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ARTIFICIAL INTELLIGENCE IN MILITARY STRATEGY: NEW APPROACHES TO COMMAND MANAGEMENT

The article explores the transformation of military strategy, armed forces management, and combat operations under the influence of artificial intelligence (AI) technologies. Key aspects of AI integration into the military sector are considered, including its impact on decision-making processes, coordination of combat operations, and the development of new forms of military confrontation. Special attention is given to analyzing practical AI application experiences in modern conflicts, particularly during the Russian-Ukrainian war. Based on this experience, trends in the development of military technologies and their impact on the future of military arts are identified.

The paper analyzes the approaches of leading countries in applying innovative technologies in the defense sector, particularly the strategies of the USA, China, and others, in using AI in the military field. Ethical aspects and potential risks related to implementing AI systems for automating military command and warfare are discussed. The issue of maintaining a balance between the technological capabilities of AI and the need for human control over critical decision-making in the military domain is addressed. The necessity of developing a hybrid approach to AI integration into military management is justified, where AI serves as a decision-support tool rather than a fully autonomous combat system. The importance of developing appropriate ethical norms and control mechanisms to ensure the responsible use of AI in the defense sector is emphasized.

Keywords*: military strategy, automation of military command, artificial intelligence, Russian-Ukrainian war, military technologies, decision-making, ethics of war, military arts.*

Волощук В., Банах С., Ковальчук О.
Штучний інтелект у військовій стратегії: нові підходи до управління

У статті досліджено фундаментальну трансформацію військової стратегії, управління збройними силами та ведення бойових дій під впливом технологій штучного інтелекту (ШІ). Проаналізовано багатовимірний ефект ШІ на систем на основі штучного інтелекту на сучасне воєнне мистецтво – від тактичних рішень на полі бою до стратегічного планування військових операцій. Досліджено правові аспекти застосування сили в міжнародних відносинах в умовах впровадження штучного інтелекту, зокрема проаналізовано виклики для традиційного тлумачення Статуту ООН та доктрини самооборони. Висвітлено проблематику збереження балансу між технологічними можливостями штучного інтелекту та фундаментальними принципами міжнародного права.

Розглянуто стратегії провідних держав світу щодо інтеграції штучного інтелекту у військову сферу. Проаналізовано американський підхід, зокрема програми «Мозаїчна війна» (Mosaic Warfare) та Об'єднане командування і управління всіма доменами (JADC2), китайську концепцію «інтелектуалізованої війни» та ро-

сійські розробки автономних систем озброєння. Окрему увагу приділено практичному досвіду застосування ШІ в умовах повномасштабної війни Росії проти України. Висвітлено різноманітні концепції ведення війни з використанням ШІ, такі як «гіпервійна», «алгоритмічна війна», «мозаїчна війна» та «програмно-визначена війна». Розкрито специфіку використання штучного інтелекту для розпізнавання цілей, геопросторової розвідки, аналізу незашифрованих комунікацій та протидії дезінформації.

Проаналізовано етичні виклики та потенційні ризики мілітаризації штучного інтелекту, зокрема небезпеку зниження порогу застосування військової сили, дистанціювання людини від наслідків насильства та виникнення «воєн можливостей». Обґрунтовано необхідність гібридного підходу до інтеграції штучного інтелекту, за якого технологія є ШІ-системи є лише інструментом для підтримки прийняття рішень людиною. Визначено ключові тенденції подальшого розвитку військових технологій на основі ШІ та їх вплив на трансформацію концепцій ведення війни.

***Ключові слова**: військова стратегія, автоматизація управління військами, штучний інтелект, російсько-українська війна, військові технології, прийняття рішень, етика війни, військове мистецтво.*

Statement of the problem. New technologies are changing the nature of modern warfare. The integration of AI into military strategy is changing the very essence of operational effectiveness and strategic power of armed forces around the world, opening a new era where digital intelligence becomes as important as physical strength. One of the key questions is how AI can be used in developing military strategy and decision-making during combat operations. Less explored, though more complex, is the question of whether integrating AI into military command will change the roles currently performed by humans, or eliminate them. The main question is whether AI will change the very nature of war – from its beginning, to the conduct of hostilities and conclusion, as armed conflict is inherently an exclusively human phenomenon. Armed conflict has an organized nature, includes strategic planning, use of technology and ideological justification, which confirms its uniqueness among social processes. The impact of AI systems on the decision-making process regarding the initiation of military action creates a new dimension in international relations and military law. The traditional «military calculation» is being transformed under the influence of AI technologies, requiring a rethinking of established mechanisms of deterrence and checks and balances.

