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A Comparative Analysis of the United States and China's Experience in the Military Use of Artificial Intelligence Technologies

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Abstract. The progressive economic development of the People's Republic of China (PRC) with its further integration into the global economy, as well as the growing complexity of the international political environment due to China's rising power, have revealed the need to expand the capabilities of the People's Liberation Army (PLA) to protect China's national interests in conflicts with developed states. A key technological innovation of the current stage of scientific and technological progress is artificial intelligence (AI). AI has already entered the list of technologies that are fundamentally changing the nature of war and peace, and has the potential to fundamentally reshape the military-economic power of states, as it is actively used in the most advanced fields, including the space industry and virtually all military domains, particularly in command and control systems. The main rivals for leadership in AI are the United States and China. Both countries are actively developing AI-based technological solutions to modernize their armed forces. This could lead to increased strategic competition between the two powers. The study analyzes the experience of modernizing the armed forces and the concepts of their employment by the United States and China in the context of the military application of AI. The aim of the study is to determine the impact of AI adoption on the changing nature of warfare and the strategic balance of power between these countries. The object of the research is the armed forces of the United States and China in the context of their technological modernization and institutional improvement. The authors analyze the conceptual documents of the two countries and examine changes in the organizational structure of their armed forces in light of national strategies for the development and implementation of AI technologies in the military sphere. The authors conclude that the use of AI can significantly accelerate military operations, change concepts of warfare and the strategy for employing military forces, increasing the role of autonomous systems. The PLA is acutely aware of the importance of adapting to and benefiting from advances in AI, fearing a "generation gap" between its capabilities and those of the U.S. armed forces, which are perceived as a powerful adversary and, therefore, a key benchmark for comparison. Currently, in terms of the number of weapons systems under development using advanced technologies, the two states maintain parity. The future trajectories of these technologies in the PRC and the United States will influence the future strategic balance of power, potentially leading to the emergence of new forms and methods of employing armed forces, as well as changes in the fundamental documents of military development.

Key words: strategic rivalry, balance of power, autonomous systems, integrated operations, cybersecurity, decision support systems, defense innovation, international security

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Сравнительный анализ опыта США и КНР в области применения технологий искусственного интеллекта в военной сфере

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Аннотация. Поступательное экономическое развитие Китайской Народной Республики (КНР) с дальнейшей интеграцией в мировую экономику, а также усложнение международно-политической среды в связи с усилением Китая выявили потребность в расширении возможностей Народно-освободительной армии Китая (НОАК) для защиты национальных интересов КНР в войнах с развитыми государствами. Важным технологическим новшеством текущего этапа научно-технического прогресса выступает искусственный интеллект (ИИ). ИИ уже вошел в перечень технологий, навсегда меняющих облик войны и мира, и способен придать абсолютно новое содержание военно-экономической мощи государства, так как активно используется в самых передовых областях, в частности в космической отрасли, практически во всех военных сферах, в том числе в системах управления. Основными соперниками в борьбе за лидерство в ИИ выступают США и Китай, которые активно разрабатывают технологические решения на основе ИИ для модернизации собственных вооруженных сил (ВС), что может углубить стратегическую конкуренцию между этими державами. Исследование посвящено анализу опыта модернизации вооруженных сил и концепций их применения США и Китаем в контексте применения ИИ в военной сфере. Цель — определение влияния внедрения ИИ на изменение характера ведения войны и на стратегический баланс сил между этими странами. Объектом исследования выступают вооруженные силы США и Китая в контексте их технологической модернизации и институционального усовершенствования. Проведен анализ концептуальных документов двух стран и изучено изменение организационной структуры вооруженных сил двух стран в свете национальных стратегий по разработке и внедрению технологий ИИ в военную сферу. Авторы пришли к выводу, что применение ИИ способно существенно ускорить военные операции, изменить концепции ведения войны и стратегию использования военных сил, увеличивая роль автономных систем. НОАК остро осознает важность адаптации к прогрессу в области искусственного интеллекта и извлечения из него выгоды, опасаясь возникновения «разрыва поколений» между ее возможностями и возможностями вооруженных сил США, которые воспринимаются как могущественный противник и, следовательно, ключевой показатель для сравнения. В настоящее время по количеству разрабатываемых образцов вооружений с применением передовых технологий два государства сохраняют паритет. Траектории дальнейшего развития данных технологий в КНР и США будут влиять на будущий стратегический баланс сил, что может привести к появлению новых форм и способов применения ВС, а также к изменению основополагающих документов военного строительства.

Ключевые слова: стратегическое соперничество, баланс сил, автономные системы, интегрированные операции, кибербезопасность, системы поддержки решений, оборонные инновации, международная безопасность

Вклад авторов. Данилов В.А.: валидация данных. Данилова Е.В.: валидация данных. Дубровский И.Р.: концепция исследования, методология исследования, подготовка текста исследования. Все авторы ознакомлены с окончательной версией статьи и одобрили ее.

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Introduction

China's rise to becoming the world's largest economy, a leading industrial power, and a competitor to the United States for global leadership has heightened demands on its armed forces as a tool for solving political problems through military means. Military modernization, which started in the People's Republic of China (PRC) in the second half of the 1990s, reached a significant milestone in 2020: the People's Liberation Army (PLA) completed its mechanization process and made significant progress in informatization and improved strategic capabilities.

The strategic importance of artificial intelligence (AI) in the global arena is undeniable, leading to intense competition not only between companies but also to a kind of 'arms race' among leading countries. The words spoken by Russian President Vladimir Putin in 2019 are beginning to sound prophetic: "If someone can secure a monopoly in artificial intelligence, the consequences are clear to all—they will become the ruler of the world."[1] AI will become the cornerstone of global competitiveness in the coming decades, providing leaders in this field with significant economic and military advantages.

In the ongoing struggle for leadership in AI, China and the United States are enshrining their strategic priorities in a number of key documents.

To determine how technological change is being translated into the military spheres of the United States and China, three questions must be addressed.

First, how is the use of AI technologies influencing each country's evolving understanding of the nature of warfare?

