

As Budget Polemic Drives Headlines, Do Not Lose Track of NATO's Approach to AI

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Artificial Intelligence (AI) is becoming a decisive force in the international security environment, with the potential to transform everything from information operations to intelligence analysis to mission planning. Whether NATO takes a unified approach to AI or not is a crucial question for the Alliance to consider.

After European leaders faced renewed American pressure to more than double defence spending at NATO's most recent summit, the budget debate is likely to become the headline-driving narrative about the Alliance's future in the coming months on both sides of the Atlantic. Yet, what risks being eclipsed by the fiscal polemic is a critical conversation about how the 29 member states approach the one innovation with perhaps the greatest potential to up-end warfare and even NATO itself: artificial intelligence (AI).

AI Everywhere

As an alliance whose potential is defined by the totality of its members, NATO faces a growing challenge in coordination and collaboration around military-relevant emerging technologies – perhaps even more than during the Cold War when there were fewer member states and a relatively unified threat from the Soviet Union and Warsaw Pact countries. Then, it was military innovation that led defence-relevant breakthroughs, the opposite of today's private-sector driven innovation. AI research and implementation in particular is being led by companies, not governments.

Now, and in the future, NATO's missions will be increasingly dynamic and politically thorny – from policing migration to counternarcotics to strategic deterrence – because of the 'algorithmic impact' of increasingly capable social media bots, AI-created fake images and video, and even automated weapons platforms. Recent social media influence offers a preview. In Poland and the Baltic states, automated social media bots, which are a form of AI, produce 'roughly 70% of all Russian messages about NATO' according to a study last year from the NATO Strategic Communications Centre of Excellence. Underscoring the risks to come, Russia employed bots, or automated social media accounts, and exploited social media machine-learning algorithms during the 2016 election cycle to target US voters with ads and content designed to exacerbate partisan divides within NATO's largest member.

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This can be expected to be amplified by states such as Russia, which harmonise highly disruptive propaganda and kinetic operations while committing to investments in military-relevant AI. As Russian President Vladimir Putin has said, 'whoever becomes the leader in this sphere will become the ruler of the world'. Under President Xi Jinping, China's ambitions are equally grand, with the state's 2017 New Generation Artificial Intelligence Plan recognising that China 'must, looking at the world, take the development of AI to the national strategic level ...'.

As this is a larger global challenge, NATO is a perfect 'laboratory' for member states to find their way forward with AI by embracing commonality through the Alliance rather than going it alone.

AI need not add to NATO's recent challenges, fiscal or technological. Although individual European NATO members have promising government-and commercial-sector AI investment programs underpinned by national strategies, as the UK and France do, a standardised Alliance-driven approach ensures all members benefit from current and future breakthroughs. Unlike defence industrial bases, which are needed for fighters or tanks, critical AI innovations could come from NATO's smallest nations, with an Alliance-standard approach ensuring that small states are not crowded out. A set of common NATO AI capabilities matched to the Alliance's operating concepts can bridge the technical gaps that could leave out states lacking the relevant technology-industry expertise or the ability to implement AI systems in their defence ministries. Moreover, given the complexity of missions around the world, NATO needs to be fully integrated at a mission-systems level, rather than individual states operating individually with incompatible technologies. Technological developments concerning AI are presently advancing with such speed that the trailing behind of any one country with adoption or implementation could undercut whole-of-NATO effectiveness when it is needed most during a crisis.

This applies to more than just technology: there is also growing collective responsibility around data, privacy and the power of the state. A NATO AI operational framework can ensure world-leading standards are upheld across the Alliance.

Indeed, NATO is working on AI commonality, but it is focused on the question of how much freedom to give autonomous machines. 'Creating a common standard for describing the role of the human operator and the role of the machine in systems that use AI will help commanders incorporate such systems in their planning processes', NATO officials wrote in setting-up a study due in 2020 on Human in the Loop Considerations for Artificial Intelligence. 'In a coalition environment, such systems potentially deploy in parallel during an operation, which requires that NATO commanders understand the subsequent effect on planning and C2'. That is indeed critical, but equally important is considering this at a much higher level. With a new NATO AI standard, NATO can employ AI in a manner that does more good than harm, operationally and bureaucratically speaking.

