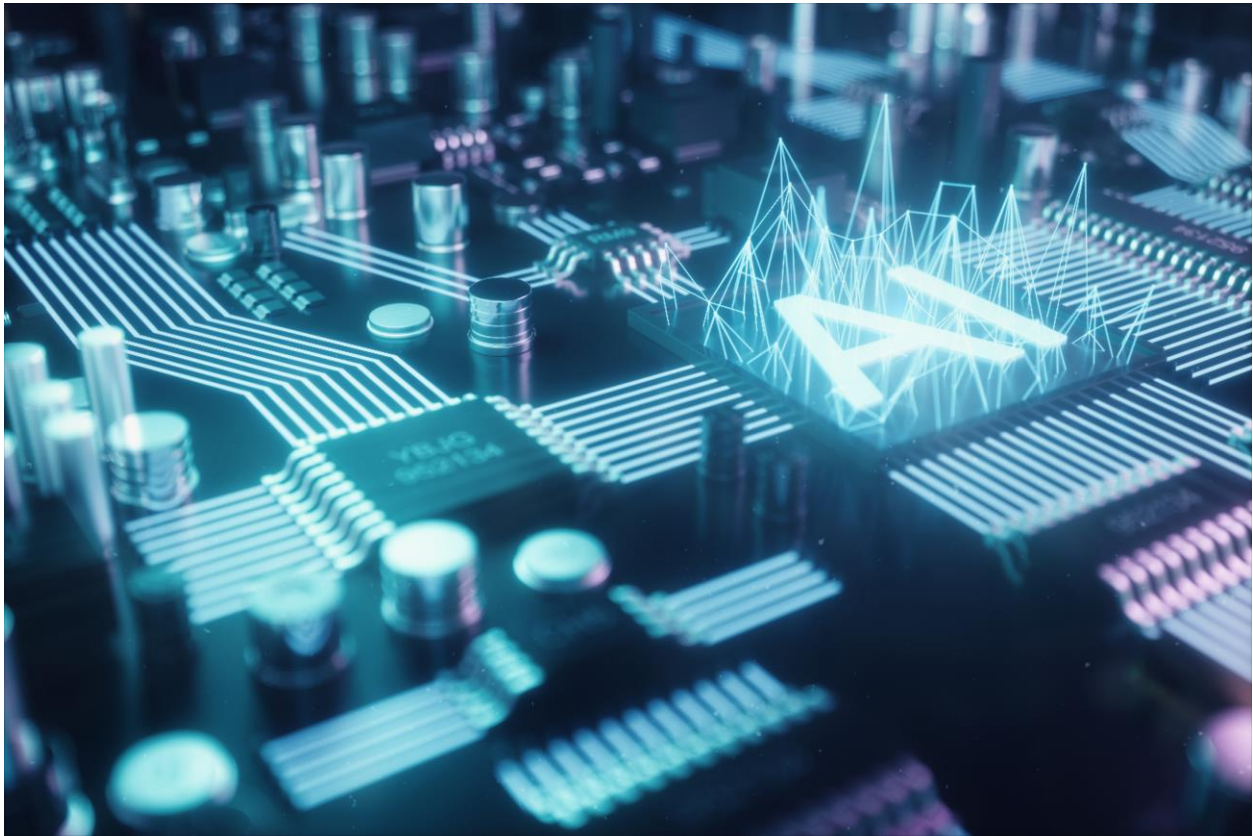


## **Artificial Intelligence: A Revolution in Military Affairs?**

**By Michael Raska and Richard Bitzinger**



At the Singapore Defence Technology Summit that begins tomorrow (26 June), defence-innovation leaders from around the world will discuss the direction and nature of novel technologies, as well as their impact at a time of intensifying geopolitical strategic competition.

One of the key issues for this summit has to do with artificial intelligence (AI) and whether its rapid diffusion will have a revolutionary impact on the future of warfare; if it does, how will it be applied to weapons technology and even the way the military is organised?

In theory, the possession of AI technologies equals more effective weapons systems, which in turn results in greater military power, which in turn translates into greater geopolitical power. AI proponents argue that the application of novel machine-learning algorithms to diverse problems promises unprecedented capabilities in terms of speed of information processing, automation for

weapons platforms and surveillance systems, and ultimately, decision-making for more precision firepower.