Second, how are states incorporating this technology into their military structures? It is important to consider that the challenges of organizational adoption and implementation of technological innovations are closely linked to effectiveness. These challenges are crucial for determining how innovation will impact international policy. Decades of research have shown that the impact of technological change on global politics—whether changes in the economy, society as a whole, diplomacy, or military power—depends far more on how governments and organizations decide to implement and utilize new capabilities than on the technologies themselves (Pinch & Bijker, 1984).

Third, in which areas of military affairs research is being conducted to incorporate AI technology into weapons or combat support systems?

The issues addressed in this study are partially reflected in the works of scholars such as L.Y. Hunter (Hunter et al., 2023), E. Kania (2022), J. Johnson (2021), K. Zhu and K. Long (Zhu & Long, 2019), and others. In the works of these researchers, the applied implementation of AI technologies in the military sphere in the United States and China is considered from the perspective of China's gradual replacement of the US position in this area. Unlike these studies, this research focuses not on documenting a shift in the balance of power between the two powers, but on a comparative analysis of the conceptual and institutional mechanisms for implementing AI in the military spheres of the United States and China. The authors examine this process by assessing how the characteristics of each country's national strategies, military doctrines, and organizational reforms influence the nature of the emerging strategic balance of power.

The theoretical framework for the study is neoclassical realism (Rose, 1998), which allows us to examine the complex political, diplomatic, and military foreign policy actions of the United States and China as steps by great powers seeking to realize their national interests in

[1] Meeting on the Development of Technologies in the Field of Artificial Intelligence // President of Russia. May 30, 2019. (In Russian). URL: http://www.kremlin.ru/events/president/news/60630 (accessed: 25.08.2024).

a highly competitive international environment. To identify the specific approaches of the United States and China to the development of AI in the military sphere, the authors applied a comparative method of the two actors' modes of action based on three qualitative indicators: the reflection of the specific application of AI technologies in the military doctrines of the United States and China; the degree of implementation of AI technologies in the current military organization of the two countries; and the role of AI technologies in the promising developments of each country.

The theoretical framework for this study is neoclassical realism, as proposed by Rose (1998). This approach allows us to analyze the complex political, diplomatic, and military actions of the United States and China in terms of their efforts to pursue their national interests in a competitive international environment.

To identify the specific strategies of the United States and China regarding the development of artificial intelligence (AI) in the military realm, the authors employed a comparative analysis of the two nations' approaches based on three key qualitative indicators:

1. The reflection of AI technologies in their respective military doctrines,

2. The degree of implementation of these technologies in their current military organizations,

3. The role of AI in their future military plans and strategies.

Research into the development of AI in the military spheres of the United States and China inevitably carries the risk of bias, as open sources predominantly cover AI applications in the commercial sector, where transparency is higher and information is more readily available. At the same time, many military developments, their scale, and actual capabilities are not fully reflected in public reports and studies, making it difficult to objectively assess the impact of military AI. It is also impossible to objectively track which tasks are outsourced to commercial firms as part of military-civilian integration—an approach to military development that both countries adhere to. As a result, assessments of military AI are based either on limited data or indirect indicators, such as changes in doctrinal sources or official announcements of the adoption or development of new weapons using AI technologies. To partially overcome these limitations, this study employs a multi-layered approach to its source material: alongside official conceptual documents (military doctrines, national security strategies, and government programs) it also draws on data on arms procurement, institutional reforms, and verified tests of specific weapons systems. This combination of sources allows assessing not only declared intentions but also practical progress in the field of military AI. However, the reader should note that the study's findings are primarily conceptual and comparative-analytical in nature: they reflect documented trends and institutional development vectors, but cannot claim to provide a comprehensive assessment of the actual military potential of any given power.

Trends in the Application of AI in the Military Sphere

New technologies are shaping the balance of power primarily through military and economic means. On the one hand, technologies create new global political spaces that become arenas for geopolitical confrontation. On the other hand, technologies directly influence countries' ability to wage and win wars, and also indirectly affect the balance of power by strengthening a country's economic strength.

In particular, prominent researchers on the political implications of military technology developments, such as M.C. Horowitz, G.K. Allen, E.B. Kania, and P. Scharre, have noted that the success of AI in the military will

depend on how easily its technologies can be replicated and integrated with commercial applications. The greater the overlap with civilian technologies, the faster companies will be able to develop similar solutions. Military AI systems specific to combat operations may retain their advantages longer. Furthermore, the success of countries in the "AI revolution" will depend on their ability to use AI to strengthen their economies and optimize their military capabilities, as well as their ability to manage the social changes brought about by these technologies (Horowitz et al., 2018, pp. 11–12).

It is important to distinguish potential technological innovations from military innovations. While military innovations often involve changes in technology, this is not always the case. Military innovations refer to changes in organizational behavior and warfighting practices of armed forces, aimed at enhancing their ability to effectively convert capabilities into power (Grissom, 2006). The use of aircraft carriers as mobile airfields by the United States and Japan during World War II (1939–1945) is a typical example: the British Navy, which relied primarily on battlecruisers and battleships, used aircraft carriers only as auxiliary assets. The United States and Japan, by contrast, appreciated their striking power and began organizing task forces of other warships around aircraft carriers. While AI has the potential to form the basis for several military innovations, it is not a military innovation itself, and no one is currently using AI in a way that could be considered a military innovation. Instead, in most cases, the use of AI in the military sphere represents the highest level of automation in the application of existing technology (Romashkina, Markov & Stefanovich, 2023, pp. 82–84).

Several potential implications for the strategic balance of power from the military use of AI should be highlighted.

First, the implementation of AI has the potential to significantly accelerate military operations. Autonomous AI systems increase the speed of decision-making and task execution, even if final decisions still rest with humans (Abaimov & Martellini, 2020, pp. 145–146). Military applications of AI are already being developed, such as Project Maven in the United States, where AI is used to analyze data and recognize images from unmanned aerial vehicles (UAVs), improving the accuracy and speed of assessments.

Secondly, the advent of AI could lead to the development of new warfare concepts (military doctrines). One such possibility is the use of swarms of small robotic platforms for military operations (Huizing et al., 2019). These systems require coordination with other military assets and are capable of adapting in real time in the face of losses. Such technologies are already commercially available, and their military application could change the structure and tactics of armed forces.

