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# New technologies and their impact in the military field

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## Abstract

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Military geniuses like Hannibal, Caesar, Suvorov or Napoleon proved to the whole world how relatively small armies prevailed through complex battle strategies, ingenuity and courage, through scientific and military knowledge that can make a difference. The technological progress made in the last hundreds of years, based on technical-scientific discoveries, has led the armed struggle to such a high level that technological supremacy, the ratio of forces and military technique are extremely important in the assumption of a military conflict. However, combining conventional resources of combat with modern ones, the use of combined forms and methods of combat, are still issues of general interest, which require adaptable strategies and not least the ingenuity, flair and exuberance of leaders. The impact of new technologies on the military field still remains a dilemma that will probably never be clarified, precisely because of the constant challenges, which are increasingly complex and different.

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### Keywords:

science; technology; technological progress; robots; balance of power;  
new technologies.

## Introduction

Approaching a subject based on the impact of new technologies on the military field is extremely sensitive due to the multitude of news, TV shows, permanent technical-scientific discoveries and the fulminant evolution of electronic products around the world. In order to highlight some elements that are necessary for national defense, it is interesting to go through a brief evaluation and interpretation of the effects of technological progress on modern military conflicts and an approach to the relationship between technology and society.

In an ever more complex and volatile security environment, shaping the future serves as a compelling motive for each of us to employ our capabilities in making predictions and forecasts. Drawing on modern technologies, these endeavors aim to enhance the quality of human life and ensure the necessary safety to enjoy it under optimal conditions. Given the overwhelming volume of information, our minds are incapable of processing it all. Consequently, scientists have explored and continue to seek technical solutions that enable the discovery of products capable of significantly simplifying and lengthening our lives.

The continuous technological evolution creates great differences between the nations of the world, precisely because of their different economic power, and our country considering the geostrategic situation in which we find ourselves, tries to keep the stability and predictability regarding the order and security in the area. Romania has been the beneficiary of NATO's political and military objectives since 2004, and this fact has so far ensured the peace and security longed for by entire generations of our population. It is necessary to be aware of the importance of this treaty and to keep up with the partners of the Alliance by maintaining and increasing the interoperability of armaments, techniques and technologies of the military field, by organizing the national territory, thoroughly examining the possibilities of developing our own defense industry and by preparing for a possible war, considering all the political, military, economic, social, infrastructure and information reconfiguration needs. Perhaps one of the most important problems to solve now, in our society, is to make the best decisions regarding the acquisition of the latest techniques and technologies or the attempt to modernize the existing ones. Opinions are still divided, perhaps time and geopolitical challenges will make a difference, but it is clear that we must act in a way that is beneficial to national interests.

Strategic partners of the United States of America and members of the NATO Alliance are developing various strategies to try to achieve faster interoperability goals, by encouraging private companies to produce emerging technologies for the military or by creating acquisitions departments to find better contract-making solutions, because a colossus like NATO cannot and should not be affected by declarations, intentions or, even worse, real attacks on any allied members. In order to achieve the proposed objectives, the Romanian Armed Forces must identify the

military capabilities that need to be improved and especially those necessary to accomplish the interoperability standards in relation to technological evolution and future predictions.

The progress of science and technology is evident and causes the adaptation of existing military art and doctrines, manuals and operating procedures. Emerging technologies such as quantum, artificial intelligence, and robotics can influence weapon systems and combat techniques, communication, computer or detection systems, and can bring fundamental changes in modern military thinking. If the relationship between technology and society is a positive and productive one based on necessity, trust, awareness and efficiency, the military can benefit from the advantages of technological evolution by gaining credibility, respect and fighting power.

By trying to predict the concept of technology development, we will analyze the impact of technological progress on the military field, by studying the effect produced by emerging and disruptive technologies, and the relationship between them and society, trying to include in this limited space some ideas that will attract reader's attention.

### **Technological progress – the paradigm of the present**

The current conflicts are different from those of the past, due to the complexity of the political, military, economic, religious, social, infrastructure, and information issues, due to the precise anticipation of the transformation of the possibility into certainty, especially when the armed aggression comes from two or even three courses of action. We sometimes wonder how it is possible that for centuries the whole world has been influenced by misunderstandings that, most of the time, turned into particularly bloody conflicts.