In doing so, the utility of AI in military affairs seems virtually endless – from real-time analyses of sophisticated cyberattacks and detection of fraudulent imagery to directing autonomous platforms such as drones, and enabling new forms of command and control such as automated battle management systems that analyse big data and provide recommendations for human action. Consequently, many argue that the diffusion of AI will have profound implications for how militaries adopt new technologies.

At the same time, however, the pursuit of next-generation AI, which will transform computers from tools into problem-solving “thinking” machines, presents a range of complex organisational and operational challenges. These include developing algorithms that will enable systems to better adapt to changes in their environment, learn from unanticipated tactics and apply them on the battlefield. It would also call for designing ethical codes and safeguards for these thinking machines.

Another challenge for policy-makers is that we now live in a time when “militarily relevant technologies” are becoming harder and harder to identify and classify. Technological advances, especially in the area of military systems, are a continuous, dynamic process; breakthroughs are always occurring, and their impact on military effectiveness and comparative advantage could be both significant and hard to predict at their nascent stages. Moreover, such technologies and resulting capabilities rarely spread themselves evenly across geopolitical lines.

In the Asia-Pacific, for example, the sources and development paths of new and potentially powerful militarily relevant technologies – based on AI and robotics as well as the ability of militaries to exploit their potential – vary widely.

The growing rivalry involving the United States, China, and to a lesser degree, Russia, has seen different national responses to the same technological breakthroughs. In China, for example, the strategic competition in the research, development and acquisition of cutting-edge AI technologies

and robotics for the People's Liberation Army (PLA) to fight and win future "intelligentised wars" is embedded in its concept of military-civil integration (MCI).

While the MCI concept is not new for China, President Xi Jinping elevated it in 2016 to a national-level strategy. What this means is that the PLA's long-term strategic military programs are deeply embedded in China's advancing civilian science and technology base, which in turn is increasingly linked to global commercial and scientific networks.

Yet, critical weaknesses remain. China still lags in cutting edge defence R&D. Western armaments producers, for example, continue to outpace China when it comes to most military technologies, particularly in areas such as propulsion, unmanned platforms and defence electronics.

In the US, its quest for AI supremacy in military affairs is driven by a multitude of priorities, requirements, operating concepts, resources, and strategies. Unlike during the Cold War, spending on military R&D is now dwarfed by its commercial equivalent. Consequently, the US military is no longer the primary driver of technological innovation. Instead the Pentagon relies on its science and technology engines such as the Defense Advanced Research Projects Agency (DARPA) to support sustained research in fundamental technologies while also looking to quickly leverage on emerging technical opportunities in the commercial sector.

Essentially, the US military hopes to tap all potential sources of technical advantage, from America's traditional industrial base as well as non-traditional suppliers and academia.

Whatever their approaches, the ability of nations to make the best use of advanced military and dual-use technological innovation will have a significant impact on their military capabilities. Some countries, including Singapore, may possess the resources to acquire advanced military technologies – either through indigenous R&D efforts or through acquisition from foreign suppliers – and others will not; some will have the means to systems-engineer advanced commercial technologies into effective military systems and others will not.

The main factors for success will not be technological innovation per se, but the combined effect of sustained funding, organisational expertise (i.e. sizable and effective R&D bases, both military and commercial) and institutional agility to implement defence innovation. This means having the people, processes, and systems in place, capable of delivering innovative solutions while maintaining existing core capabilities.

The diffusion of technological innovation has the potential to shape new strategic dynamics. Alliances may become more closely interconnected through technology-sharing and interoperability imperatives, while traditional strategic concepts such as deterrence will be tested through the emergence of different types of conflicts brought on by new technologies.

All of these factors, in turn, will likely have a significant impact on regional security and stability. Given how potentially game changing AI and other technological changes could be on military capabilities and strategic competitiveness, the discussions at this week's three-day Singapore Defence Technology Summit is an important stepping stone in what is bound to a broad, multi-decade-long dialogue.

*Michael Raska is Assistant Professor and coordinator of the military transformations programme at the Institute of Defence and Strategic Studies, a constituent unit of the S. Rajaratnam School of International Studies, Nanyang Technological University, Singapore. Richard A. Bitzinger is a visiting senior fellow with the military transformations program at RSIS.*

The Singapore Defence Technology Summit 2019 will be held at Shangri-La Hotel, Singapore, from 26 to 28 June 2019.