Finally, AI may also change the strategy for employing military forces, increasing the role of machines and reducing reliance on human factors. AI algorithms can help commanders optimize battle plans and manage complex operations in real time, which is especially important in modern combat, where speed of decision-making is crucial.

AI Applications in the Military: The US Military's Experience

The United States views artificial intelligence as part of its Third Offset Strategy,[2] which was unveiled in 2014 by Secretary of Defense, Chuck Hagel, with the goal of restoring the United States' military technological advantage.[3]

[2] The first offset strategy was developed in the 1950s and focused on US investments in nuclear weapons. The second offset strategy, developed in the 1970s, focused on precision-guided weapons. See: (Kashin, 2016).

[3] Hagel C. Secretary of Defense Speech: Reagan National Defense Forum Keynote // U.S. Department of Defense. November 15, 2014. URL: https://dod.defense.gov/News/

Therefore, the Third Offset Strategy focuses on automated control and autonomy systems, where AI plays a crucial role (Bartenev, 2016).

The first two offsets were developed in the 1950s and 1970s respectively, focusing on nuclear weapons and precision-guided missiles. The third offset builds on these earlier strategies by incorporating AI technology to enhance military capabilities.

Chuck Hagel's speech at the Reagan National Defense Forum in 2014 outlined the goals and objectives of the Third Offset, emphasizing the importance of AI and automation in maintaining US military dominance.

The first statement regarding AI was made in 2016, when the Obama administration released a roadmap emphasizing the importance of U.S. leadership in AI. However, this roadmap primarily focused on regulatory policy issues.[4] That same year, the White House's Office of Science and Technology Policy established a subcommittee on Machine Learning and Artificial Intelligence (MLAI).[5] The subcommittee's primary goal was to facilitate the coordination of national activities in the field of artificial intelligence. As a result of these developments, the Obama administration produced a number of documents focusing on artificial intelligence regulation and government research and development (R&D).[6]

Human augmentation systems have been a priority for research, with a particular focus on optimizing human-AI interactions to enhance performance in various applications. Equally important goals included standardizing testing by creating accessible datasets and environments for training AI models and initiating the development of industry standards to enable objective evaluation of AI systems (Rickli & Mantellassi, 2023, pp. 16–17). It should be noted that research in these areas has long-term potential for the military.

During Donald Trump's first term, the field of AI gained further momentum in the United States. In 2017, the US Department of Homeland Security published an analytical report on AI,[7] which focused on assessing the benefits and risks of the technology. That same year, for the first time, AI was included in the National Security Strategy,[8] emphasizing its role in creating an information state, weapons development, and surveillance systems.

In 2018, the National Defense Strategy identified AI as a key technology for winning future wars and noted threats from Chinese and Russian investments in military AI applications that could undermine the US position.[9] At a White House conference, Michael Kratsios outlined the Trump administration's goals for AI: prioritizing funding for AI development, removing barriers to innovation, training the workforce, achieving military superiority, and

Speeches/Speech-View/Article/606635/reagan-national-defense-forum-keynote/ (accessed: 25.08.2024).

[4] The Administration's Report on the Future of Artificial Intelligence // Obama White House. October 12, 2016. URL: https://obamawhitehouse.archives.gov/blog/2016/10/12/administrations-report-future-artificial-intelligence (accessed: 25.08.2024).

[5] Charter of the Subcommittee on Machine Learning and Artificial Intelligence, Committee of Technology, National Science and Technology Council // Obama White House. May 6, 2016. URL: https://obamawhitehouse.archives.gov/sites/default/files/microsites/ostp/NSTC/ai_charter_-_signed_final.pdf (accessed: 25.08.2024).

[6] The National Artificial Intelligence Research and Development Strategic Plan // Executive Office of the President of the United States. October 2016. URL: https://www.nitrd.gov/pubs/national_ai_rd_strategic_plan.pdf (accessed: 25.08.2024).

[7] Narrative Analysis: Artificial Intelligence. Washington: Department of Homeland Security, 2017 // Pennsylvania State University. URL: https://psu.pb.unizin.org/hls476/chapter/narrative-analysis-artificial-intelligence-us-department-of-homeland-security-july-2017-national-protection-and-programs-office-of-cyber-and-infrastructure-analysis/ (accessed: 25.08.2024).

[8] National Security Strategy of the United States // The White House. December 2017. URL: https://trumpwhitehouse.archives.gov/wp-content/uploads/2017/12/NSS-Final-12-18-2017-0905.pdf (accessed: 25.08.2024).

[9] Summary of the 2018 National Defense Strategy of the United States of America : Sharpening the American Military's Competitive Edge. Washington : Department of Defense, 2018. P. 3.

leading internationally. A Special Committee on AI was formed to coordinate efforts in this area.[10]

In 2019, an Executive Order was issued that established U.S. leadership in AI as a strategic priority for the country. The budget request identified artificial intelligence, autonomous systems, and hypersonic technologies as key areas for ensuring technological dominance.[11]

The Biden administration has continued to focus on military AI development, releasing an updated National AI Research and Development Strategic Plan in 2023. It built on a similar document from the Obama administration, but added two significant innovations: the emphasis on expanding public-private partnerships and the proposal for international cooperation in AI research.[12]

The priority of AI technologies has been demonstrated by the significant investment made by the United States in AI development since 2019. The United States has allocated USD 328.5 billion to AI development. In 2023, US investment in this area reached USD 67.9 billion, representing a 65.94% increase compared to 2019 spending.[13] This dynamic indicates a steady increase in the priority of AI in US national strategy.

Despite a significant number of official statements and documents published by US presidential administrations, there is still a lack of a clear organizational framework for AI policy. The institutional framework for the application of AI in the US military is provided by several government agencies responsible for AI research and development, with the Department of Defense as the primary responsible agency. In June 2018, the Pentagon established the Joint Artificial Intelligence Center (JAIC). According to JAIC Director Lieutenant General John N.T. Shanahan, the JAIC plays a critical role in transitioning research and development to practical capabilities.[14]

Another agency responsible for artificial intelligence projects within the Department of Defense is the Defense Advanced Research Projects Agency (DARPA), which plays a leading role in artificial intelligence research and development. DARPA's annual budget exceeds USD 3 billion, allowing it to address a wide range of research challenges.[15] Additionally, in 2018, DARPA announced a multi-year investment of more than USD 2 billion in new and existing programs known as the "AI Next" campaign.[16]

Finally, on May 10, 2018, the White House established the Ad Hoc Committee on Artificial Intelligence within the National Science and Technology Council. This committee provides advisory support to the Executive Office of the President on AI research and development priorities, and is responsible for coordinating

[10] Summary of the 2018 White House Summit on Artificial Intelligence for American Industry. The White House Office of Science and Technology Policy. May 10, 2018 // The Trump White House. URL: https://trumpwhitehouse.archives.gov/wp-content/uploads/2018/05/Summary-Report-of-White-House-AI-Summit.pdf (accessed: 25.08.2024).