The struggle for supremacy has led civilian and military leaders to invest huge financial funds in the creation of new, emerging, and disruptive technologies that will surprise possible adversaries, with their use, attaining important benefits to those who possess them, as well as involving huge human and material costs to those who have not kept up with technologies. Now, the EU and NATO have established common directions of action for the faster integration of emerging and disruptive technologies in the military field, trying through the *EU Strategic Compass* and the *NATO Strategic Concept* to issue recommendations to the member states, so that urgent action procedures are started for the research, the production and procurement of intelligent, compatible weapons with common characteristics that allow them to be used jointly by each allied military (Foggo, et al. 2022).

Technological evolution is a result of the interpenetration of science and technology through the use of scientific discoveries in technological processes, the context

in which human civilization and culture developed. In order to understand the current technological progress, we have deduced that it has as its features precisely these components: science and technology, the approach of which always leads to philosophy. Philosophy of technology is a relatively new field, emerging two centuries ago, concerned with the impact of technology on society. In 1994, Carl Mitcham, a philosopher of engineering and technology, defined this philosophy as one of the “*technological humanities*” (The Competitiveness of Nations in a Global Knowledge – Based Economy 2004) because it deals with social science and the humanities, while also being a continuation of the philosophy of science.

Technology encompasses various definitions provided by cultural and scientific experts. In contemporary terms, it primarily refers to the knowledge and application of well-planned, efficient, and practical actions facilitated by machines within companies or institutions. Ernst Kapp, German philosopher and geographer, considered the creator of technological philosophy, published in 1977 the book “Grundlinien einer Philosophie der Technik” in which he states that “*technology is an extension of the human organs, especially the hand, as the archetype of all artifacts, a means of cultural, moral and intellectual progress*” (Mureșan, et al. 1995, 9). Later, other famous philosophers such as James Kern Feibleman, John Standeumaier, Mihai Drăgănescu, and others analyzed and developed the technology-philosophy relationship and stated that technology had an essential role in human culture, but everything belonging to philosophy should not be neglected, either. Thus, we can say that technology is also science and the scientific method is applied in technology as in science. Science and technology have developed increasingly sophisticated technologies that combined with the philosophy of knowledge and the art of war decisively influence decision-making.

Technological progress can be explained and stimulated, especially towards increasing efficiency, the discovery of modern, cheap, compatible energy sources and especially towards the minimization of stress and hard work, and in the military field of human losses. Preparing for war involves organization, careful examination of land, air or naval combat equipment, personnel selection, execution of a rigorous planning process through the correct assessment of the planimetric details of the terrain in the likely area of operations, and last but not least, technologies compatible with those of allies or that respond to challenges with the same force. Also, knowledge of world politics, enemy movements, troop training, thorough knowledge of subunit and unit commanders, potential soldiers, deceiving the enemy about future intentions are very important aspects of achieving success. So, technological evolution provides military power to a state and the activities preceding the preparation of a conflict can represent the key to the success of a military operation.

The military power of a state is in close correlation with technical-scientific progress; that is why the role of technology in wars is crucial. The military field is facing a strong wave of technological revolutions due to the rapid evolution of mechanisms,

equipment, techniques and procedures that must be maintained at a high level of development. Robotization, computerization, and digitization manifest in all areas of social life and implicitly in the existing armaments and techniques used in present and future conflicts. Military power is *"the military action capability of a state, ensured by its military potential"* and is composed of the budget, infrastructure, personnel, armaments, logistics, defense industry, and research institutions and has as a result the objective of development, the defense of the national territory ([Zamfir and Vlăsceanu 1998](#), 481). National defense is closely correlated with the development of technology and science, with current military thinking paying special attention to military scientific potential, its links to *scientific potential*, and *military potential* for war.

What is military *scientific potential*? *"A state's possibilities of operative and efficient use of the achievements of science in solving the problems that the strengthening of its defense power entails and is characterized by the following indicators: information assurance, technical-material base, personnel assurance."* ([Mureșan, et al. 1995](#), 44). *Scientific potential* represents the ability to solve the problems of scientific and technical development faced by society or a certain scientific system. The close connection between them is given precisely by the nature of their application and represents the way in which the defense capacity of the country is developed.