The state of research of the problem. Despite the relevance of AI application in military affairs, comprehensive scientific research on this topic is still lacking. Certain aspects of it have been examined in the works of researchers such as G. Akhmametyeva, V. Zinchenko, O. Koppel, N. Loginova, O. Parkhomchuk, N. Patseriya, O. Reshetnyak, A. Sokolov, O. Trofymenko, M. Khaustov, V. Khaustova, P. Chikunov and others. The unprecedented scale of AI technology application in the conditions of the Russian-Ukrainian war, which has turned into a testing ground for advanced military command systems, creates an urgent need for in-depth scientific investigations aimed at systematizing the practical experience of using AI during combat operations and forming scientifically grounded recommendations for its integration into Ukraine's military strategy.

The research aims to analyze the transformation of military strategy, armed forces management, and combat operations under the influence of AI technologies.

Presentation of the main research material. The legal basis for the use of force in international relations is clearly regulated by the UN Charter. Article 2(4) establishes a fundamental prohibition on the use of force or threat of force against the territorial integrity or political independence of any state. Legitimate exceptions are the right to self-defense (Article 51) in case of armed attack and actions sanctioned by the UN Security Council to maintain international peace (Article 42) [1].

However, the implementation of AI systems can significantly affect the assessment of prerequisites for applying these exceptions. For example, AI can change the understanding of conditions necessary for the right to self-defense through faster analysis of threats and potential attacks, the ability to preventively detect preparation for attack, or assess the probability of success of defensive actions. This technology can influence the assessment of non-obvious factors by predicting public reaction based on social media analysis, modeling economic consequences of military actions, calculating potential losses with higher accuracy, predicting diplomatic reactions of the international community, or assessing long-term reputational risks. AI-based systems can influence the decision-making process by reducing the time needed for situation analysis, providing more detailed scenarios of event development, reducing the impact of human factors and emotional aspects, and enabling simultaneous analysis of multiple action variants.

A key issue becomes maintaining the balance between technological capabilities of AI and fundamental principles of international law. There is a need to develop new international norms and standards that would

regulate the boundaries of AI application in military planning, responsibility for decisions made with AI support, mechanisms for verification of AI data and forecasts, and protocols for international control over AI systems used in the military sphere. AI can significantly improve the process of analysis and decision-making regarding the use of military force. It is important to ensure that these technological capabilities do not undermine the basic principles of international law and do not lead to lowering the threshold for the use of force in international relations. The implementation of AI systems significantly transforms the nature of tactical decision-making during combat operations. The technological distancing of military personnel from the immediate battlefield forms a new psychological and ethical dimension of conducting combat operations.

The implementation of AI in modern strategic military management radically transforms traditional approaches to warfare, creating unprecedented opportunities and challenges. This technological revolution does not simply improve existing military systems. It fundamentally changes the paradigm of military confrontation at all levels. In the tactical dimension, AI provides the ability to conduct lightning-fast analysis of the combat situation and make decisions with speed unattainable for human intelligence. AI systems are capable of processing large arrays of data from various intelligence sources, creating an accurate picture of the battlefield in real time. At the strategic level, the implementation of AI leads to the emergence of new forms of military potential. Autonomous systems, predictive analytics, and machine learning are becoming determining factors of the military power of states [2]. This prompts rethinking traditional concepts of deterrence and military advantage.

