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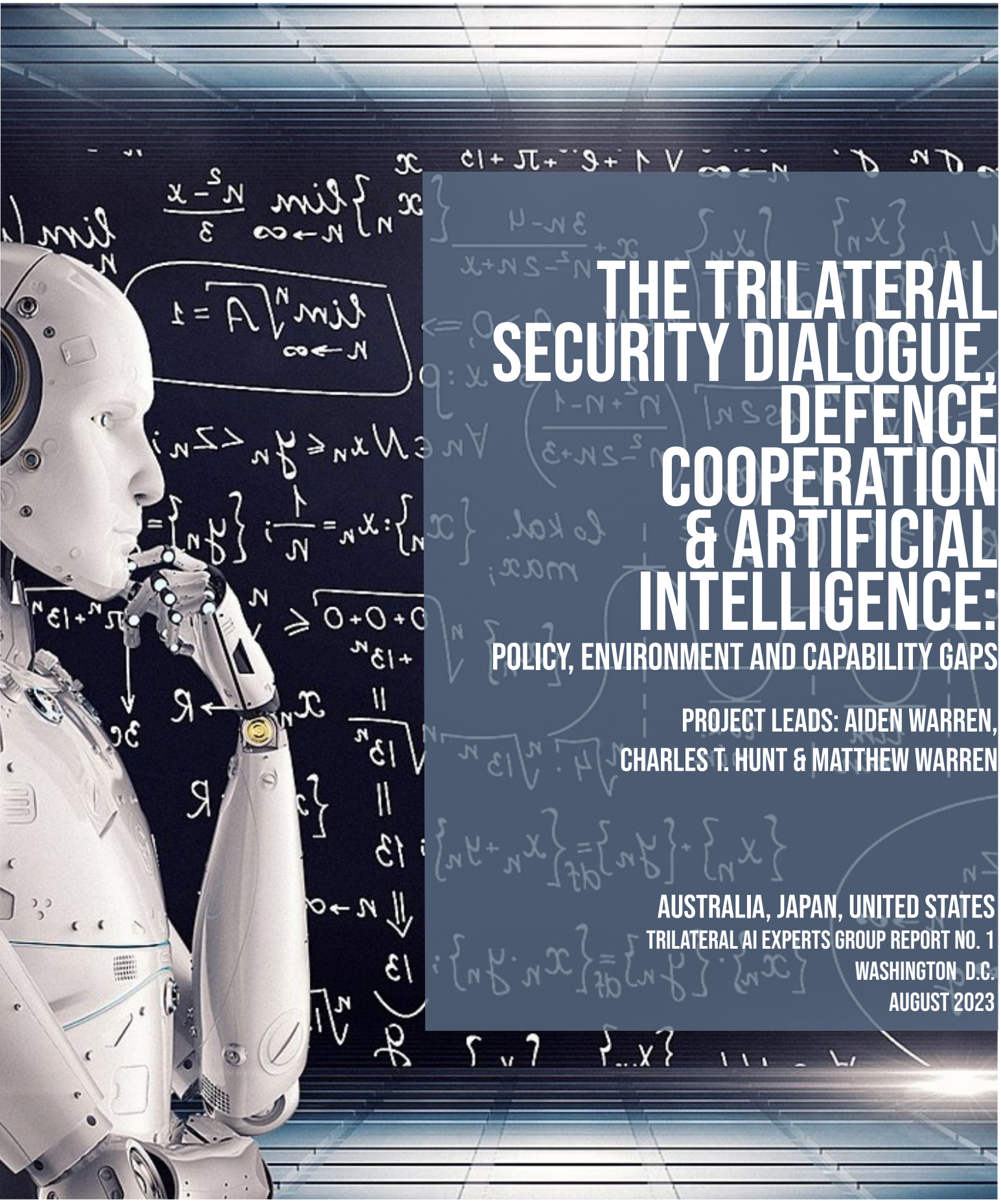

THE TRILATERAL SECURITY DIALOGUE, DEFENCE COOPERATION & ARTIFICIAL INTELLIGENCE:

POLICY, ENVIRONMENT AND CAPABILITY GAPS

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ABOUT THE PROJECT

This project examines strategies for enhancing Australia's Artificial Intelligence (AI) capability development and defence cooperation with Japan and the United States under the Trilateral Security Dialogue (TSD) framework.

