AUKUS.

Although there are calls for legislative action on creating an ITAR exemption for AUKUS, this would still need to be executed by the Department of State, which would need to create an exemption that takes into consideration types of technologies to add, needs from the United Kingdom and Australia, and all the end users within both countries that could receive American defense articles. Two easier paths that could be taken are to:

1. Extend current Canadian ITAR exemptions to Australia and the United Kingdom under the existing U.S. National Technology and Industrial Base authorizations from Congress to enable AUKUS cooperation.

2. Expand and update Australia and U.K. ITAR exemption lists to include AUKUS Pillars I and II technologies.

If and when these barriers to information and capability exchange are dismantled, a systems-of-systems mindset is necessary to effectively track the lifecycle development of critical technologies. This includes the initial planning and design, experimentation and evaluation, and runs through adoption and implementation to ensure end-users are ready to integrate these technologies into their existing operational architectures. An integrator, which has the capacity and capability to facilitate efforts across AUKUS, would optimize accelerator efforts and further the goals of interoperability and interchangeability. System-of-systems expertise is not in high supply when looking at the full breadth of demand for AUKUS Pillar II advanced capabilities, and an integrator presents the opportunity to concentrate that expertise to support all adopters. Institutional models that are independent and operate on a not-for-profit framework are best equipped to scale up a network of leading labs and test centers, and leverage existing trusted relationships within government, to effectively serve as such an integrator in the establishment of an AUKUS meta-accelerator. Existing models include federally funded research and development centers (FFRDCs), university affiliated research centers (UARCs), and NATO’s not-for-profit framework (NFPF) cooperation model.

AUKUS governments have obvious essential roles in helping Pillar II succeed—from clarifying and easing defense trade controls, to sharing mission needs at the government level to create joint requirements, to aligning government funding mechanisms toward
such joint needs, to sharing as much information as possible with actors in the innovation ecosystem at the earliest possible point. Managing such a complex ecosystem, however, should not be a government role. This requires entities that can operate across the seams to connect private investors to accelerators to start-up companies to researchers. Within this ecosystem, success will rely on adapting agile processes, deepening a culture of collaboration, and increasing a tolerance for risk.
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