[11] Executive Order 13859 on Maintaining American Leadership in Artificial Intelligence // The White House. February 11, 2019. URL: https://www.federalregister.gov/documents/2019/02/14/2019-02544/maintaining-american-leadership-in-artificial-intelligence (accessed: 25.08.2024).

[12] The National Artificial Intelligence R&D Strategic Plan. 2023 Update // NITRD. May 2023. URL: https://www.nitrd.gov/pubs/National-Artificial-Intelligence-Research-and-Development-Strategic-Plan-2023-Update.pdf (accessed: 25.08.2025).

[13] Tanner B. USA Leading the Charge on AI Investment // Intelligent CIO. August 8, 2024. URL: https://www.intelligentcio.com/north-america/2024/08/08/usa-leading-the-charge-on-ai-investment/ (accessed: 22.03.2025).

[14] Özdemir G.S. Artificial Intelligence Application in the Military: The Case of United States and China. İstanbul : SETA, 2019. P. 16.

[15] Moss S. Understanding the United States' National AI Strategy // Data Centre Dynamics. February 12, 2019. URL: https://www.datacenterdynamics.com/en/analysis/understanding-united-states-national-ai-strategy/ (accessed: 25.08.2024).

[16] DARPA Announces $2 Billion Campaign to Develop Next Wave of AI Technologies // DARPA. September 7, 2018. URL: https://www.darpa.mil/news-events/2018-09-07 (accessed: 25.08.2024).

the work of government, industry, and academia on AI research and development.

The US military is actively developing and testing various applications of artificial intelligence (AI) for military purposes, demonstrating significant achievements in this field. In 2013, the US Navy successfully performed an autonomous landing of the X-47B drone, and in 2015, an autonomous mid-air refueling.[17] In 2016, the Pentagon demonstrated a swarm of 103 unmanned aerial vehicles that operated as a single organism; similar tests were also conducted with unmanned boats. The Project Maven, which uses AI for reconnaissance and surveillance, has been successfully used in the fight[18] against ISIS.[19] A significant program is the Loyal Wingman, in which unmanned aircraft are protected by manned fighters.[20] Also noteworthy is the Sea Hunter, an unmanned anti-submarine warfare vessel that has completed an autonomous voyage.[21] Despite these successes, the US has not yet announced tests of lethal autonomous weapons systems using AI.

As part of the "AI Next" campaign, DARPA's agenda includes the development of explainable AI (XAI), as well as autonomous systems, including swarms of unmanned aerial vehicles and ground vehicles (the OFFSET project).[22] The military services are also developing their own initiatives: the US Army is testing autonomous tactical vehicles (The Ground Vehicle Autonomous Pathways, GVAP), the US Air Force is developing AI pilots to control drones (the Skyborg program), and the Navy is developing cyber defense algorithms for its autonomous vessels like the Sea Hunter.

Thus, AI has become an integral part of US military strategic plans, beginning with the Third Offset Strategy initiatives aimed at restoring military technological superiority. In recent years, a number of programs and agencies, such as the JAIC and DARPA, have been established to actively pursue AI development for military purposes. Despite significant progress in autonomous systems such as drones and reconnaissance systems, a key challenge remains the lack of coordination and an overly complex institutional structure in AI development at the national level. Current efforts, including public-private partnerships and international cooperation, are aimed at strengthening US leadership in this area. However, the future depends on the government's ability to effectively implement its plans and maintain technological superiority in the face of increasing competition from other countries.

AI Applications in the Military: China's Approach

Although the military component of China's foreign policy is not used as frequently as economic and diplomatic instruments, the reality of Chinese long-term military planning is ambitious: by 2035, the modernization of national defense and the armed forces will be

[17] X-47B UCAS Makes Aviation History… Again! // Northrop Grumman. April 22, 2015. URL: https://www.northropgrumman.com/what-we-do/air/x-47b-ucas (accessed: 25.08.2024).

[18] Freedberg S.J. Artificial Intelligence Will Help Hunt Daesh By December // Breaking Defense. July 13, 2017. URL: http://breakingdefense.com/2017/07/artificial-intelligence-will-help-hunt-daesh-by-december/ (accessed: 25.08.2024).

[19] Hereinafter, an organization included in the Unified Federal List of Organizations, containing foreign and international organizations, recognized as terrorist in accordance with the legislation of the Russian Federation is mentioned.

[20] Liptak A. The US Air Force's Jet-Powered Robotic Wingman Is like Something out of a Video Game // The Verge. March 9, 2019. URL: https://www.theverge.com/2019/3/9/18255358/us-air-force-xq58-a-valkyrie-prototype-robotic-loyal-wingman-drone-successful-test-flight (accessed: 25.08.2024).

[21] Trevithick J. Navy's Sea Hunter Drone Ship has Sailed Autonomously to Hawaii and Back Amid Talk of New Roles // The War Zone. February 4, 2019. URL: https://www.twz.com/26319/usns-sea-hunter-drone-ship-has-sailed-autonomously-to-hawaii-and-back-amid-talk-of-new-roles (accessed: 25.08.2024).