Supported by the Department of Defence's Strategic Policy Grants Program, researchers from RMIT University are investigating the transformative impact of AI on the future of information warfare, cybersecurity, nuclear-deterrence, and space capabilities with specific implications for collaboration among the TSD countries. As the first of five expert dialogues, the team held intensive workshops in Washington D.C. to discuss and evaluate American perceptions and inclination for boosting AI cooperation across the TSD partners.

Hosted in partnership with the James Martin Center for Nonproliferation Studies, the Washington D.C. dialogue consisted of consultations with over 40 stakeholders from defence, diplomatic, intelligence, and policy communities. Insights from the dialogue revealed a strong appetite for enhancing AI cooperation. Yet, understanding how collaboration might take place across multiple lines of policy, legal institutions, cultures, and vocabularies remains a key and ongoing undertaking. In this report, we canvas several preliminary findings towards efforts to begin the process of developing this framework:

- AI development is moving very fast, outpacing the ability for policy-makers to define common standards for testing and evaluation. As a consequence, across traditionally conservative arms of the military AI adoption will be slow moving, even as AI innovation and military end-use capabilities speed up in the private sector.
- In the United States, fears about falling behind Chinese AI development – amid heightened tensions between the two countries – have caused an unsustainable and ultimately unachievable ambition to be the "best" in AI. Experts believe that US AI collaboration with international partners may be a more effective way of achieving and sustaining primacy.
- The traditional "hub and spokes" model of collaboration is no longer fit for purpose. For the TSD to be fully operationalised, partners need to enhance collaboration between all members, not just between the United States and Australia, but also between Australia and Japan and the US and Japan.
- Despite longstanding alliance partnerships, export control regimes in the United States – particularly around language themes associated within ITAR (International Traffic in Arms Regulations) categories – have become a major impediment to AI collaboration. Advancing AI exchange will require an intensification of lobbying efforts by the Australian government to simplify Australia-US exchange.
- The need for an AI capability framework to increase awareness of collective progress and capacity among TSD members is considered urgent. While there are many suggestions about where possible collaboration can take place, there is very little understanding about how it can be achieved, where collaboration can begin, and who to involve.

Building AI interoperability between TSD partners will require significant experimentation and trust among partners, and as a result more military exercises with higher tolerance for risk.

Private sector enterprises have been extremely successful in developing focused, AI-enabled capabilities, however, low-trust cultures within the military and with AI-generated systems presents a challenge that can only be overcome with considerable trialling and testing.

INTRODUCTION

Australia is both a participant in the globally competitive race toward AI development and a concerned party interested in the broader evolution of AI for human development. AI has been likened to a "field of fields" in technological enhancement. Unlike past evolutionary leaps based on single transformational innovations, such as steam or electricity, AI offers many life-changing, world altering possibilities, from, inter alia, health and nutrition to poverty alleviation, smart cities, and cyber security.[1]

Economically, estimates point to a doubling of global economic output by 2035 via increased productivity, new virtual workforces, and the diffusion of innovation across most sectors.[2] According to the Australian Science Agency, AI offers the ability to add AU$315 billion to the national economy by 2028, and a possible AU$22.17 trillion to the global economy by 2030.[3]

AI DEVELOPMENT IS MOVING VERY FAST, OUTPACING THE ABILITY FOR POLICY-MAKERS TO DEFINE COMMON STANDARDS FOR TESTING AND EVALUATION

