



THE IMPACT OF ROBOTICS AND ARTIFICIAL INTELLIGENCE ON FUTURE MILITARY CONFLICTS

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Robotics and artificial intelligence are high technologies that are pushing the boundaries of human civilization. Recent decisions made by international military organizations have launched major programs for the development of new technologies that will lead society to modernity while increasing security for the entire world population. The dynamics of technological progress are constantly increasing due to economic and military advantages and, at the same time, the desire of researchers and scientists to go beyond the limits is a result of the challenges we face on a daily basis. The physiognomy of military conflicts is becoming more complex as a result of the unprecedented development of modern military technologies, which, when combined with conventional technologies, change the approaches to planning and the principles of operational use of forces and means.

Keywords: technology; robotics; artificial intelligence; conflicts; technological progress.

The use of cutting-edge technology, which is often the key to success in a military conflict, is a challenge for the new generation of soldiers from NATO member countries and from the entire National Defense System in Romania. What exactly does high technology imply? Smart cars, humanoid robots, artificial intelligence devices, quantum computers, and anything else that can be incorporated into existing or new equipment.

Recent scientific research has drawn the attention of the global population to emerging technologies, demonstrating first and foremost the implications they have on specific equipment as well as the approach to specific doctrines, manuals, and operating procedures. Although the war between Ukraine and Russia, which began this year, demonstrates the need to combine classical, conventional technologies with modern ones that make a difference, it is expected that the large-scale introduction of robotics, artificial intelligence, autonomous systems, and quantum technologies on equipment in the endowment of armies will produce profound changes in the conduct of future military conflicts in the not-too-distant future.

Since the communist period, the concept of artificial intelligence has been intensely debated in mass media, scientific communications,

and published books, and it continues to be a fascinating topic for the entire modern world. There is currently a series of actions and activities being carried out for the modernization and a rapid, continuous development of military equipment and technique by introducing some initial elements of artificial intelligence, which determines the change in the way military commanders analyze and synthesize information in modern armed conflicts.

Starting with these coordinates, it is interesting to bring to the scientific research plan the need to introduce large-scale artificial intelligence within current and future technologies. The steps that must be taken in approaching future wars are related to the way in which the young generation of soldiers understands to involve actively in the development of equipment and the search for viable solutions to convince the command of the military system to make optimal decisions regarding the acquisition of modern equipment.

The research activities of military engineers and scientists for the development of existing technologies, at the pace imposed by international military organizations, as a response to the interests of the Romanian state to be the first to achieve great goals, as our forefathers did, are a permanent concern and correspond to the national objectives generated by the new existing military conflict in the Black Sea area, in the context of the conflict between Russia and Ukraine.

The new NATO Strategic Concept, which was adopted at the Summit on 29th of June, 2022,

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defines the Alliance's new security challenges and outlines NATO's political military objectives to be addressed. As a result, the impact on Alliance members determines the strengthening of the cyber space, the development of skilled responses to the Russian Federation's misinformation campaigns, the discovery of solutions to prevent exaggerated population migration, and the reduction of the effects generated by economic constraints, by encouraging private companies to develop cutting-edge technologies capable of responding to such challenges.

The benefits of technological progress are obvious all over the world, but only a few countries can keep up with the unprecedented and rapid development of all technologies. It is international military organizations that initiate policies, research programs, and technological development, and which, thanks to large funds raised as a result of member interest, accelerate technological progress. It remains to be seen how each NATO member state understands and responds to the Alliance's demands.

This article proposes an examination of the ability to comprehend and promote the need for new military technologies. Are autonomous robots and artificial intelligence required in future military clashes? Is it necessary to revise the logic of military command structures? Could they be the answers to these questions, the key to the development of fields that will be common place in the future, rather than mere fantasies, as we may believe at the moment?!

Emerging technologies and their relevance to NATO

Because all countries around the world are interested in technological advancement in the interest of maintaining peace and prosperity, it is worth considering whether it is time to discuss robotics and artificial intelligence in the military field. Perhaps the world is not ready to face the challenges posed by robotics, artificial intelligence, and bitcoin-based technology because of the low standard of living and ongoing conflicts that have an indirect impact on daily life. Computers are becoming increasingly difficult to use due to the complexity of their software systems, and artificial intelligence may cause significant confusion when it comes to understanding an action or making a decision.