The military war potential of a state is a concept of modern war, it represents Romania's defense capacity and is represented by *"the military forces, the materials, the technique and the armament with which the military forces are endowed; material stocks; trained reserves; armaments and combat equipment factories and plants; the system of fortifications; communication channels; geographical situation, and so on"* ([Prisăcaru 2021](#), 131).

The interaction between science and the military domain, the scientific and military potential of war, is dependent on the level of science. Scientific development has always exceeded the possibilities of the military field, but the knowledge obtained through science was used later. For example, the construction of military equipment has always been inspired by the surrounding nature. Bionics implements compact, effective and reliable principles and mechanisms of self-regulation, orientation in space, self-organization, shape recognition, thermal regulation, etc. which are also found in beings. The structure of technical systems tries to copy the patterns of biological systems.

We have inherited little knowledge from human history because the technology that could record and store information appeared several decades ago. Economic growth has determined that, currently, the technical means represented by sets of optical, electronic, mechanical and electrical systems, for recording, storing and transmitting information, are evolving at an overwhelming speed and have unlimited capabilities. Modern technologies in science and technology, such as quantum computers, eliminate empirical methods and give high value to abstract

models capable of issuing strategic, operational and tactical reasoning in the military domain (Circiumaru, et al. 2021, 62-63). Quantum technologies, although at the beginning, are in continuous development and aim to achieve complex applications in computing, detection, and communication systems. Quantum computers have “significant uses in computational fields such as decision-making, process optimization, artificial intelligence, simulation and analysis of natural phenomena, the creation of vaccines and drugs, or the mathematically important factorization of large numbers, to ensure the secure transmission of data” (Circiumaru, et al. 2021, 59).

Artificial intelligence represented by “the ability of systems or machines to imitate human intelligence as faithfully as possible, can be software systems (virtual assistants, search engines, facial and voice recognition systems as well as image analysis programs) or embedded (robots, drones, autonomous cars and the internet of robots” (Colorful.hr 2021). The military domain already includes equipment, technique, and weaponry endowed with such capabilities, with use in military medicine, training and simulations, autonomous weapon systems, equipment used for surveillance, monitoring, ensuring information security, electronic warfare, intervention in the neutralization of improvised electronic devices and so on (Georgopoulos and Nurkin 2020, 4).

In the field of operation planning, military action and logistics, digitization and robotics are in full development. If at the beginning of the 20<sup>th</sup> century, robots were massive, they were built with great financial and intellectual efforts, being programmed only to answer a few questions asked by the builder or to perform simple operations, nowadays they can perform tasks such as: directing traffic, reading books, providing feeding services, serving, cleaning, planning or recalling necessary data and information, moving heavy weights, controlling and timing different issues. The military field benefits from the development of robotics by replacing the human factor in certain structures with a high degree of danger, examples in this sense being the nuclear field where robots are viewed with great interest, the repairing of railways and roads, the guarding of important, strategic objectives, research areas with radiation, as well as their incorporation into aerial or ground combat reconnaissance vehicles equipped with recording, attack and destruction devices. Thus, the field of robotics remains extremely attractive and open to discoveries to which the future will give the appropriate use.

Technological transformations and rising scientific achievements have determined the development of a relatively new field, cyber defense, carried out in accordance with the evolution of the information environment, which involves “cyber attacks, hostile/influence actions carried out in the public space, disinformation, spread of fake news/manufactured, etc.” (presidency.ro 2020, 6). The development trends in the field of cyber defense are considerable due to the very low costs compared to a classic action, the implementation of cyber security strategies by allied states, the development of research and technical innovations, the accelerated expansion of

virtual space and the development of specific military defense structures (Pătrașcu 2020, 33-35). Cybersecurity has an extremely important role for the military as it ensures the confidentiality of information and prevents “illegal activities that include the use of digital technologies in cyberspace by protecting critical systems and infrastructures against military and other attacks” (European Court of Auditors 2019, 15).