Australia has been an active participant in the AI space. In its Action Plan 2021, the government articulated its national goals along four broad efforts: to develop transformative AI for Australian businesses, create an environment to grow and attract global AI talent, use cutting edge AI to solve national challenges, and make Australia a global leader in responsible and inclusive AI.[4] Accompanying strategy documents from the Commonwealth Scientific and Industrial Research Organisation (CSIRO), the Artificial Intelligence Roadmap, have illustrated that Australia is a world leader in AI research. Others, such as the Oxford Insights Government AI Readiness Index (2022), showcases that Australia is not only a Pacific regional leader, but sits in 8th place worldwide overall and second in data and infrastructure.[5]

However, Australia also faces substantial shortfalls in its specialist AI workforce (between 32,000-161,000 by 2030), effective data governance and access to data, AI trust and standardisation processes, quality-assured and interoperable systems, improved digital infrastructure and cybersecurity, and all-round increased activity within science, research, and technology development.[6] The release of the Action Plan 2021 also revealed several shortfalls in adequate funding levels employed to bridge the growing divide between capabilities and needs, with only AUD$29 million dedicated to this development. These capability shortfalls and the lack of committed funding illustrate the need for Australia to forge lasting and efficient collaborative efforts with like-minded partners to sustain national AI aims and vision, to which this TSD based initiative advocates.

Consideration of China's pursuit of AI and digital leadership has also led to concerns about the future of global integrated systems across trade, supply chains, military, economic,

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and financial domains. These apprehensions have often been accompanied by issues associated with human rights, transparency, and network dependencies across new digital ecosystems, which have been vaunted across the Belt and Road Initiative and amid China's domestic economic plans. Beijing's adoption of key technology insulation policies, semi-conductor supply chain indigenisation, and broad-based civil-military fusion has engendered what some have called an "AI arms race."

In the global development of AI, innovators will benefit from being first movers in the drive for competitive advantage. For nations, this means increasing gains in economic and military systems as AI scalability improves. In a post-liberal world order, these gains are likely to have stronger zero-sum connotations. While mutually beneficial collaboration should be pursued, the creation of global public goods around digital and AI standards, AI competition management, and ethical safeguards for AI systems and software have become a key concern among AI professionals. These are key considerations for Australia's AI agenda and collaboration needs.

WHY THE TRILATERAL SECURITY DIALOGUE FRAMEWORK?

The Australia, US, and Japan Trilateral Security Dialogue formed in the 1990s as a natural outgrowth of improving trilateral relations and merging security considerations. At the time, and continuing since, each country has sought to "leverage its strongest relationships in the region as one of several tools to hedge against global uncertainty," a core aspect being regional power shifts and weak institutionalisation.[7] Among the various mechanisms to emerge from the TSD is the Security and Defence Cooperation Forum, which has sought to build upon interoperability and cooperative capacities. This collaboration has expanded to include a focus on maintaining international law and norms, order preservation, regional maritime zones of economic engagement, and later, research and development.

Minilateral groupings, like the TSD, offer avenues for fast tracking cooperation, enhancing strategic interests, driving development agendas, and maintaining regional and international order. On this basis, the TSD members share considerable alignment across a range of policy, commercial, and security domains. More importantly, the partners share similar societal, legal, and political values, reducing the trust challenge embodied within and across AI systems. Unlike other minilateral defensive groupings, TSD partners share uniquely similar ambitions for liberal world order, ideas about mutual defence and deterrence, and understandings about mutual obligations.[8]

All three nations have a proven track record of material and ideational investment in the region. Tokyo has pledged to invest over US$50 million in infrastructure building across the region.[9] The United States has led with the development of the Indo-Pacific Economic Forum, and Australia has been at the forefront of Pacific Island aid and development. In the security domain, all nations have agreed to spend more on defence and technology, and all three nations have complementary AI strategies.

The United States-Japan-Australia Trilateral Defense Ministers Meeting (TDMM) 2022 Joint Vision Statement further underscores the drive towards collaboration in AI fields, proposing areas for expanded cooperation, including:

- Direct departments to conduct the necessary coordination to create a Research, Development, Test and Evaluation (RDT&E) framework to advance trilateral cooperation.