The NATO AI Standard

When NATO developed Cold War-era standards on everything from ammunition to aircraft grease-ports, commonality of military hardware was essential in ensuring the feasible collective defence of Europe. A new NATO standard for AI is not a set of measurements or technical specifications, as would be used in establishing, for example, a common calibre for small arms ammunition. This is the era of decentralised innovation and software-driven warfare, where accessible data confers strategic advantage and social media can be as tactically relevant as a light machine gun. This approach to a new NATO AI standard is more of a framework than a technical specification, but it is equally crucial for developing a common understanding and set of expectations about what kind of AI systems the Alliance can utilise. This approach is derived from the operational capabilities covered in the joint NATO operational planning framework. Each operational phase has distinct ways that AI can be most effectively used at an Alliance level. The next step would be the development of specific technical guidelines once an overarching common NATO approach is agreed to.

Indications and Warnings of Crisis

Readiness at an Alliance level depends on the synchronised sharing of high-quality data to inform intelligence assessments and general situational awareness. One way to accomplish this is to establish AI-focused all-source data processing that is centralised by NATO headquarters but produced by, and available to, member states. An electronically shared view of the operational environment, frequently referred to as a common operating picture, can be developed in seconds, not days, to aid overloaded human analysts. Data sources must be expanded beyond conventional defence-related sources, to include open-source and commercially available imagery, metadata, and social media. Existing machine-learning systems already make this possible, but their use is nascent. The current generation of analytical software tools are a step in the right direction, but plenty of unprocessed data is not transformed into national and Alliance-level actionable intelligence reports due

to a shortage of human analysts. This causes gaps in the intelligence picture, which can be exploited by an adversary.

Crisis Assessment

Taking full advantage of AI can smooth out the escalation of a crisis by combining the analytic efforts of NATO command organisations and member states to ascertain how, and when, a scenario will develop. Machine-learning crisis simulation systems offer improved visibility into the causes and drivers of a crisis that might otherwise be overlooked by conventional analysis, which can be too narrow to capture the true complexity of a situation.

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In a hybrid, multi-domain context, a real-time common operating picture – that draws upon simulations but is also predictive – must extend into the information domain, including modelling peacetime public narratives. The volume and velocity of information during the early phases of a crisis will be nearly overwhelming. Anything other than an AI system has little hope of success in keeping up, while paring away irrelevant information to ensure that human decision-makers are tracking the right information.

Response Options and Mission-Planning Development

As with the assessment phase, AI-driven simulations and scenario planning offer substantial insights. With those insights, such systems can create a comprehensive picture of force readiness and logistical imperatives to inform NATO's response options. AI-driven analysis can process massive amounts of unstructured data, maintenance logs, reports and logistical information to create a detailed and accurate picture of force readiness. Machine-learning systems can also fold-in data from civilian, commercial-sector and non-governmental sources in order to produce a more accurate 'whole of society' capabilities view than what is currently possible.

Employing this approach across the 29 NATO states is especially critical in the context of high-intensity conflict scenarios that, although unlikely, would be potentially catastrophic. Additionally, being able to include civilian resources and infrastructure as part of this response option analysis is something that AI systems are better suited to do than conventional database analysis. In addition to readiness driving response options, another major consideration is developing plans and evaluating their effectiveness. In more tactical scenarios, such as in the development of mission optimised auto-pilot capabilities for fighter aircraft, AI techniques such as reinforcement learning are already proven in creating optimised operational plans for a single platform in a similar way that can be applied for entire combat elements.