According to scientists and military experts around the world, *"the field of robotics is still in its early stages, but robots will most likely become a very common equipment in future wars"* (Doaré, et al. 2014, 3). The dynamics of technological progress convinces us that we are not far from the use of robots because there already exists equipment for the execution of important activities concerning property rights, free movement, image rights, privacy, the delimitation of virtual areas and borders, and the artificial intelligence tested within systems of any kind, will be developed concurrently with the use of test algorithms.

NATO is celebrating 70 years of scientific and technological research to gain an advantage over potential adversaries this year. Dr. Theodore von Karman was the first scientist to achieve scientific cooperation among NATO members in science and technology. Since 1952, space research has been conducted, and year after year, conditions have been created for the advancement of the human factor, vehicles, medicine, computer systems, simulation and modelling, electronics, maritime research, and so on (NATO Science and Technology Organization n.d.). The new NATO Strategic Concept, adopted at the June 29-30, 2022 summit in Madrid, and the decisions made at the September 14, 2022 North Atlantic Council meeting, *"establish how the Allies will work together to adopt and integrate new technologies, to cooperate with the private sector, to protect innovation ecosystems, shape standards, and commit to principles of responsible use that reflect the Alliance's democratic values and human rights"* (NATO 2022a).

Starting with these coordinates, all NATO members are to launch research programs and seek collaboration solutions with private companies to introduce new technologies for large-scale production. These NATO decisions are expected to benefit the military system first, by requiring the implementation of cutting-edge information technologies that will allow command and control of troops, as well as obtaining a common operational picture of the battlefield. Furthermore, communication technology, which currently ranks first in the world in terms of technological progress, is critical to the success of military operations. It remains to be seen how artificial intelligence embedded in information and communication systems will anticipate human intentions before



scripts and action plans are required. Every day, we seek answers to the question of how technology will develop and what the consequences of rapid progress will be.

When we examine the ability of NATO member armies to collect information, we notice that each one has information structures that, when divided into different sectors of activity, can learn aspects about the enemy, such as strategic objectives, doctrine, strategies, and defense policies, both through human resources in the field and, more importantly, through modern information and communication technologies. The processing and distribution of this information is a critical component to develop, as the speed and accuracy of the data can be critical for combat forces in the field to ensure the success of a military operation. The development of robotics, artificial intelligence, and quantum technologies could be the key to obtaining vital information much faster for a country's security.

If we had robots with artificial intelligence, we might be able to clear buildings occupied by terrorists or neutralize artificial bombs without having to sacrifice people. Of course, the cost of construction and use would be high, but the benefits obtained would be significantly greater. The cutting-edge technology has long been a challenge for the entire global scientific research community, but it is still in its early stages because it is critical that artificial intelligence *"to be implemented in accordance with the ethical code and moral values"* (Ene 2019, 252). Its widespread use, regardless of the benefits and risks involved, can have profoundly changing effects on the daily lives of the entire global population, which is why NATO has established an accelerated start of cooperation with independent companies in the research and production of intelligent military equipment. How does it accomplish this? By establishing agencies at the level of allied commands that specialize in the study, analysis, and centralized procurement of equipment and technologies shared by all Alliance members that are interoperable, necessary, and sufficient for use on national territories or in areas of assumed responsibility.

Artificial intelligence is present in all aspects of social life; it assists us in everything we do through the technologies in which it is embedded, with the assumption that we are aware that we are

not acting in a secure environment, and that we are perpetually vulnerable to invasions of our privacy. High-performance computers with artificial intelligence algorithms installed can be turned into self-learning human robots. This aspect contributes to redefining the strategic concepts of security and defense and has an indirect influence on future military operations.

Quantum technologies act as a force multiplier for mass-produced systems, bringing emerging concepts to life. The use of artificial intelligence to improve existing applications results in the development of equipment that, for example, can be extremely useful for nation-state defense and security. The quantum computer has an astounding speed in performing calculations and comparisons, which would be a huge advantage in selecting information needed to avoid conflicts.