[22] OFFSET: OFFensive Swarm-Enabled Tactics // DARPA. URL: https://www.darpa.mil/research/programs/offensive-swarm-enabled-tactics (accessed: 23.03.2025).

largely completed, with the prospect of creating a "world-class" army from the PLA by 2049.[23]

To achieve these goals, China's military-political leadership has recognized that warfare is evolving from today's "information" (信息化, *xinxihua*) warfare to future "intellectual" (智能化息化, *zhinenghua xihua*) warfare. During this transformation, artificial intelligence is expected to become as important a factor in victory on the battlefield of the future as information technology does today.[24]

The concept of intelligentization entails the development and implementation of artificial intelligence and the integration of interconnected technologies necessary for the development of automated command, control, communications, surveillance, intelligence, and reconnaissance (C4ISR) capabilities (Costello & McReynolds, 2018, p. 7). According to the concept of intelligentization, the integration of AI into the processes and functions of the PLA is not an end in itself. According to one PLA scholar, it "refers to the overall operational description of the armed forces' systems, consisting of people, weapons, equipment, and combat methods."[25]

The main premise of the new stage of theoretical development for modernizing China's military capabilities was the focus on creating a unified organizational structure at the operational-strategic level, encompassing troops of various branches and services, with the participation of all services and branches of the armed forces. The concept was to enable the PLA to conduct "integrated joint operations" (协同联合作战, *xietong lianhe zuozhan*) (Shou, 2013, pp. 206–207), which would create conditions for unified command and control, rapid maneuver, comprehensive strike potential, as well as operational support, logistical support, and supply for various formations. In this way, it is intended to create a "system of systems" that includes the integration of humans and machines, using AI as the "leading" or dominant (智能主导, *zhineng zhudao*) element that would act as a connecting link in this entire system.

Chinese military and political circles believe that a new "military revolution" is taking place globally, presenting both challenges and opportunities for China. In August 2014, the Politburo discussed new trends in global military development and the need for military innovation. Chinese President Xi Jinping emphasized the importance of this "new revolution" and called on China to accelerate military innovation to close the gap and leap forward. He emphasized the importance of developing new military theories, strategies, tactics, institutions, and governance models for waging war in the information age.[26] China's science- and technology-based military renewal strategy (科技兴军, *keji xingjun*) is a key element of the Chinese Communist Party's (CCP) goal of building a "powerful military" (强军目标, *qiangjun mubiao*) in the "new era."[27]

[23] Xi Jinping: zai Zhongguo gongchandang di shijiu ci quanguo daibiao dahui shang de baogao [Xi Jinping Delivered a Report at the 19th National Congress of the Communist Party of China] // Xinhua. October 27, 2017. (In Chinese). URL: https://www.gov.cn/zhuanti/2017-10/27/content_5234876.htm (accessed: 19.08.2025).

[24] Jiefangjun Bao: shunying junshi biange chaoliu bawo gaige zhudong [The People's Liberation Army Newspaper: Moving Towards the Wave of Military Reforms, Take Reform into Our Own Hands] // PLA Daily. January 5, 2016. (In Chinese). URL: http://military.people.com.cn/GB/n1/2016/0105/c1011-28013286.html (accessed: 19.08.2025).

[25] Zhuanjia : Junshi zhinenghua jue bujinjin shi rengongzhineng [Expert: Intelligentization of the Armed Forces Is More Than Just Artificial Intelligence] // Renminwang. December 6, 2017. (In Chinese). URL: http://military.people.com.cn/n1/2017/1206/c1011-29689750.html (accessed: 25.08.2024).

[26] Xi Jinping: Zhunque bawo shijie junshi fazhan xin qushi yushijujin dali tuijin junshi chuangxin [Xi Jinping: Accurately Grasp the New Trends of Global Military Development, Keep Pace with the Times, and Vigorously Promote Military Innovation] // Xinhuawang. August 30, 2014. (In Chinese). URL: http://www.xinhuanet.com//politics/2014-08/30/c_1112294869.htm (accessed: 25.08.2024).

[27] Fadong qiangjun xing jun de chuangxin yinqing — jundui daibiao weiyuan re yi keji xing jun [Launching an Innovative Engine for a Strong Army to Modernize the Army — Army Representatives Are Hotly Discussing Issues of Science and Technology for Modernizing the Army] // Xinhuawang. March 11, 2019. (In Chinese). URL: https://web.archive.org/

Xi Jinping stressed that in an increasingly competitive international military landscape, only innovators win, and called on China to focus on advanced military technologies. He emphasized the need to develop strategic technologies and gain unique advantages in key areas.[28]

China's military strategy has evolved in response to new assessments of the nature of conflicts. The latest revision of the strategy, focusing on "winning local wars using information technology," was reaffirmed in the 2019 Defense White Paper. The document also discusses a new stage in the military revolution, involving the development of high-precision, stealthy, unmanned, and intelligent weapons.[29]

In August 2016, the Joint Staff of the Central Military Commission (CMC) of the People's Republic of China called on the PLA to actively utilize the potential of artificial intelligence for operational command, planning, decision-making support, and integrate advanced technologies such as big data and cloud computing into the command system for joint operations.[30] In 2017, at the 19th CPC National Congress, Xi Jinping emphasized the need to accelerate the development of military "intellectualization" and improve the capabilities of joint operations based on networked information systems.[31]

Artificial intelligence has become a strategic focus for China, influencing economic development and military potential. In 2017, AI was included in the Next-Generation Artificial Intelligence Development Plan, forming the basis of the national strategy in this area.[32] Chinese technology companies play a vital role in implementing this program, particularly within the military-civilian fusion strategy, where AI is used for command decision-making, military calculations, and defense technology development. In the 14th Five-Year Plan for National Informatization (2021), China's leadership emphasized the development of key technologies such as artificial intelligence and quantum computing to enhance national competitiveness and ensure security.[33] At the 2nd session of the National People's Congress in March 2024, the PLA's commitment to modernization through military-civilian integration was reaffirmed, with AI highlighted as a key element of the "revolution in military affairs."[34]

China is making significant progress in AI development, as evidenced by key statistical indicators. According to a World Economic

web/20250903081748/https://www.gov.cn/xinwen/2019-03/11/content_5372987.htm (accessed: 25.08.2024).

[28] Keji chuangxi, maixiang shijie yiliu jundui de qiangda yinqing [Technological Innovation Is a Powerful Driver of Building a World-Class Army] // Xinhuawang. September 14, 2017. (In Chinese). URL: http://news.china.com.cn/2017-09/14/content_41588972_3.htm (accessed: 25.08.2024).