Mission Execution

The operational execution of a plan by NATO forces is currently dependent on mere assumptions of the consistency of training, resources and the joint force's ability to accomplish their mission. AI, particularly when combined with virtual- and augmented-reality visualisation, can play

a significant role in providing advanced training and pre-deployment unit-level preparation for NATO-led forces during peacetime, to ensure a rapid yet smooth transition into conducting operations. During those operations, autonomous software can be used to assist with maintenance, logistics management, and targeting of offensive and defensive systems. It can also ensure that a NATO force is successfully integrated with autonomous, unmanned ground, air and sea vehicles to provide a standardised, and ever increasing, level of operational competence and consistency of execution. During operations, machine-learning systems can use sensor data, entire technical libraries and advanced models to accurately predict and then prevent equipment failure; given the danger now posed by improvised explosive devices and precision munitions to supply lines, such efficiency has profound strategic importance.

In more tactical scenarios, such as in the development of mission optimised auto-pilot capabilities for fighter aircraft, AI techniques such as reinforcement learning, which allows machines to share their experiences and optimal solutions among themselves, have shown their utility. Adversarial AI systems running within a simulator can assist in the evolution of a highly optimised, robust mission intelligence that is effective at fulfilling defined objectives. In a similar vein, adaptations of these tactical AI-driven simulator frameworks can be used to gauge likely public reactions to proposed response options. What all of these approaches permit is to potentially identify – and address – operational pitfalls before they actually occur.

Transition

Given the importance of public opinion and political support for NATO, what happens after a crisis is as important as the operations undertaken during it. Disengagement is likely to be an ongoing real-time competition over information and digital narratives, as contested as an operation's military elements. The AI tools will be familiar, not unlike the machine-learning algorithms that today automatically run behind-the-scenes markets placing political ads or marketing campaigns onto social media feeds. Successful messaging requires engagement not just with media but directly with civil society, from citizens to companies to NGOs, in multiple countries and in multiple languages. Such an approach requires sophisticated and real-time interactions on social media, both in terms of pushing a NATO narrative and evaluating the public mood and reactions. Natural language processing systems that can automatically analyse large-scale unstructured data to extract not just sentiment but also model topics, and discover threads and trends for

further analysis are an essential element in future transition activities and in establishing a predictive understanding of post-crisis narratives.

Moving Forward, Together

NATO presents an ideal place to develop and establish a new AI standard for multilateral military organisations, one that has relevance not only among NATO's own 29 member states, but which can act as a global benchmark for responsible operations using these new capabilities. Integrating AI into coalition operations is a global challenge, not only for NATO, but also for its supporting allies, many who, in the hyperwar era, may not be organised militaries. With the right NATO initiatives in place, this diversity can be harnessed to make the alliance more effective and resilient as AI plays a larger and larger role in business and civil society.

One model for implementing an Alliance-wide AI standard would begin with establishing a feeder system to start integrating machine-learning systems

Therefore, integrating emerging technologies whose civilian-sector development moves faster than traditional defence procurement deserves renewed attention. One model for implementing an Alliance-wide AI standard would begin with establishing a feeder system to start integrating machine-learning systems, as well as other highly disruptive but strategic technologies, into the commands of member states as well as the Alliance overall. This feeder system would be integrated with the NATO Science and Technology Organization and other standards organisations. For example, the US Department of Defense's Defense Innovation Unit Experimental (DIUx) facilitates matchmaking between military customers and commercial-sector companies that develop software-intensive capabilities, the likes of which can be arduous to acquire with conventional procurement processes.

As NATO debates its fiscal priorities and struggles against the attendant political undertow, it is important to remember that breakthroughs in machine-learning technology will continue apace around the world. These breakthroughs will likely accelerate in the coming years, if not months, promising to broaden the capability of AI systems in business, civil society, politics and national security. Many of the most strategically relevant advances will not announce themselves, either. There is a danger that these will be even easier to miss, bureaucratically speaking, amid the current budget battle. As an Alliance, however, NATO can take a unified approach to AI that will help secure its future in the approaching era of AI as a transformative global force.