As a result, robotics, artificial intelligence, and quantum technologies are fields that can improve humanity's standard of living by simplifying daily activities as well as having long-term beneficial effects. Physics demonstrates that the principles required to develop these fields are feasible, implying that only time, interest in progress, and financial resources are preventing large-scale equipment production.

Therefore, emerging technologies are constantly on NATO's agenda because they are changing the way wars are fought and won in an increasingly dangerous and competitive world. Adoption of emerging technologies is difficult to achieve precisely because they must be implemented in accordance with solid principles of responsible use. NATO launched the *"NATO Innovation Fund"* this year to support cutting-edge technologies that can help the world's increasingly dangerous security challenges. NATO Defence Ministers approved a *"NATO Coherent Implementation Strategy on Emerging and Disruptive Technologies"* (Romanian Government 2022), under which each member country will contribute annually to private companies developing dual-use, emerging, and disruptive technologies.

The United States of America, NATO's strategic partner, is the one who established the Defence Advanced Research Projects Agency (DARPA) within the United States Department of Defense, a leading institution that has invested billions of dollars in research



programs – development of equipment based on algorithms and applications in the field of artificial intelligence. Among the programs developed there are *“real-time analysis of sophisticated cyber attacks, detection of spoof images, construction of dynamic robots that produce casualties in war, human language detection technologies, automatic recognition of enemy targets, analysis of spatial images, and supply chain logistics”* (DARPA n.d.). In 2021, for example, the Agency created a program in which military personnel could have assistants perform complex tasks with minimal error and extend human physical abilities beyond normal limits. Further research, as well as the demand for these benefits by NATO’s strategic partners, could be used to carry out tasks such as mechanical repair of malfunctioning equipment, providing first aid on the battlefield, or mentoring aircraft pilots.

The civilian company BAE Systems, which was awarded a series of research and development projects by the US Advanced Projects Research Agency, made software and equipment for *“operational planning and execution of tactical missions, ballistic protection of fighters and bringing them to safety from the fields of combat systems, a wide range of smart munitions and artillery systems, electronic warfare systems that detect and protect against advanced radio frequency attacks, transmit and receive antennas that use artificial intelligence”* (BAE Systems 2022).

The modernization of military equipment is dependent on the R&D sector, which must be allocated at least the value of the procurement sector from all NATO member states’ defense budgets. NATO’s decision to prioritize cutting-edge technologies as an integration priority is likely to result in significant changes in the approach to bold development projects in the near future.

One of the most complex tasks in the NATO command structure is military operations planning, and automation has become the primary focus of technological attention. Increased speed in information assurance, support for decision-making processes, replication of logic processes that can provide an alternative response, compensating for the lack of specialized personnel in specific fields, and physical security of travelers through facial recognition, voice recognition, and image recognition are all advantages of automation.

The United States of America is now known for its investment in artificial intelligence as a result of the well-known goal of increasing military operability as a major player in NATO. The planning and decision-making process developed and tested by Americans is now implemented as an example for each Alliance member state and represents simplified management and simulation of the operational environment, a useful way to detect and combat threats, treat and select the collected information, and provide rapid delivery of strategic and tactical analyses. Thus, robotics and artificial intelligence enable human performance improvement and evolution.

The experience gained over the last two decades through the participation of all NATO members in operations in the theaters of Iraq and Afghanistan has shown us the real progress achieved by the use of drone systems, and as a result, interest in the field of intelligent machines is increasing year after year. Drones are future weapons that can be used as disruptive factors in both military confrontations and terrorist or crisis situations. They are relatively simple to construct and can take the form of robots, land vehicles, or air vehicles. For the time being, airspace laws are not clearly established, in the sense that there is a need for recommendations regarding their authorized use and clear provisions regarding their improper use.

NATO members’ strategies include plans for technological and interoperable advances in the field of emerging and disruptive technologies, for which guidelines on the use of artificial intelligence and its control mechanisms have already been issued. As a result, technology has become a sometimes-unattainable necessity, driving each of us to fulfill obligations. The future is the main character in the game that our minds are constantly playing, and the accelerated transformations of technologies give the impression that humanity is on the verge of extinction, which can cause disorientation.