Global rivalry in the field of AI-based military technologies has become a defining factor of international security in the 21st century. The world's leading powers view AI development as a critical element in ensuring their military advantage and geopolitical influence. The United States, recognizing the strategic importance of AI, has integrated this technology into its long-term defense policy. The Third Offset Strategy, initiated by the Pentagon in 2014, identified AI and autonomous systems as key components of future US military superiority. This strategic line was further developed in the National Security Strategy of 2022. The strategy confirms the priority of AI and aims to significantly increase investments in this area. It includes the development of new weapons systems, improvement of command and control systems, and strengthening cybersecurity [3]. The US Navy launched its first experimental, fully autonomous unmanned military vessel, "Sea Hunter." This is a significant step forward in the field of robotic warfare, which is increasingly becoming the foundation of the American strategy to counter China and Russia. The ship is designed to search for enemy submarines. This autonomous vessel demonstrates how AI is transforming naval operations, performing intelligence tasks and mine detection without human intervention [4].

The results of US Air Force tests, where AI achieved victory over an experienced pilot in a simulated aerial combat, open a new page in the history of military aviation and combat application of AI. This achievement goes far beyond a simple demonstration of technological capabilities [5]. In modern aerial combat conditions, where decisions need to be made in fractions of a second, AI demonstrates impressive advantages. Algorithms are capable of simultaneously analyzing a huge number of parameters – from target position and own position to atmospheric conditions and weapons characteristics – and instantly selecting optimal tactics. The advantage of AI over humans is obvious, however, it's important to understand that it has a specific nature. Algorithms outperform humans in highly specialized tasks that require lightning-fast reactions and processing of large volumes of data. At the same time, human pilots maintain critical advantages in strategic thinking, adaptability to unpredictable situations, and the ability to make complex ethical decisions [6]. The transition to autonomous control of combat operations will likely be a gradual process, where AI systems will first provide support to pilots and then gradually expand their role. The success of AI in aerial combat may become not just a technological breakthrough, but the beginning of a fundamental transformation of military aviation and the principles of aerial combat as a whole.

AI is already being actively implemented in military operations, improving decision-making processes. Programs such as Mosaic Warfare and Joint All-Domain Command and Control (JADC2) are aimed at using AI to coordinate combat operations across different military domains, optimizing both strategic and tactical planning [7]. Mosaic Warfare is a concept developed by the US Department of Defense agency DARPA (Defense Advanced Research Projects Agency). It outlines the development of new technologies for use in the US armed forces [8; 9]. The concept involves creating a dynamic, adaptive system of warfare. In this system, various military units and platforms can quickly reconfigure and interact. AI plays a key role in coordinating these elements, analyzing the combat situation in real-time and suggesting optimal force deployment options. JADC2 is a US Department of Defense initiative aimed at unifying the command and control systems of all armed services into a single network. AI in this system helps process large volumes of data coming from various sensors and platforms. This approach provides command staff with a complete picture of the battlespace and information support for making more informed management decisions [10].

AI-based systems use advanced machine learning algorithms for analyzing intelligence data and identifying potential threats, optimizing logistics supply chains, planning routes and coordinating troop movements, predicting enemy actions based on historical data and current situations, assessing risks, and modeling various scenarios [11]. The use of AI in the military sphere also raises important ethical and security issues, including algorithm reliability, protection against cyber attacks, and responsibility for decisions made. Therefore, the development and implementation of such systems is accompanied by the creation of appropriate security protocols and ethical standards. To adapt to a future dominated by AI, the Pentagon is also modernizing military training programs, increasing awareness about AI so that the armed forces can effectively implement these technologies in their operations [6].

China demonstrates a systematic approach to implementing AI systems in the military sphere through the concept of «intelligentized warfare». This strategy, announced in 2019, involves deep integration of AI into all aspects of military affairs – from logistics to combat operations. Chinese leadership views AI as a tool for achieving military parity with the US and potential dominance in future conflicts [12]. The Russian Federation is also actively developing military applications of AI, albeit with somewhat different emphases. The Russian strategy focuses on developing autonomous weapons systems and electronic warfare tools using AI [13].