Romania, as a member of NATO, has established cyber defense structures and developed action plans, in accordance with national rules, which ensure the security of the national and multinational cyber domain in cooperation with allied members (Joint Publication 3-12 2018, IV-24 - IV-26). The recent war, which began in 2021, between Ukraine and the Russian Federation, demonstrated that the physical environment for the conflict has a highly developed component – the informational environment – which is permanently influenced by communications, mass media, IT security, international organizations, public figures and military capabilities, which led to unexpected successes for those who were considered to have less and older technology. Probably, the ongoing conflict will start a new direction of action regarding the development of the cyber component at the level of the NATO Alliance and will determine the rethinking of security standards and action strategies in accordance with new technologies that will also bring new vulnerabilities (Hartwig 2021).

So, science and technology ensure technological progress as a paradigm of the present, the latest technologies having incorporated components of artificial intelligence, robotics, quantum mechanics ensuring the development of the country's military power, by creating a climate of safety and well-being on all social levels. At the moment, each of us is happy and excited about the benefits of technology, but it remains to be seen how it will evolve and what the impact on human life in general and in the military field, in particular, is going to be.

### **The influence of technological development on the field of defense**

The accelerated technical-scientific progress represents for the Romanian Army one of the permanent challenges because it is closely related to the human resource that must be prepared, trained, maintained and developed in accordance with the acquisitions. Scientific discoveries were tested most of the time with priority in the military field, which led society to rigorously select human values, which are to use new technologies in military activities.

There is a mentality fueled by the present information, whereby the highly developed states believe that without technology the war is almost impossible to sustain and is lost, right from the start. Some conflicts, such as those in Iraq, Afghanistan, and the

Balkans, have shown that technological supremacy allows the rapid destruction of the enemy without significant organic losses. It is time, therefore, to realize that the impact of technical-scientific development on the military field can be radical and must be oriented towards development.

What directions of action are necessary to achieve technological interoperability in the armies of NATO members? We believe that in order to faster achieve optimal cooperation between the existing equipment, technique and technologies in the armies of the NATO allies, it is necessary to increase the importance of institutions with attributions in the field of education, research, production of military equipment, and technologies, participation in conferences, equipment exhibitions, materials and technique, organized at the national and international level, as well as the realization of plans for the improvement of armaments, based on rigorous planning, the increase of cooperation with the armies that already use modern equipment, the development of communication and information systems and so on.

Within the Ministry of National Defense there are institutions that are permanently concerned with the achievement of the technical and technological dimension, such as the Defense Staff, the Research Agency for Military Equipment and Technologies, the General Directorate of Armaments, the Joint Logistics Command, which delegates experienced military personnel, to participate in meetings, working groups, analysis sessions with representatives of the defense industry in the country and abroad. Based on the reports drawn up following the implementation of such activities, the need to adapt the equipment and armaments to the realities of the modern battlefield emerges more and more. However, it is difficult to harmonize costs with efficiency and the need to renew equipment and techniques. Many times, the needs are much greater than the budget, therefore it is necessary to have an *iron will* to justify the benefits achieved. The programs for the acquisition and modernization of Romanian military equipment are viable, necessary, and follow their course of action according to planning, but the threats present in the world prevent in some cases the delivery or production on a larger scale of some equipment or technical elements imperatively necessary for the current development.

Having a strong military requires effective leadership, which requires a quality planning and decision-making process. This activity involves the improvement of communication, mainly IT, and the purchase of equipment and software programs to support this complex and dynamic process.

Do we therefore have strategies that make technical and technological, operational performance with those of the Alliance? We could say yes, because, at this moment, soldiers from the Alliance, who have been stationed or are training on the Romanian territory, appreciate the efforts made to achieve an effective defense position on NATO's eastern flank, by providing equipment comparable to their own, in joint exercises, by ensuring cooperation and communication between structures, and last but not least by good fighting skills.

Do we need technological superiority in the event of military conflicts? Given the current geostrategic situation, we believe that now is the time when we can adapt command structures to the information age, we have the opportunity to develop infrastructure networks and cyber defense equipment, we can increase investments in emerging and disruptive technologies, or we can cooperate with the private sector to develop its own production of armaments, techniques, and technologies (NATO 2022, 7). Therefore, it is possible and necessary to continue equipping the military with new technologies to meet threats and fulfill our obligations within the Alliance. Currently, we can state that in order to ensure technological supremacy, we have solutions to support it through the existing procurement programs, and through membership in NATO and the EU, we can access programs for the absorption of development funds in many directions necessary for national defense.