Analyzing human history, it was found that *“food surpluses fueled politics, wars, art, and philosophy”* (Harari 2017, 95), and technology did not make their lives easier. Furthermore, *“the human brain is not perfectly built like a computer because it has certain limits, determined by its limited capacity and the fact that it dies with the person, the information existing in it cannot be*



preserved for more than a century" (Harari 2017, 95) and cannot analyze any type of information.

Following the analysis of these considerations in working groups and conferences at the level of NATO experts, the start of endowment programs, tenders, purchase intentions, and the sale of modern military equipment to all Alliance members was initiated. From the standpoint of the long-term war between Ukraine and Russia, it is natural that the modernization of armaments and military technology determines the joint production of equipment such as tanks, fighter and reconnaissance aircraft, surface-to-air missile systems, missile-carrying ships, navigation and communications systems, power generators, and ship handling systems.

Already, great powers such as France have acquired combat helicopters; Israel has signed contracts for the purchase of tanker aircraft; and Serbia has launched programs to modernize its own defense industry, leading us to believe that NATO's signal regarding the development of new technologies was not coincidental.

The conflict in Ukraine, which has been described as a war of attrition, has led us to believe that its outcome is directly related to the ability to stockpile weapons and the efforts of Western countries to supply modern weapons capable of effectively responding to the Russian Federation's challenges, such as HIMARS missiles (High Mobility Artillery Rocket Systems) with a range of up to 80 kilometers, anti-artillery radars, anti-aircraft radars, Javelin missiles, anti-armor missiles, helicopters, tactical vehicles, spare parts, equipment are weapons and techniques that can influence the way of war.

By carefully analyzing recent events, we can see that the conventional war is not over, and it is a challenge for our generation to find solutions that combine established technologies with modern ones based on artificial, robotic, and quantum intelligence in conditions where the human factor is increasingly interested in living a normal life based on peace, prosperity and understanding.

Robotics and artificial intelligence in Romanian military applications

In the modern Romanian society, the military make use of techniques that necessitate care, attention to usage instructions, and physical and

emotional intelligence in order to keep them in good working order and achieve the objectives proposed at the level of military structures. The modern equipment and systems with which the Romanian Army is now equipped impose a number of obligations on the entire military force, beginning with their storage, preservation, maintenance, and use, as well as a number of responsibilities for its development and modernization.

"Developments in the technological field determine the diversification and increase in the complexity of security risks and threats, such as cyber-attacks and activities specific to the information field." (Presidential Administration 2020, 6), therefore attracting the elites of Romanian society is one of the permanent concerns of the military system's command mechanism in order to successfully use the equipment and high-performance technology for the purpose for which they were designed.

"Technological advancement is a never-ending process that affects not only aeronautical organizational systems but the entire society." (Iordache 2020, 236), which leads us to investigate the rapid evolution of technology as evidenced by the appearance of new systems and equipment in all categories of Romanian Army forces, with the goal of supporting the operational planning process and, implicitly, the decision-making and training processes of the own military structures. The civil domain benefits implicitly from technological progress through the development of the two scientific branches of robotics and artificial intelligence, which are becoming more relevant in our lives, knowing that robots endowed with artificial intelligence will be able to perform a vast array of tasks that exceed human performance.

However, we cannot discuss robotics and artificial intelligence in the Romanian military field at this time because it is only a topic debated within working groups at the level of the international military organizations in which we are members. Modern technologies are required to achieve the following goals: management and simulation of the operational environment, detection and combating of threats, treatment and simplification of collected information, and rapid delivery of strategic and tactical analyses. Autonomous unmanned vehicles, for example, can monitor and recognize targets that are



impossible to reach with human resources, enable the use of strike force by eliminating targets, or protect dispersed units or structures in the field.

Romania's strategy includes an "exponential development trend of emerging technologies (5G, artificial intelligence, big data, the Internet of Things, cloud and smart computing), which generates, on the one hand, the need for growth and improvement of communications that will support digital services, innovative ones intended to support citizens and the business environment, and, on the other hand, the need to collect and secure data and information circulated in the respective systems." (Presidential Administration 2020, 18). To achieve national security objectives, Romania became an active participant in the development and discovery of new technologies through research efforts submitted by military engineers within the Research Agency for Military Technique and Technologies – an elite military unit of the Romanian Army –, the Defense Command Cybernetics, Communications, and Informatics Command, as well as by participating in working groups and forums with specialized personnel, within the working groups and research programs on robotics and artificial intelligence, initiated by NATO and the EU.