Russia's full-scale war against Ukraine has become a testing ground for demonstrating AI's potential in automating military operations and its impact on transforming the art of warfare. The confrontation between Ukraine and Russia is characterized as «the first full-scale drone war» [14]. Unmanned systems have changed combat tactics and the strategic balance. This conflict is called «the first TikTok war», highlighting the role of social media in covering events and information warfare [14], and a «technological war», emphasizing the importance of cutting-edge technologies in the confrontation [15]. Technologies are changing the competitive advantage of small countries against larger adversaries [16].

AI weapons systems are called «the third revolution in military affairs» after the invention of gunpowder and the creation of nuclear weapons [17]. Although the nature of modern warfare has not yet changed, Ukraine is a laboratory where the next form of warfare is being created. In this laboratory, AI systems are being refined. Future wars will be wars with artificial intelligence. The experience of using AI in real combat conditions demonstrates the need for accelerated development and implementation of such technologies in the armed forces to ensure superiority in speed and quality of decision-making [14].

The modern world is experiencing a global arms race aimed at finding the best ways to use AI for military purposes. In recent years, many visions of warfare using AI have emerged, receiving various conceptual names. They are called «hyperwar» – a form of warfare controlled by AI with minimal or no human decision-making involvement [18], and «algorithmic warfare», in which autonomous systems and weapons independently begin to choose their course of action based on the situation they find themselves in [19]. The Defense Advanced Research Projects Agency (DARPA) proposed the term «mosaic warfare». This is a tactical term that combines conventional platforms with unmanned systems to achieve advantages on the battlefield [20]. Recently, the term «software-defined warfare» was introduced as part of a concept in which software is the decisive part of the defense architecture necessary for effectively conducting next-generation warfare [21].

AI is actively used in systems that combine target and object recognition from satellite imagery. Among all applications of AI during the war in Ukraine, it is most actively used for geospatial intelligence. The Russian-Ukrainian war is the first conflict where AI-based facial recognition software is being used on a significant scale, particularly for identifying Russian military personnel and combating disinformation. AI tools are also being used to analyze unencrypted Russian radio communications. In the discussion about AI's impact on military strategy and decision-making, the key question is who makes better decisions – humans or machines. Innovative technologies can reduce civilian casualties thanks to more precise targeting capabilities, however, decision-making using AI can be just as erroneous as decisions made by humans. The risks of such errors can be excessive. The implementation of AI technologies in the field of international security creates a dual effect. On one hand, AI can significantly strengthen early conflict warning mechanisms, improve the accuracy of military operations, and minimize collateral casualties. AI systems are capable of analyzing vast amounts of data to identify potential sources of tension and predict conflict escalation, allowing for preventive diplomatic measures. However, there are serious concerns about the potential negative consequences of AI militarization. In particular, the automation of decision-making processes could lower the threshold for using military force and lead to «wars of opportunity» – conflicts that begin due to excessive confidence in military-technological superiority. Additionally, distancing humans from direct combat operations may cause psychological dulling of the perception of violence and its consequences.

The experience of the war in Ukraine significantly influences the development of military AI technologies on a global scale. This is already leading to adjustments in military doctrines and armed forces development programs in many countries. However, despite significant successes in AI application, the human factor remains critically important. Experience shows that the greatest effectiveness is achieved by combined systems, where AI supports human decision-making rather than completely replacing it.

Conclusion. AI integration in military operations represents a watershed moment in warfare evolution, transforming traditional combat paradigms through enhanced decision-making capabilities, autonomous systems, and predictive analytics. Major powers like the United States, China, and Russia are strategically prioritizing AI development as a critical component of national security, with the Russia-Ukraine conflict serving as a real-world laboratory for testing AI applications in combat conditions. While AI offers significant advantages in processing battlefield data at superhuman speeds, improving targeting precision, and coordinating complex operations across multiple domains, it simultaneously raises profound ethical and legal questions about the threshold for using force, responsibility for decisions, and the need for human oversight in lethal operations. Future research should focus on developing international norms and standards for military AI applications, balancing technological capabilities with fundamental principles of international law, establishing verification mechanisms for AI data and forecasts, and exploring combined human-AI systems that leverage the strengths of both while mitigating the risks of fully autonomous warfare in an increasingly complex security environment.

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