The technical-scientific development and the impact of the procurement of new technologies require, on the other hand, high-quality personnel that is properly prepared and trained to be able to face the challenges given by modern technology. Analyzing the military history of the Romanians, we found that in most important battles the ratio of forces was almost always inferior to the various enemies, but voivodes, commanders, and military leaders created strategies that tipped the balance of power towards balance, by setting up trained military structures, achieving surprise, the progressive engagement of resources, ensuring the effectiveness of the means of combat available, the use of the physical space for carrying out operations for one's own benefit, as well as influencing the morale of the enemies. At the same time, increasing the cohesion of their own troops in battle was the main weapon of the Romanians, being developed by the commanders by knowing the subordinate personnel down to the smallest details and training them to use the technique to the maximum extent possible. Analyzing these lessons learned, the Romanian military art was eventually developed.

The ratio of forces has a decisive role in a military conflict, but it does not always ensure the chance of success, sometimes the exaggerated arrogance of commanders or the ineptitude of planners regarding the use of means in battle leads to true defiance of the objective laws of armed conflict (Eminescu 1986). Thus, we consider that the ratio of forces and means is an important factor in the planning and conduct of military conflicts, but it is not a decisive one, because the intelligence, training, and, most of all, the motivation of the combatants can be the key to success.

We appreciate that the lessons learned from the tumultuous history of the Romanians and the impact of the continuous development of technology in the military field, converge towards several directions of analysis depending on the level at which planning and decision-making are performed.

At the strategic level, a direction of action could be the creation of small combat groups, thought on concrete objectives, made up of soldiers with skills trained and developed towards the level of perfection in the use of sophisticated weapons, the

quality of the concept of strategic action, the ability to plan and lead the command-control system and the provision of the strategic logistic reserve.

At the operative and tactical level, situations change depending on the physiognomy of operations, the quality of the human resource, and the technique used intelligently. The concept of operations carried out at the operational level must include maneuver schemes that aim to maximize the quality of the execution of actions, the adoption of the most ingenious forms of combat and the provision of the best conditions for surprising the enemy.

At the tactical level, small force groups capable of executing complex missions in difficult situations are the task of commanders. They are appointed, as a rule, to find solutions for training the military regarding the knowledge and use of armaments and techniques, in the smallest details and most importantly, in search of ways to motivate them, in line with expectations.

Analyzing the conflict between Russia and Ukraine, which began in 2021, it appears that, in most situations, the Ukrainian Army has coped, so far, primarily due to its knowledge of the terrain, both in the open field, and especially in urban battles. It also turned out that one of the most important factors in achieving resilience so far has been the judicious blending of all combat methods and procedures. Continuously launched surprise actions, physical and psychological influence, the creation of intermediate and reserve phase lines, the misleading actions, they all created major surprises at the tactical, operative and even at strategic level. Be that as it may, the not yet concluded conflict demonstrates the competition of military technologies used and Ukraine's effort to resist a much larger force.

The impact of scientific development on the Romanian military field is real and radical, the acquisition of cutting-edge techniques and technologies being imperatively necessary, simultaneously with the attempt to modernize and revitalize the Romanian defense industry. The need to modernize the technique is extremely obvious and it has been shown that it radically influences the fate of military conflicts, both through the effects of digitization, automation, robotics and the introduction of artificial intelligence on certain components of military technique and through the effects obtained through the means of communications and IT that ensure security cyber of the entire national defense system.

## **Conclusions**

It is complicated to answer all the questions related to the effects of technology on the conduct of current, modern military conflicts, but trying to do it, in part, to the topics that appear daily in the contemporary press, is an important step in creating conclusions and measures that need to be adopted. As mentioned above,

technological transformations significantly influence the military field, in terms of weaponry, communications, intelligence, surveillance, monitoring, and control of the military operations. The combat power of a state is given by the introduction and increase in the number of weapon systems and advanced technologies, such as launch systems, missile launchers, and combat systems. Communications and information are the key elements of maintaining the link between military structures and can only be achieved through high-performance communications and IT systems, which radically support the planning and decision-making process as well. From the analysis of the science-technique-power relationship, it is clear that the first factor is the prerogative of scientists and is the basis of useful discoveries and innovations. Military educational institutions such as the „Ferdinand I” Military Technical Academy train engineer officers who analyze the needs of the defense system and cooperate with research institutions for the coordinated realization of modernization and ensuring a state of safety regarding the technologies used in military operations.