- Explore and pursue trilateral cooperation on advanced technologies and strategic capabilities.[10]

INSIGHTS FROM WASHINGTON D.C.

The first dialogue on this series in AI collaboration is derived from the broad-based need to develop a framework for synergistic cooperation on AI-enabled capabilities for defence among TSD partners. The synthesis below offers a brief analysis of the key areas across the domains of: 1) AI development, 2) security, 3) interoperability, and 4) ethics.

AI DEVELOPMENT

The United States seeks to maintain a strategic lead in artificial intelligence, elevating technological competition and considerations from the technical to the strategic level. Key recommendations by the National Security Commission on Artificial Intelligence include the doubling of non-defence non-defence funding for AI R&D to US$32 billion per year by 2026, and to establish national AI research infrastructure for the training of data, cloud computing resources, open knowledge networks, and AI experimentation.[11] Attributes of this agenda were made readily evident in exchanges with American stakeholders.

China's AI development has become a lynchpin in Washington's own strategic thinking. A potential "Taiwan

IN THE GLOBAL DEVELOPMENT OF AI, INNOVATORS WILL BENEFIT FROM BEING FIRST MOVERS IN THE DRIVE FOR COMPETITIVE ADVANTAGE.

scenario" of war with China has become popular in military analysis and is fuelling concerns about dual use AI applications and potential challenges for broad-based security. In this, there is a recognition by AI policy professionals that significant fearmongering is occurring, driving misunderstandings about Chinese capabilities. As one participant noted: "We do know that China watches the United States and key commercial entities like SpaceX very closely. They are actively learning. But there certainly is a demonstrable effect in the US on things Chinese at the moment," most of which is causing "misunderstanding [and] hyperbole."

In the context of the politicisation of China in the United States, these moderating statements are reassuring. And while there is a recognition in certain parts that American and Chinese counterparts do share similar policy ideas on AI ethical and privacy concerns, it was generally agreed that many of these are lost in translation.

A key feature of this discussion is the need for diplomatic, political, and logistical unity on AI standards settings. These include issues such as data identification, reliability and safety, privacy protection, accountability, and fairness. A key point often made in these discussions is that organisations like the International Standards Organization need to be staffed and joint programs to lead global governance on AI need to be established. The consensus among stakeholders was that not enough had been done by the US in its approach and, indeed, that it had become difficult to discuss contributions to international standards in the current political climate.

On the necessity for greater collaboration among like-minded partners, many participants interviewed expressed the need for broader networked capabilities. Part of this is based on assessments of US capabilities. As stated by one participant, "The US, and certainly because of fears about possible Chinese AI applications, gets stuck in trying to be the best at everything. This is unachievable, and there is no doubt that it is in America's best interest to collaborate with like-minded partners." A second aspect, however, is the point that AI as a field is moving very rapidly and human capital advantages will be key. The TSD partners all face shortages in this area and the extent that talent resources can be pooled will be critical in moving AI development and governance forward. While this is something the United States currently does not do well in, it was considered that opportunities existed to employ partners in a type of "Schengen area" for AI researchers, where travelling for researchers collaborating on AI is made easier. Many participants noted, however, that this would require leadership from the top in all three countries.

Another key finding is the broad recognition among participants that there is a need to move away from the "hub and spokes" model towards a more integrated collective in information sharing and research collaboration. Recent research by CSET has revealed that in AI cooperation and investment, research had been confined overwhelmingly to networks between Australia and the US, and separately between Japan and the US. Australia and Japan have collaborated very little outside of this system. Another important finding was that AI investment activity and research between the United States and China outshines all other bilateral AI investment networks.[12] This suggests that, at least in the defence area, and particularly as US-China AI investment becomes more circumscribed by the decline in political and diplomatic relations between the two countries, there is much room for more investment and cooperation in the TSD.

