

# China and US compete for AI dominance

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Signs of a growing arms race between China and the US in the field of artificial intelligence underline the importance of this technology for the future of warfare. *Tate Nurkin* examines the implications of this competition for intelligence and security agencies

## Key Points

- Artificial intelligence will shift the nature of defence, security, and intelligence competition between states, through its impact on the way intelligence analysts and decision-makers process and interpret data, and on the way militaries fight.
- China has identified AI as a key technological priority, and the leadership's heavy political and financial investment in this field is likely to produce results given the close interconnection between the government and the technology sector.
- Intelligence analysts will have to incorporate AI into their workflows, but not at the expense of traditional tradecraft and alternative analysis techniques, with the latter particularly important for conceptualising the uncertainties around the impact of AI on interstate competition.

In May 2017, then US Deputy Secretary of Defense Robert Work observed in a speech to the Department of Defense Applied Research Lab that the intersection of emerging technologies and capabilities was changing the nature of warfare.

Work was not the first observer to opine on the ways in which novel technologies are changing how conflicts will be fought. However, Work's point was that the development of emerging technologies – particularly AI, robotics, and the development of interfaces to connect humans and machines – will change the “immutable” nature of warfare, rather than just how wars are fought. “The nature of war is all about a collision of will, fear, uncertainty, and chance,” Work said. “You have to ask yourself, how does fear play out in a world when a lot of the action is taking place between unmanned systems?”

The US is not the only country to understand the potentially revolutionary impact of AI and robotics. The result has been what analysts are increasingly referring to as an AI arms race. Intelligence experts and government officials quoted in an article on the future of intelligence analysis in the January 2018 issue of *Jane's Intelligence Review* (Volume 30, Issue 1) used that exact term, as did a March 2018 *Wall Street Journal* article entitled ‘The New Arms Race in AI’.

This race is likely to be particularly intense between the United States and China (although others, including Russia, will also be involved). It is almost certain to have a profound effect on how geopolitical and military competition unfolds across the Indo-Pacific region during the 2020s as the two geostrategic rivals seek to become the first to occupy the commanding heights of cognitive warfare.

This is a high-stakes contest in which there are severe penalties for finishing second, given the potential for AI to confer dominance on those who develop the most agile and effective applications. Russian President Vladimir Putin noted on 2 September 2017, “Whoever becomes the leader in this sphere will become the ruler of the world.”



*An unmanned aerial vehicle on a flight test during a campaign for disaster prevention and reduction in Beijing on 12 May 2015. The prospect of swarms of armed unmanned vehicles working together and using AI could fundamentally shift the nature of warfare. (STR/AFP/Getty Images)*

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## **Cognitive warfare**

AI has a wide range of military applications. In part, this reflects the complex and fast-moving nature of 'fifth-generation warfare'. This term describes warfare in a situation in which combatants and non-combatants are frequently indistinguishable and military, political, and societal tools of coercion, confrontation, and conflict are fused. Such a scenario – which shares similarities with the type of conflict envisaged in the concepts of non-linear or hybrid warfare – is marked by considerable uncertainty about the origin, nature, trajectory, and pace of emerging threats, as well as the nature of adversaries' capabilities, and in some cases even the identity and location of the adversary.

This scenario demands a degree of cognitive power and agility that is beyond what human actors working in isolation are capable of providing. AI has the potential to enable humans, platforms, systems, and even weapons to function effectively by digesting and filtering information, even detecting difficult-to-sense targets or threats, and adapting to fast-moving shifts in operational environments.

Current visions of future military uses of AI typically focus on five main applications or mission areas.

## **Information processing**

First, AI will be used to better manage and process the information available to analysts and decision-makers. Machine learning and other AI applications can help better identify, queue, query, monitor, filter, and process the abundance of information available to analysts, operators, and decision-makers. Using AI in this way frees up individuals to focus on the more intellectually and psychologically demanding tasks of assessment and decision-making.

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US Air Force Chief of Staff David Goldfein highlighted the challenges of coping with the scale and pace of information availability in a July 2017 speech to the Air Force Association in Washington, DC. According to Gen Goldfein, incorporation of machine-learning applications of AI in the analysis of social media sources could greatly improve what is currently a “very human-centric methodology” by doing “that upfront analysis so that by the time it gets to the human level of analysis we’ve already refined it and focused it”.

AI applications that greatly enhance perception, processing, and cognition are not limited to intelligence activities. Pilots, tank commanders, and other operators would also benefit from AI filtering of the surfeit of information to which they have access, enabling them to focus on critical decision-making tasks.

### **Cyber attacks**

Second, AI will be used to amplify and intensify threats in the cyber domain. In February 2018, researchers at seven think tanks and universities, including Oxford and Cambridge universities in the UK, the Washington-based think tank Center for a New American Security, and non-profit research company OpenAI, released a report entitled ‘The Malicious Use of Artificial Intelligence: Forecasting, Prevention and Mitigation’. The report argued that “the use of AI to automate tasks involved in carrying out cyber-attacks will alleviate the existing tradeoff between the scale and efficacy of attacks. This may expand the threat associated with labor-intensive cyber-attacks”.

At present, outside the top tier of operators, most threat actors rely on unsophisticated techniques such as denial-of-service attacks or commonly available malware. The authors’ point was that the almost certain diffusion of sophisticated AI capabilities to more state and non-state actors will reduce the costs and risks of carrying out highly focused cyber attacks for those actors. This could include using AI to conduct sophisticated spear-phishing attacks or data poisoning attacks aimed at exploiting vulnerabilities in an adversary’s AI.

### **Unmanned vehicle swarms**

Third, the combination of the development of AI and the diffusion of unmanned technologies opens the likelihood for the use of large, autonomous swarms. These swarms will be made up of dozens or more of linked unmanned systems, operating across all of the domains: air, ground, surface, and undersea.

Individual systems within a given swarm will have specific functions – decoy, strike, air defence suppression, surveillance, electronic warfare – but they will all communicate with each other to carry out a mission with decisions being made by AI. Humans may provide the broad parameters of the mission – identifying targets to be addressed, for example – and program the platforms, but the swarm will have the capacity to cognitively adapt to an adversary’s countermeasures and a changing operational environment.

**[Continued in full version...]**

(1066 of 3410 words)

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