[29] 2019 nian "Xin shidai de zhongguo guofang" baipishu [2019 White Paper "China's National Defense in the New Era'] // Zhonghua renmin gongheguo guowuyuan xinwen bangongshi [State Council Information Office of the People's Republic of China]. July 24, 2019. (In Chinese). URL: http://www.mnw.cn/news/china/2182138.html (accessed: 25.08.2024).

[30] Jiakuai goujian juyou wojun tese de lianhezuozhan zhihui tixi [Accelerate the Creation of a Unified Combat Command System Taking into Account the Specifics of Our Army] // Zhongyangjunwei lianhe canmoubu [Joint Headquarters of the Central Military Commission]. August 15, 2016. (In Chinese). URL: http://theory.people.com.cn/n1/2016/0815/c40531-28636710.html (accessed: 25.08.2024).

[31] Xi Jinping zai zhongguo gongchandang dishijiuci quanguodai biaodahui shang de baogao [Xi Jinping's Speech at the 19th National Congress of the Communist Party of China] // People's Daily. October 28, 2017. (In Chinese). URL : http://cpc.people.com.cn/big5/n1/2017/1028/c64094-29613660.html (accessed: 25.08.2024).

[32] Xinyidai rengongzhineng fazhan guihua [Next-Generation Artificial Intelligence Development Plan] // Guowuyuan [State Council]. July 8, 2017. (In Chinese). URL: https://www.gov.cn/zhengce/content/2017-07/20/content_5211996.htm (accessed: 25.08.2024).

[33] "Shisiwu" tuijin guojia zhengwu xinxihua guihua [14th Five-Year Plan for National Informatization] // Guowuyuan [State Council]. December 24, 2021. (In Chinese). URL: https://www.gov.cn/zhengce/zhengceku/2022-01/06/5666746/files/cbff2937df654b44a04c6ef9d43549e9.pdf (accessed: 22.03.2025).

[34] Dishisijie quanguo renmin daibiao dahui dierci huiyi [The Second Session of the 14th National People's Congress] // Guowuyuan [State Council]. March 5, 2024. (In Chinese). URL: https://www.gov.cn/gongbao/2024/issue_11246/202403/content_6941846.html (accessed: 22.03.2025).

Forum report, the country's AI industry will exceed USD 70 billion in 2024, involving more than 4,300 companies, and investment is expected to reach USD 1.4 trillion by 2030, including through the integration of AI technologies across various industrial sectors. China's intelligent computing power reached 260 EFLOPS in 2022, achieving a compound annual growth rate of 33.9%. Furthermore, AI development is driving data growth at a rate of 26% annually, from 22 ZB in 2022 to 77 ZB by 2027. The country leads in the development of basic AI models (188 registered nationally) and the deployment of industrial robots (1.7 million units, accounting for 51% of global demand in 2023).[35]

Regarding the institutionalization of the function of developing and applying AI in the military, the PLA military reforms initiated in 2015 led to a historic restructuring aimed at strengthening military innovation. As part of these reforms, the PLA Strategic Support Forces were established, which strengthened China's capabilities in space, cyber, electronic, and psychological warfare, and were tasked with developing capabilities in new areas of military power. While the Strategic Support Forces are responsible for implementing developments in the Armed Forces based on operational prerequisites and needs, bodies such as the Office of the Central Civil-Military Cooperation Commission, the Science and Technology Commission of the CMC, and the CMC Equipment Development Department were established to manage the development and implementation of new technological solutions, including those using AI.[36]

On April 19, 2024, the Information Support Force (ISF) (信息支援部队, *xinxi zhiyuan budui*), was established as an independent branch of the armed forces, reporting to the four branches of the armed forces (Army, Navy, Air Force, Rocket Forces) and directly subordinate to the Central Military Commission. In his speech, Xi Jinping emphasized that the ISF represents a new strategic-level branch of the armed forces, tasked with coordinating the development and application of cyber information systems to ensure victory in modern warfare. In this regard, the PRC President demanded that ISF personnel achieve the following results as quickly as possible: to deeply integrate into the existing system of joint operations of the Chinese armed forces for even more accurate and effective mission execution, and to create a cyber information system that meets the requirements of modern warfare and takes into account the specific characteristics of the Chinese army.[37] This body will be able to lead the process of introducing AI to create a "system of systems" in the modern PLA.

The Scientific and Technical Commission of the Central Military Commission oversees research in advanced technologies, including through the creation of a "rapid response team" to implement commercial innovations in the defense sector. The commission is responsible for implementing programs, funds, and competitions focused on defense scientific and

[35] Blueprint to Action: China's Path to AI-Powered Industry Transformation // Word Economic Forum. January 2025. URL: https://reports.weforum.org/docs/WEF_Blueprint_to_Action_Chinas_Path_to_AI-Powered_Industry_Transformation_2025.pdf (accessed: 22.03.2025).

[36] Xinyidai rengongzhineng zhanlüe zixun weiyuanhui chengli zidonghua suo suochang xu bo danren zhuanjia weiyuan [An Advisory Committee on the Development Strategy of Next-Generation Artificial Intelligence Was Established, with Xu Bo, Director of the Institute of Automation, Joining as an Expert] // Kejibu [Ministry of Science and Technology]. November 21, 2017. (In Chinese). URL: https://web.archive.org/web/20250906050157/http://www.ia.cas.cn:80/xwzx/ttxw/201711/t20171121_4896939.html (accessed: 15.05.2026).

[37] Zhongguo renmin jiefangjun xinxi zhiyuan budui chengli dahui zaijingjuxing xijinping xiang xinxi zhiyuan budui shouyu junqi bing zhi xunci [The Founding Conference of the Information Support Forces of the People's Liberation Army of China Was Held in Beijing, Where Xi Jinping Presented the Banner to the Information Support Forces and Delivered a Speech] // Xinhuashe. April 20, 2024. (In Chinese). URL: https://www.mohrss.gov.cn/SYrlzyhshbzb/dongtaixinwen/shizhengyaowen/202404/t20240420_517173.html (accessed: 25.08.2024).

technological innovation.[38] The CMC's Equipment Development Department also actively supports research in AI and unmanned systems, funding dual-use developments under the leadership of the AI Expert Group.