A KEY FEATURE IN THIS DISCUSSION IS THE NEED FOR DIPLOMATIC, POLITICAL, AND LOGISITICAL UNITY ON AI STANDARDS

These broad insights were discussed more at length in follow on interviews and are addressed below.

AI SECURITY

The implications for AI in developing cyber security controls have led much of the discussion on machine learning algorithms. A key area is the ability to automate detection and responses to cyber attacks, and in some cases disabling computer-based vulnerabilities. Some governments have begun incorporating AI features in national AI systems, and it is believed that speed of response creates a far greater capability for detection and mitigation than what humans currently offer.[13] But offensive cyber activities also benefit from AI generated tools that allow actors to skirt cyber defences by enabling, among other examples, rapid malware adaptation. In moving forward, building AI for network resiliency, and to defend against cyber-attacks, will require significant focus on testing and monitoring systems. This is one way partners can build trust in AI across platforms and systems, more on which is below.


Michael Virtue / U.S. Defense

In a defensive and systems context, for the time being, these abovementioned capabilities are still considered unreliable. A strong cultural conservatism toward new and untested systems underscores the US Department of Defense's approach to AI, even as AI systems become increasingly central to concepts of defence. Even in an applicable context, systems may be slow and inefficient as basic shortcomings, like old and slow computers, continue to define a lack of trust in technological solutions to challenges like intelligence compromise. Other considerations, such as decision-making and human "in," "on," and "out of the loop" scenarios, will require significant testing and evaluation before integration is possible. One consideration, then, is that commercial sector cooperation can be more timely/responsive and efficient for AI collaboration. Many participants expressed the sentiment that any collaboration among TSD members would necessarily involve the private sector, which had become intrinsic to US AI operations.

Adversarial machine learning will continue to create dilemmas for trust building. Computer vision algorithms can be employed to deface signs/data and upset systems operation. Others provide camouflage and neural decoys to protect against algorithm recognition. Data poising includes small changes to images, often undetectable to humans, to cause misclassification and manipulation to data models and AI algorithms – leading to inaccurate or unintended decisions. Where allies can seek to exchange data sets for AI training, there are concerns about how best to anonymise and protect sensitive data from theft and manipulation.

A final security issue for AI is talent acquisition and foreign academic exchange. High profile cases of espionage and Chinese intellectual property theft have tightened the rules and regulations around AI research exchange, chilling academic sentiment. The legal restrictions and visa entry requirements in the United States have become what one participant called "bizarrely" burdensome, making issues of development and collaboration extremely difficult.

AI INTEROPERABILITY

In building upon capabilities for seamless interoperability, part of the concern for Washington D.C. participants is that AI and its applications are transforming at speeds too fast for effective adoption. A common point is that there are still significant challenges to understanding what AI applications are good or suitable; whether they work appropriately, and if they do work, are they doing what they're supposed to be doing; and what timeframes are involved in their improvement? Currently, there are no metrics to appropriately measure accountability in AI systems. This makes it difficult to have conversations about what to regulate and how. At one end of the spectrum, this can be extremely problematic. As Paul Scharre has conveyed, while leaders at the departments or ministries of defence invariably reject full autonomous weapons systems or robots, the scenarios in which Lethal Autonomous Weapons Systems can be employed already exist and have been in some cases integrated into command systems. Without standards and regulations on what is acceptable, this kind of autonomous creep is likely to continue. At the other end, observers are cautious about moving too fast on regulation and standards due to what this could mean for AI development and innovation, particularly in the civil space.

The private sector in this context is pivotal to future AI

employment. Most spending on AI and associated platforms takes place in the commercial domain, and a concern is that AI development will be subsumed by economic competition and the market for AI applications. In a conflict scenario, if private sector actors have full reign over AI development, one fear is that partners will meet up to engage an enemy with contending AI operating systems and no way to communicate across platforms. As one participant commented, there is currently no automatic assumption within the private sector that interoperability should be factored in. Increasing awareness about the need for interoperability among AI actors in the private sector is therefore needed. This may need to be managed by the government via a whole of society approach to development.

