

Chinese Perspectives on EDTs & Military Applications

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EDTs and US-China Strategic Rivalry

- US-China strategy rivalry spans a wide spectrum of military, economic, diplomatic and, increasingly, technological spheres
- Given the importance of emerging and disruptive technologies in determining both economic and military balances of power, the US and China are both pursuing policies aimed at winning this race
- Areas of competition include 5G technologies, Artificial Intelligence, quantum computing, robotics, hypersonics, advanced materials, biotech, data analytics, space technologies, among others



US-China Technology Competition

- US-China competition for the commanding heights of innovation—key to economic growth, national security, and military capabilities
- China: from ***Made in China 2025*** to ‘new productive forces’ and state-led and funded initiatives/projects to promote indigenous innovation
- US policies have revolved around industrial policies such as the ***CHIPS and Science Act*** and major investment to export controls and restrictions on investments to curb, slow down, and increase costs in China’s tech and innovation endeavours



Sino-US Technology Competition and China's Evolving Policy Frameworks

- Chinese pursuit of technology development & advancement, self-reliance, self-improvement, and leadership since the 1990s
- State High-Tech Development Plan, or the 863 Program, initiated in March 1986, partially inspired by the US Strategic Defense Initiative
- The Program covers niche key technologies: Biotechnology, Space, Information technology, Laser technology, Automation, Energy, New materials, Telecommunications, and Marine technology



Sino-US Technology Competition and China's Evolving Policy Frameworks

- ***Made in China 2025***, a Chinese industrial policy guideline launched in 2015, aims to transform China from a low-cost manufacturing 'world workshop' to a global high-tech innnovation leader
- Ten sectors: aerospace, biotech, information technology, smart manufacturing, maritime engineering, advanced rail, electric vehicles, electrical equipment, new materials, biomedicine, agricultural machinery and equipment, pharmaceuticals, and robotics manufacturing



Made in China 2025

WHAT IS 'MADE IN CHINA 2025'?

A strategic plan by the Chinese government to transform the country into a global high-tech powerhouse across 10 key sectors:



Source: DHL <https://lot.dhl.com/made-in-china-2025-industrial-policy-lives-on/>

EDTs: China Catches Up

- In the field of emerging and disruptive technologies (EDTs), China is considered a serious competitor in artificial intelligence (AI)
- It is becoming a world leader in commercial applications of AI, such as facial recognition, speech technology, financial technology (fintech), research publications and patents, and deep learning
- In order to apply AI in military domain, China has long practiced what it calls ‘military-civil fusion (军民融合, MCF)’
- Chinese interests in military applications of AI include C2, decision making, and autonomous nuclear weapons systems



Chinese Perspectives on EDTs and Military Applications: An Overview

- As a rising power and a peer competitor with the US in both intent and capabilities, China's views on EDTs deserve closer and careful scrutiny
- CNKI and other open sources: Chinese language literature and its limitation, including access to relevant materials
- Chinese perspectives cover a wide of spectrum of issues, including how EDTs (in particular AI) help improve collection and analysis of intelligence to enable more effective decision-making



Growing Chinese Discussions of EDTs

- While the Chinese literature indicates that science and technology have always been an area of focus, there was a noticeable surge between 2015 and 2016 in Chinese literature on EDT-related research based on the CNKI database. This was roughly the same time ‘Made in China 2025’ was announced, and the US’s ‘Third Offset Strategy’ was rolled out
- By using keywords such as ‘新兴与颠覆性技术 (Emerging and disruptive technology)’, ‘政策 (policy)’, ‘战略稳定 (strategic stability)’ and ‘核 (nuclear)’, the search results show that the majority of the research focuses on general conceptual rather than policy specific issues, especially on discussions directly related to China’s own military strategy



Chinese Focus on AI Development

- China places great emphasis on AI development and this has been clearly spelled out in both the ***Made in China 2025*** and the 2017 ***New Generation AI Development Plan***
- China has made headways in some areas in AI, such as machine learning, data mining, etc. Military-Civil Fusion also allows collaboration between the two sectors to drive AI development
- China recognizes the important role AI will play in its military modernization, especially as the PLA aims to fight and win intelligentised warfare



AI and Military Applications

- Ability to collect, process and derive patterns in large quantities of data which in turn can help improve NC3 and decision-making
- Unmanned autonomous ISR systems and analysis/processing massive data
- Improve early warning systems
- However, improvement in AI-driven ISR could also threaten the survivability of a second-strike force, given the ability of technologically more advanced powers to detect, identify, track, target and destroy mobile and concealed launch platforms, enabling them to achieve 'first mover' advantage and the temptation in pre-emptive strikes against opponents.