Furthermore, China is accumulating scientific potential to achieve its military objectives: leading academic and research institutes within the PLA have been instructed to prioritize technologies identified by the CPC and the CMC as breakthrough technologies. Specifically, in May 2018, Xi Jinping, visiting the PLA Academy of Military Sciences, called for a focus on innovation in strategic and disruptive technologies, with a particular focus on unmanned systems and artificial intelligence.[39]

The PLA National University of Defense Technology (NUDT) plays a key role in developing technologies for national defense in the era of intellectualization. There is a special focus on automation through the Academy of Intelligent Sciences, which conducts research in the areas of intelligent robotics, bionic robotics and autonomous control, including swarm intelligence. NUDT is also studying the impact of artificial intelligence in war games and teaching. The PLA Academy of Military Sciences (AMS) has significantly enhanced its status and is now engaged not only in developing strategy and doctrine, but also in promoting theoretical and technological innovation. The AMS has established the National Academy of Innovative Research in Defense Science and Technology, actively involving scientists and civilian experts.[40] The National Academy of Sciences' Artificial Intelligence Research Center focuses on deep learning and human-machine integration.

For China's experience in integrating AI into weapons systems, researchers from the Center for Security and Emerging Technologies (CSEIT) analyzed 343 PLA equipment contracts and identified seven areas of interest for ongoing AI investment:

1) intelligent and autonomous vehicles,

2) intelligence, surveillance, and reconnaissance,

3) predictive maintenance and logistics,

4) information and electronic warfare,

5) simulation and training,

6) command and control,

7) automatic target recognition.[41] Broadly speaking, these areas can be divided into two areas: AI in PLA weapon systems and AI in PLA functions and battlefield support.

China is actively developing systems with varying levels of autonomy, ranging from virtually remotely controlled systems with no autonomy to fully autonomous systems that can navigate, select targets, and even fire without human intervention. The PLA is pursuing greater autonomy in unmanned aerial, surface, and underwater vehicles to enable joint use of manned and unmanned aerial vehicles, group attacks, optimized logistics support, and distributed intelligence, surveillance, and

[38] Junbao zhuanban kandeng 36 wei gaoji jiangling zai jundui gaige zhuanti yantaoban fayan [The Military Newspaper Published a Special Issue Featuring Speeches by 36 High-Ranking Generals at a Seminar on Military Reform] // PLA Daily. April 27, 2016. (In Chinese). URL: http://military.people.com.cn/n1/2016/0427/c1011-28307236.html (accessed: 25.08.2024).

[39] Xi Jinping : Nuli jianshe gaoshuiping junshi keyanjigou wei shixian dang zai xin shidai de qiangjun mubiao tigong youli zhicheng [Xi Jinping: Strive to Build High-Level Military Research Institutes to Provide Strong Support for the Party's Goal of Building a Strong Military in the New Era] // Xinhuashe. May 16, 2018. (In Chinese). URL: https://baijiahao.baidu.com/s?id=1600619164933045267&wfr=spider&for=pc (accessed: 25.08.2024).

[40] Tansuo "Juzhenshi" keyan moshi tisheng chuangxin nengli [Explore the 'Matrix' Model of Scientific Research to Enhance Innovation Capabilities] // Zhongguo jun wang [Chinese Military Network]. April 2, 2018. (In Chinese). URL: https://m.gmw.cn/baijia/2018-04/02/28185578.html#verision=b400967d (accessed: 25.08.2024).

[41] Fedasiuk R., Melot J., Murphy B. Harnessed Lightning: How the Chinese Military Is Adopting Artificial Intelligence // Center for Security and Emerging Technology. October 2021. P. 14. URL: https://download.zendy.io/url/https://cset.georgetown.edu/wp-content/uploads/CSET-Harnessed-Lightning.pdf (accessed: 12.02.2026).

reconnaissance (ISR), among other capabilities.[42] The TYW-1 and ASN-216 are two examples of UAVs that can operate autonomously using AI. China is also developing a system called the FH-97A, which is similar to the American "loyal wingman" concept, where an autonomous aircraft flies in tandem with a crewed aircraft.[43]

When it comes to lethal autonomous weapons systems, the PLA is developing prototypes of such weapons. However, at the moment, none of them possess a significant level of autonomy provided by AI.[44]

Tracking the adoption of military AI in the battlefield support and other functional categories is even more challenging. This is due to the fact that these capabilities are primarily software-based and therefore more difficult to observe using tools such as satellite imagery (Romashkina, 2023, p. 132). However, the PLA will likely begin using AI for predictive maintenance and logistics systems relatively quickly, given the similarities of these technologies to commercial applications. According to research by the China Aerospace Studies Institute (CASI), the PLA is already using AI for some types of ISR missions, particularly in radar and air defense. One such system is the YLC-2E radar, an upgraded version of the YLC-2 already in service. Its developers claim to utilize advanced AI technologies, but the details of their application are not disclosed. Another example is the YLC-16 stealth radar, which is being developed for export. This system can be controlled remotely without direct operator involvement, indicating elements of autonomous operation.[45] However, due to the lack of available data, it is not possible to assess the extent to which this system's autonomy is achieved through AI technologies.

In addition to the systems already deployed, China is actively developing more advanced technologies. One promising area is cognitive radars, which use intelligent algorithms to adapt signals and process data based on changes in the environment. These systems employ deep learning, which is intended to replace traditional algorithms for detecting, tracking, and identifying targets. Research is also underway on the use of AI in air defense systems, exploring algorithms for countering jamming, improving image processing, accelerating radar operation, and applying AI to automated decision-making and the creation of networked air defense systems (Zhao, Zhang & Li, 2022, pp. 29–31). A project under development for the Integrated Air and Missile Defense (IAMD) system is using artificial intelligence to combine data from various types of sensors, including radars.[46] The China Command and Control Society and the 35th Research Institute of the Third Academy of the China Aerospace Science and Industry Corporation (CASIC) are working in this area. They are developing intelligent sensors for fusion of radar data from multiple missiles.

In the future, China intends to develop AI systems for use in command, control, and

[42] Military and Security Developments Involving the People's Republic of China 2024. Annual Report to Congress // U.S. Department of Defense. P. 97. URL: https://media.defense.gov/2024/dec/18/2003615520/-1/-1/0/military-and-security-developments-involving-the-peoples-republic-of-china-2024.pdf (accessed: 12.02.2026).