Moving beyond narrow AI applications to machine learning poses important questions about what can be measured. This point cuts across the different cultures of the armed forces, which have been hesitant to adopt AI systems more broadly, and because testing and evaluating is likely to be difficult. Upstream data fusion between the different branches of the US armed forces and civilian agencies may also be problematic because not all forces share between each other.

This presents a challenge for partners like Australia and Japan. While large data sets may be more manageable for exchange, and while military exercises will be useful for building interoperability, cultural differences across the US armed forces toward AI use and adoption may provide roadblocks for further adoption.

GREATEST POTENTIAL FOR TSD AI INTEROPERABILITY

- Predictive maintenance and logistics – maintaining bases and performing peacetime basic operations, operational availability, training, personnel management.
- Data sharing for AI training, synthetic data building, and image triaging offer credible areas for exchange.
- Human-machine teaming programs around platforms the like Skyborg, the Air Force autonomous aircraft teaming architecture, will produce more combat mass and training with AI integrated systems.
- There is no substitute at the moment for military exercises in terms of shared learning. The difference between training on the ground and planning in the room is still vast. On this point, field commanders are still hesitant to move beyond what is comfortable and risk acceptable. Part of this will depend on building a culture that accepts greater risk taking.

AI AND ETHICS

In a collaborative framework, clear ethical standards will be central to legal exchanges of potentially exploitative applications and data. The United States has made significant advancements in this respect. Department of Defense programs, like the Urban Reconnaissance through Supervised Autonomy program, for instance, have made ethical challenges of human information and interaction central to design and operation. Across departments and agencies, ethical codes have been written into strategies for AI employment, with DARPA (Defense Advance Research Projects Agency) taking a lead in implementation at the design phase.

With that being said, the number of incidents concerning the misuse of AI is rising. According to the Stanford AI Index, the number of AI incidents and controversies has increased 26 times since 2012, with notable instances including a "deepfake video of Ukrainian President Volodymyr Zelenskyy surrendering and U.S. prisons using call monitoring technology on their inmates."[14] Other examples include biases in natural language processing leading to the manufacture of false information, and even as "fairer" language models are being developed, these have found to contain their own biases.

As these challenges indicate, AI systems can be difficult to understand and interpret, particularly if machine learning has contributed to algorithm development. This is the explainability problem of AI. AI machines and algorithms have become the workhorses and increasingly the main innovators in new AI development. While TSD states have clear legal distinctions on commercial AI use and intellectual property (IP), there is a concern that legal jurisdictions and doctrine will be unable to keep up with and/or explain the algorithm and determine fault or wrongdoing.

IN A COLLABORATIVE FRAMEWORK, CLEAR ETHICAL STANDARDS WILL BE CENTRAL TO LEGAL EXCHANGES OF POTENTIALLY EXPLOITATIVE APPLICATIONS AND DATA.

What is clear is that the legal implications of AI capability platforms remain understudied and under-regulated. Some issues, like the domains of "conflict technologies," such as AI softbots – software-based systems with great task variance and autonomy – remain in an extended and persistent state of ambiguity. This is due to machine learning capabilities and the untethered nature of such systems; that is, their disconnect from an explainable physical location and therefore jurisdiction.

In a TSD context, dialogue will be required to appropriately fix standards of use and development among partners. Consistent audits would allow for updated and cross-border ethical guidelines for practical use.

RECOMMENDATIONS

1. TSD members should instigate an AI research security dialogue.

   The dialogue should cover issues of IP theft, academic infiltration, norms and regulations on academic publishing, and what this means for export exclusion capabilities. Such a dialogue would allow government departments to foster a robust and strategic AI research corridor among TSD partners. For broader understanding, interaction, and time saving, this security dialogue should include key members of security commissions and committees in all three countries. A further feature would be the establishment of new networks to begin building an ecosystem of AI innovation. While each nation is currently driving national innovation towards such systems, they are currently doing so in isolation, and with separate ambitions in mind. Bridging bureaucratic and conceptual gaps at an early stage in this development will smooth the processes of exchange.