Focus of Chinese Discussions

- The concept of EDTs in the Chinese literature often refers to the established understanding as framed by western scholars/analysts and stated in official western documents. While there are analyses on conceptual discussion related to EDTs, there is no clear distinction when it comes to specific technologies
- Instead of detailing its own development and planning on EDTs, most Chinese analyses describe, explore, and explain other countries' developments in this area. In particular, there is a preference to research the developments and policies in the US, Russia, India, Korea, Japan, and overall discussion at the North Atlantic Treaty Organization (NATO)



Implications of AI applications in NC3 systems for strategic stability

China recognizes the important role AI will play in its military modernization, especially as the PLA aims to fight and win intelligentised warfare. The application could benefit the PLA for, for example:

- increasing efficiency in data processing and perhaps even accuracy
- providing better situational awareness (态势感知) and judgement on the battlefield
- shortening decision-making time for faster reaction times
- providing military rehearsal (军事推演) including war-game simulation



Implications of AI applications in NC3 systems for strategic stability

On the other hand, compressed time for decision-making also runs serious risks:

- when and if the data informing decisions are either inaccurate or tampered with
- Increased tendency in pre-emptive nuclear use
- AI, combined with high precision strike capabilities, can seriously threaten the survivability of nuclear powers' second-strike capabilities
- Imbalance between those with better AI-enabled ISR and NC3 and asymmetrical advantage and temptation toward first strikes
- serious doubt about the survival of retaliatory capabilities, hence undermining strategic stability



Trust or Misgivings about AI

- There is not sufficient trust in AI and its ability to both bring about better, secure, and safer NC3 and avoid feeding misinformation/tempered data resulting in wrongful and fatal decisions
- Unpredictable and unexplainable errors due to the black box nature of AI algorithms; risk of strategic miscalculation due to shortened decision-making time in the fog of war; risk of unintended escalation should the AI algorithm be fed compromised data
- The trust in military use of AI remains low in China and there is an emphasis of centrality of human intervention, especially in nuclear weapon systems - AI should always remain under the control of humans



China on AI in NC3: Don't Go There

- There is an emphasis of centrality of human control/intervention in NC3
- China has suggested that AI should not be used in NC3 given the potentially devastating consequences should things go wrong
- China has made its positions known in international arms control negotiations on regulating military AI and autonomous weapons
- China Also pledges from all nuclear weapons states to not use AI-enabled capabilities to strike each other's nuclear facilities



Understanding and Assessing Risks

- unpredictable and unexplainable errors due to the nature of AI algorithms
- risk of strategic miscalculation due to compressed decision-making time within the fog of war
- risk of unintended escalation due to the dependence on AI data analysis that could be compromised, bringing in the AI-nuclear-cyber nexus
- and especially in autonomous nuclear-weapon systems, China remains tentative, given the uncertainty and risks. This appears to be in line with the debates currently ongoing in the West regarding the benefits and risks of AI applications in the nuclear realm, including NC3



China on AI Risk Mitigation

Chinese suggestions on risk mitigation by:

- promoting arms control discussion under multilateral frameworks, especially under the UN framework
- calling for the establishment of review mechanism, such as the authoritative scientific development review mechanism at the Conference on Disarmament in Geneva to assess the prospects and risks of the military applications
- reaching bilateral and multilateral agreements for prohibiting the use of AI-enabled weapon systems, including autonomous weapons, in attacking each other's strategic assets



Chinese Views on AI: Key Takeaways (1)

- Chinese literature on AI related research surged in 2017. The focus of the expert debate has shifted from developments in other countries, to the implications of AI on great power relations
- There is a divergent view on the extent to which AI will have an impact on nuclear deterrence and strategic stability.
- Due largely to ethic issues and the risk of losing control, AI application, and especially in autonomous nuclear-weapon systems, will remain tentative and limited, given the uncertainty and risks
- There is consensus among the Chinese expert community that there is no clear indication that nuclear armed states intend to apply AI or autonomous systems to their nuclear weapons



Chinese Views on AI: Key Takeaways (2)

- AI-enabled systems in nuclear weapons could include a range of aspects, from early warning to C2 and decision-making, from weapon delivery systems to air and missile defence
- Overall, there is confidence that the strategic stability can be maintained with nuclear powers placing greater efforts in securing the survivability of their nuclear retaliatory capabilities through hardening, concealment, and redundancy
- Both official perspective and expert community in China share a common sense that the application of AI will bring unprecedented complexity in decision-making process
- There is also consensus on the centrality of human intervention in AI-enabled weapon systems in both Chinese literature and official doctrines



Managing AI Through Arms Control

- Sharing views on the risks associated with the increasing military use of AI, especially with nuclear forces
- Further elaborating a framework outlining acceptable and unacceptable adoption of AI in NC3 system
- Enhancing understanding of risks and implications of military use of AI for non-governmental actors
- Providing targeted education and training
- Developing rules of the road for military AI applications, especially in NC3
- The Conference on Disarmament (CD) could be a suitable venue to start the dialogue, which could involve the P5 and other de facto nuclear weapons states



The Future of Chinese AI Development

- The future developments of China's AI will likely depend on both the hardware and software aspects
- On the former, current US policy on restricting semiconductor technology transfers to China will have a significant impact in the short term
- Overtime, China can overcome the bottleneck in chip making and its ability to access large datasets will help it with AI development
- On the latter, apart from clearly articulated national strategies, training and retaining AI talents will be critical
- The main approaches to mitigating risks from military application of AI technology come from multilateral frameworks