[43] Stewart E. Survey of PRC Drone Swarm Inventions // China Aerospace Studies Institute. October 2023. URL: https://www.airuniversity.af.edu/Portals/10/CASI/documents/Research/Other-Topics/2023-10-09%20Survey%20of%20PRC%20Drone%20Swarm%20Inventions.pdf (accessed: 25.08.2024).

[44] Stokes J. Military Artificial Intelligence, the People's Liberation Army, and U.S.—China Strategic Competition // CNAS. February 1, 2024. URL: https://www.cnas.org/publications/congressional-testimony/military-artificial-intelligence-the-peoples-liberation-army-and-u-s-china-strategic-competition (accessed: 25.08.2024).

[45] Hundman E. China's Air Defense Radar Industrial Base // China Aerospace Studies Institute. March 2025. P. 16, 33. URL: https://www.airuniversity.af.edu/Portals/10/CASI/documents/Research/Infrastructure/2025-03-10%20Air%20Defense%20Radars.pdf (accessed: 15.05.2026).

[46] Hai Lu Kong Yitihua Zuozhan de Rengong Zhineng Funeng Zhihui yu Kongzhi Xitong [AI-Powered Command and Control System for Integrated Maritime, Land and Air Operations] // Sohu. January 3, 2024. (In Chinese). URL: https://mil.sohu.com/a/749187698_358040 (accessed: 23.03.2025).

communications (C3) and decision-making, which will likely be refined over time at three levels of sophistication: using AI to disrupt an adversary's C3 capabilities; using AI in multi-domain cyber operations involving space, land, air, and other platforms; and, finally, conducting a full range of cyber operations, including attacks on adversary AI systems.[47]

Overall, China's military modernization reflects serious ambitions to transform the PLA into a world-class force by 2049, with a focus on advanced technologies, particularly artificial intelligence. Currently, one of the priorities for the development of the PLA is the implementation of AI technology to automate certain functions and tasks performed during the planning, management, and execution of military operations. Beijing is actively using AI to enhance its military capabilities, including reconnaissance, autonomous weapons systems, and cyber operations. The implementation of AI is aimed not only at improving current capabilities but also at preparing for the 'intellectual warfare' of the future, where AI will become the dominant element on the battlefield. These efforts are accompanied by significant institutional reforms and close cooperation between the military and civilian sectors, reflecting China's commitment to innovative development and global military leadership.

Conclusion

An analysis of the two powers' military applications of AI technology suggests that, although the conceptualization and institutionalization of AI in their militaries have not yet been fully developed and will continue to evolve, it is crucial to document the specific approaches of the two countries' military-political circles to this area of military development.

First, the US and China have different approaches to leveraging private sector advances in AI development. China uses a model of military-civilian integration, which entails close cooperation between military and civilian (private) companies to develop technologies, including AI. Government support and official mechanisms facilitate this collaboration, creating synergies between sectors and accelerating technological progress. The US, in turn, emphasizes partnerships with the private sector, particularly through funding and procurement mechanisms such as the Defense Innovation Unit (DIUx). However, this is complicated by the tense relationship between government agencies and the tech community (particularly Silicon Valley). Private companies may be reluctant to collaborate with the Ministry of Defence (which has been renamed the Ministry of War), making it difficult to quickly introduce innovative technologies into the defense sector.

Secondly, the PLA Central Military Commission is implementing a large-scale 'intellectualization' program aimed at integrating AI into all aspects of the armed forces. This program relies on both centralized initiatives and those of individual military districts or services, which can lead to experimentation, competition, and long-term achievements, albeit with the risk of inefficiencies and management complexity. The US military is using AI to solve more specific, specialized problems. For example, Project Maven focuses on data analysis, machine learning, and automating drone video processing. This mission-focused approach may be more manageable in the short term, but poses challenges in scaling up and adapting AI technologies to a wider range of tasks.

Thirdly, the PLA views AI as an important tool for supporting decision-making within its

[47] Vassilev A., Oprea A., Fordyce A., Anderson H. Adversarial Machine Learning: A Taxonomy and Terminology of Attacks and Mitigations // National Institute of Standards and Technology. January 2024. URL: https://csrc.nist.gov/pubs/ai/100/2/e2023/final (accessed: 25.08.2024).

command structures. China may seek a higher degree of automation, especially in conditions where the speed of military operations may exceed the capabilities of human thought. This suggests the possibility of a transition to a new command model in which AI plays a leading role. At the same time, China maintains an emphasis on human-machine interaction, particularly in the control of manned and unmanned systems. However, this may require significant changes in the PLA's command culture, which has traditionally been centralized. The US Department of Defense emphasizes human-machine collaboration, insisting that humans must always remain "in the loop," especially when it comes to using lethal force. American military doctrine rules out full autonomy of weapons systems in order to maintain human responsibility for key decisions.

Based on an analysis of China's and the United States' approaches to integrating AI technologies into their armed forces, it seems reasonable to predict that the United States and China will compete in this area in the future. Given the current lack of an international regime regulating the use of AI technologies in the military sphere, it is highly likely that the development and implementation of these technologies will be driven by the logic of the 'security dilemma.' This could lead to the further militarization of AI and increased strategic risks. Both countries are likely to continue using AI for military purposes, including autonomous combat systems, cyberwarfare, and threat forecasting. China will continue to actively develop the concept of 'smart warfare' (智能化战争, *zhi neng hua zhan zheng*), integrating AI into military planning and combat management. The United States, on its part, will seek to maintain its superiority by strengthening cooperation with allies and limiting the export of critical technologies to China. This will increase the likelihood of escalating competition and even incidents involving the use of autonomous weapons systems.

The trend toward technological decoupling between the US and China appears set to continue, particularly in semiconductors, cloud computing, and AI algorithms. China, seeking technological autonomy, will develop national open innovation platforms and reduce its dependence on Western hardware and software. The US, meanwhile, will increase sanctions, limiting China's access to cutting-edge technologies such as advanced semiconductors and quantum computing.

Given that AI technologies place high demands on intellectual resources, it is expected that strategic competition between the US and China will also extend to education. In an effort to attract and retain specialists, both countries may impose restrictions on student visas and tighten export controls on knowledge.

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