2. TSD members should begin discussions on the framework of collaboration across guiding principles.

   A principles framework for TSD collaboration would underline all actions within government and defence of matters related to AI. Defining ethical guidelines is of primary importance. Australian authorities can begin and lead this process. This would require a multi-departmental team, which would involve: (i) a very clear understanding of Australia's AI values and vision for collaboration; and, (ii) commitment by Japan and the United States to establish similar teams and to agree to a timeline of engagement. This beginning would lead to an exchange and understanding of interpretations of principles; a joint agreement on ethical uses, applications, and employment of AI; and, the basis for a diplomatic approach to standards setting in AI internationally.

3. TSD member states should undertake more military exercises with specific AI-targeted training and interoperability.

   TSD military cultures vary greatly, and exercises help to overcome errors and miscommunications in real-time scenarios. Regular (e.g. bi-annual) rotationally hosted exercises promise to improve the deployment of AI-enabled technologies and equipment, and provide an avenue to encourage requisite risk-acceptance activities among service personnel. Such training will also lead to a more diversified and professional defence force, and agility training across systems. While such training does currently take place, building in scalability to such exercises will be key in fostering lasting and useful cooperation.

4. Australia and Japan should lead more intensive diplomatic efforts to build international AI standards.

   Consensus on AI standards is difficult, for various political reasons, for the United States to initiate. Australia and Japan should therefore take leadership roles to provide a firm foundation for developing strong trilateral, cross-sector AI partnership. Common standards will help to build trust in AI exchange, development, and security within and across borders. As regional leaders in this space, TSD partners can broaden their influence to build global consensus around AI standards.

5. Australia should establish a shared data resource index with the potential for promoting AI data exchange and learning.

   Australia should begin discussions on possibilities for sharing data and outcomes on optimisation from training and AI implementation across whole of society applications. One framework this program could build upon is a shared data resource index. This would encourage the beginning of an exchange in legally appropriate/acceptable data sets between nations. There are several benefits to such sharing, including the ability to test and evaluate models across different systems, cultures, and national indicators. Building cross-cultural data training into AI systems would also build agility and learning within algorithms and clarify applications for interoperable use.

6. Australia should explore the ability to develop national cloud resources for researchers for cross-TSD exchange.

   In the US, safe and secure online platforms for research exchange exists in theory via the National AI Research Resource, however, funding is yet to put these goals into practice. For Australia, like the US, this could take place at the national level at first, adopting later a transnational scale, upon inspections and joint systems integration. This would lead to a smoother transaction of data and stronger collaboration in research.

7. The Australian government should raise the role of the Advanced Strategic Capabilities Accelerator (ASCA), particularly through strong funding measures.

   ASCA serves to solve several AI challenges facing Australia and build linkages across the TSD network. This will require bridging the fields between AI, industry, and defence. One example is the DARPA competitions, which help to build interest and enthusiasm for student and industry partners. Students need challenges and interest in exciting programs to drive engagement. Talent pools are depleted by commercial opportunities with large remuneration packages that create recruitment problems for defence and security sectors.

Additionally, there is a need to complement the focus of ASCA and AUKUS Pillar II (Advanced Capabilities) with a TSD component for collaboration. This does not have to be in collaboration with AUKUS, and the projects can be kept separate. However, hosting processes and projects for one defence group will provide a platform to develop and build agility across others like the TSD. With a fully funded ASCA, DARPA, and JARPA (a 2024 promised Japanese Advanced Research Projects Agency), Australian defence and industry insiders will have more opportunities to collaborate, share data and technology, and egage in cutting edge development within a TSD innovative ecosystem.

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