The Research Agency for Military Techniques and Technologies has scientific research centers under its umbrella that produce inventions, innovations, and maintenance and modernization elements of techniques and equipment in the categories of land, air, and naval forces.

In order to achieve technological progress, the Romanian Army encouraged "the use of modeling and simulation in the training of troops as an advantage in the formation of skills and in the development of capabilities." (Dogaru 2015, 82). There are currently *Simulation Training Centers* in Romania that control complex programs and applications that bring the reality of the battlefield in front of users and test their technical capabilities, operating procedures, intelligence, and way of action in borderline situations. This is a step forward in the implementation of artificial intelligence and robotics on endowment equipment in the context of future warfare.

We discovered how important new

technology was at certain points in the planning of actions and during the conduct of battles based on an analysis of how certain operations were carried out in the theaters of operations as well as military exercises carried out, and how much it meant that the equipment in the endowment was comparable to that of the combatants. As a result, "the use of technology in the military system inevitably contributes to lowering the risks for the engaged human resource, reducing execution time, and increasing the intensity or complexity of the action" (Gimiga 2021, 114).

The participation of the Romanian Army with soldiers in the theaters of operations was a huge advantage for the development of knowledge and skill formation in the fields of communications and informatics, logistics, and operations. Veteran militaries were aware of the testing of various combat equipment, military robots, and combat machines equipped with artificial intelligence algorithms, which led to the purchase of similar equipment for the transport, storage, and use of certain categories of armaments, explosives, and means of delivery fire, as well as unmanned aircraft for the execution of reconnaissance and objective destruction.

Numerous meetings and consultations have taken place in recent years at the level of the North Atlantic Alliance, but also at the allied level in the European Union, with an emphasis on artificial intelligence and new technologies, including the need to identify the impact they have on defense concepts and the development of defense capabilities. As a result, the Romanian military is aware that the world's most powerful armies are developing autonomous weapons or combat robots as part of the joint effort to develop the new armament program, through which NATO armies will be equipped with weapons based on new physical principles, with lasers, drones, tracked vehicles armed with machine guns, and rocket launchers as top priorities. It is obvious that new technologies, increased numbers of qualified soldiers, well-trained teams, and leaders' ability to quickly adapt to changes will lead to victory in current and future wars.

Future technological integration into Romania's ability to defeat the enemy's combat capabilities is heavily reliant on the collaboration of robotic systems and people, both of whom



should be present in the first place. By utilizing enhanced autonomy capabilities, fewer soldiers are required to control combat systems, allowing robots to take on boring, unnecessary, and dangerous tasks. Greater autonomy will enable robots and systems to carry out high-risk missions for extended periods of time, extend the ability to penetrate enemy territory, and maintain occupied positions. As a result, the Romanian military, which is already small in size, will be able to focus on the missions that they can best perform.

Romania proposes, through *military ambassadors* sent to various international conferences, the adoption of ethical principles for the use of intelligent military equipment, which acquires the necessary capabilities to carry out the assigned missions on its own, through experience; they must be controllable, so that they can be deactivated in the event of a malfunction. The autonomy of combat robots and autonomous systems based on artificial intelligence are being studied and debated, with many people believing that humans should be in control and that machines should not be able to eliminate targets based on self-learning algorithms. Because even if the robot is programmed to do something right, it does not know if it is also good, the human factor must decide when the robot soldiers can initiate actions with destructive potential. It is recommended to consider the relationships established between values such as loyalty, duty, respect, honor, integrity, courage, and discipline and the ethics of using the military instrument, respectively. These issues are hotly debated in conferences attended by Romanian military elites, and everyone has an obligation to actively participate in fostering an understanding attitude toward the progressive development of technologies.

Finally, it is not suggested that the presence of robots in the military environment should be viewed solely from the standpoint of lowering the level of risk for the human factor, increasing the degree of certainty of missions, or facilitating the creation of a high-caliber arsenal. Considering that a superior force is determined by combat methods, the selection of objectives, and the employment of advanced military technologies, it is necessary to consider that their constructive and functional particularities confer a qualitative leap in the preparation and conduct of military

actions, either in accordance with the ethics of the production of military robots or to promote an education and a new technological mentality circumscribed by the concepts of morality and responsibility, supporting that technological progress beneficial to humanity.

Currently, the majority of Romanians are skeptical about the possibility of expanding robotics and artificial intelligence production on a large scale, but recent studies show that we should be optimistic about the future, thanks to the results of debates organized in these fields through collaboration with research institutions at prestigious scientific institutions around the world. Our intellectual and financial capacity to enter into major development programs, to value more military professional training, and to capitalize on experience and knowledge gained in theaters of operations, allied and transformational operational commands, and global peacekeeping centers provides Romania with the added value required to initiate development programs for existing technologies. It is also necessary to provide the young generation of military engineers with the opportunity to value their knowledge gained at Romania's prestigious military academies, as well as to establish the necessary framework for motivating and rewarding them when the results obtained demand it.

The preparation of the next generation of military leaders for the robotics era is a constant concern of the Romanian military institution, which has introduced some new disciplines into its annual educational plans that seek to know how to make robots by understanding the principles of making mechanical and intellectual actions, as well as the purposes for which they are created. Military instructors are currently teaching future visions, either by sharing personal intelligence and experience gained on the battlefields of Iraq and Afghanistan, or by presenting unique events experienced in theaters of operations in the Balkans and Africa, or by presenting virtual images developed on the basis of current events analysis.

Financial assistance will never be enough to meet everyone's expectations, so we should all consider how we can improve our actions and fight for our ideas and the future of the industries in which we work and live.



Analysis of the potential future clashes in terms of artificial intelligence and automation

Deep transformations at the regional and global levels continue to determine the repositioning of actors on the global geopolitical map. It is obvious that the current geopolitical context, both regionally and globally, imposes some instability in the eastern countries, a fact determined by the evolution of military equipment and techniques. Romania is in a security environment marked by complex developments that necessitate, on the one hand, redefining the role of military power and, on the other, adapting response methods to counter risks and threats to national security.

The development of a resilient infrastructure capable of meeting the new operational challenges is required in light of *"the primary role that capabilities for operations in cyberspace play, aggregated in a big data system, including artificial intelligence, Internet of Things (IoT), machine learning, and quantum technology."* (Presidential Administration 2020, 28). To achieve this goal, the evolution of information and communication means, the gradual implementation of artificial intelligence in existing technologies, and the establishment of premises for the purchase of modern ones that keep up with modernization are all required. The civilian population, which will be an active participant in the war through intelligent communications, is expected to play a decisive role in future military conflicts. The mass media plays an extremely important role in influencing the benefits and drawbacks of technological progress through the information provided to the public.

Because public opinion is becoming more involved in the unfolding of events, political and military leaders must consider their desires when deciding whether to engage their own forces in military confrontations. With the disappearance of international press organizations' reliance on the leadership of states to obtain access to operational areas by having their own satellites and aerial reconnaissance technologies without a pilot, keeping certain information secret from the mass media and other actors is becoming increasingly difficult.

The distinction between states of peace and war, between a conflict situation and a non-conflict situation, between military and non-

military conflicts is becoming increasingly difficult as the area of manifestation of war expands and becomes one of the most complex. Divergence of interests at the political level is the root cause of all conflicts, regardless of category. These factors, along with a multitude of cultural and demographic factors, ethnic and religious differences, and the complexity of urban areas, contribute to an interconnected, dynamic, and extremely volatile operational environment. The operational environment is constantly changing, so commanders must constantly assess it in order to maintain a high level of understanding of the changing nature of threats.

As a result, there is a need to expand the automation of military systems by introducing specific artificial intelligence algorithms to simplify decision-making procedures. Furthermore, *"automation of the systems required for the military field causes a continuous and unpredictable change in the nature of war, implicitly contributing to the need to modify the classic concept of the decision-making process, which is based most of the time on a single option of action."* (Petrescu 2015, 218).

The modern war is fought with joint military structures – land forces, air forces, naval forces, and special operations forces – distributed in theaters of operations spanning thousands or tens of thousands of square kilometers and interconnected and coordinated in real time by networks of orbital satellites. The automation of existing military technologies has a significant impact on how future wars will be fought. Technological progress, changes in the nature of conflicts, and the emergence of new regional and global military powers are all realities that cause changes in the physiognomy of armed conflict. Because of the rapid evolution of communication and information technologies, which are closely related to space technology, the planning and decision-making process is constantly adapting and changing. This constantly evolving space resource enables the implementation of 5G technologies, which determine the creation of intelligent applications, unlimited databases, and the development of faster and safer actions.

Considering the fact that the interpenetration of the actions specific to the conventional war with those specific to the non-conventional one,

represents a reality of the last conflicts carried out or being carried out around the globe, there is a need for a generation of military leaders with well-formed decision-making skills in a comprehensive approach, in conditions of uncertainty, able to adapt faster than the opponent, as well as modern technologies, based on artificial intelligence, adapted to needs. *"Revolutionary technologies such as artificial intelligence, machine learning, quantum physics, three-dimensional (3-D) printing, and DNA research are currently creating more knowledge than has ever existed in all of history."* (Ullman 2021, 31). Beginning with this reality It goes without saying that the advancement of modern technologies entails the widespread implementation of artificial intelligence on various military and civilian equipment and systems. Future technologies and approaches will continue to shape the outcome of wars and add a new dimension to life on Earth.

Globalization conditions, as well as the availability of technologies in the fields of communications and informatics, bio- and nanotechnology in the industrial sector, force us to research and determine where it is necessary to intervene to maintain the balance of power, in order to limit the use of chemical, biological, radiological, and nuclear weapons, direct and indirect attacks with conventional or non-conventional means, as much as possible.

The inclusion of academia, think tanks, specialist advisors, and a holistic understanding of all the implications that large-scale artificial intelligence would have in support of technology development will assist leaders in developing critical, creative thinking in adapting planning to the strategic context; they will develop the power of armies as well as people's ability to make decisions and act in complex operational environments.

Conclusions

The article has mainly an informative purpose, with analytical-synthetic elements that are necessary for understanding the current state of knowledge in the field of robotics and artificial intelligence on a global and national scale, especially given that it is still in its early stages. In this sense, continuous research will determine the discovery of solutions to simplify the planning process, reduce the time allotted to each phase, and, implicitly, make the best decision in order to

carry out a successful military operation.

Artificial intelligence, in my opinion, cannot replace human consciousness, feelings, and experience among military personnel; thus, technological development and application in armed conflicts must be approached with caution.

Currently, it is expected that the planning, management, execution, and evaluation groups of military operations will be formed by experienced military personnel with advanced knowledge in the fields of operations, human resources and materials, communications, and informatics.

When artificial intelligence algorithms are applied to existing military techniques and equipment, military structures experience personnel and logistical resource reductions. Last but not least, the need for high-quality human resources must be anticipated, and they must be selected, prepared, and trained in conditions that will allow them to use high-end technologies later on.

To have any hope of achieving rapid development, military leaders must be chosen in such a way that they understand the phenomenon of modernization and lead the human force not to exhaust it physically, but to develop it intellectually.

The first direction that should be followed resides in all the commanders' obligation to study the necessity and importance of artificial intelligence in the decision-making process as well as in modern technology used in the planning process of operations carried out in peace and war.

A second direction to follow is to influence the decision-making power on the need to preserve the balance of forces and means by giving confidence to scientists and military engineers regarding the development of technologies in order to bring the Romanian military structures up to the standards and requirements of international organizations. Each of us is aware that modern technology involves exorbitant costs, but step by step and over time, it can create unexpected benefits for the entire society.

Last but not least, we can find the key to the success of a Romanian industrial revolution by promoting modern ideas and having the ability to influence the direction of funds towards technical-scientific research for the development of military equipment and techniques, by utilizing military and civilian human elites, as well as the existing material resources in Romanian institutions.



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