We appreciate that equipment is the key factor in achieving troop mobility, therefore the accelerated pace at which the automotive field develops and the environmental protection measures taken worldwide lead the army to establish clear and honest objectives and levels of ambition, through the National Defense Strategy of Romania and the Military Strategy of Romania. Romania’s scientific and military potential is immense and refers to the ability to use and eventually produce weaponry and advanced technologies to fulfill our political, economic, and military objectives. Investing in research and development, improving infrastructure, ensuring adequate education and training of military personnel, and investing in advanced technologies and modern weaponry are necessary measures to improve military potential.

The new concept that is increasingly present in our lives – artificial intelligence – is already implemented, by adapting existing technologies, and by introducing learning algorithms that make possible operations that in the past required a lot of well-trained human resources. In order to be interoperable with the equipment of NATO member armies, we must be part of joint projects and accept that partnerships are the key to success. By reading and understanding the new concepts of international military organizations we can appreciate what it means to use an effective leadership system, to have a quality planning and decision-making process, and to estimate the effects of a nation’s technological superiority.

Analyzing the history of the last world conflicts in which Romania participated, it is clear that the army did not succeed in equipping it with modern equipment prior to military actions, relying more on the loyalty of its neighbors and the validity of the treaties and agreements concluded. Thus we entered the First World War unprepared, not knowing the real situation of training and equipping the army with technologies comparable to the time. World War II surprised us with the same problems that turned into disasters and huge human and material losses. It remains to be seen if

we will manage to integrate, to reach the levels of ambition set by Romania's Military Strategy and if we will have the political ability we have shown so far, to smooth out possible future conflicts.

Following current military conflicts, it is difficult to estimate what future ones will be like, but it is not useless to try to predict them, in order to have reasons not to give up on development. Probably many of us do not imagine how it is possible that in the 21<sup>st</sup> century we still need armaments through the development of new technologies and experiences, which have produced huge destruction over time. The contemporary reality, however, proves to us that it is necessary to approach technological progress with an openness to the military field, and Romania, through the military leadership structures, should have a courageous approach to the future, by realizing strategies for the development of technique and technologies, such as the Program of transformation of the Romanian Armed Forces until 2040, with clear deadlines and responsibilities and having adequate financial support to maintain the objectives.

## References

**Cîrciumaru, F., D.L. Petrescu, C. Băhnăreanu, M. Zodian, C.C. Ioniță, G. Stoenescu, and M.T. Potârniche.** 2021. *The impact of new technology on military art*. Bucharest: "Carol I" National Defence University Publishing House.

**Colorful.hr.** 2021. „Ce este Inteligența Artificială – cum funcționează, tipuri, aplicabilitate pe piața muncii. [https://www.colorful.hr/ce-este-inteligenta-artificiala-cum-funcioneaza-tipuri-aplicabilitate-pe-piata-muncii/?utm\\_term=&utm\\_campaign=NNC+%7C+Search+%7C+Dynamic+%232&utm\\_source=adwords&utm\\_medium=ppc&hsa\\_acc=9670787410&hsa\\_cam=17455092683&hsa\\_grp=1375498](https://www.colorful.hr/ce-este-inteligenta-artificiala-cum-funcioneaza-tipuri-aplicabilitate-pe-piata-muncii/?utm_term=&utm_campaign=NNC+%7C+Search+%7C+Dynamic+%232&utm_source=adwords&utm_medium=ppc&hsa_acc=9670787410&hsa_cam=17455092683&hsa_grp=1375498).

**Eminescu, Gheorghe.** 1986. *Napoleon Bonaparte*. Bucharest: Romanian Academy Publishing House.

**European Court of Auditors.** 2019. “Challenges for an effective UE cybersecurity policy.” [https://www.eca.europa.eu/Lists/ECADocuments/BRP\\_CYBERSECURITY/BRP\\_CYBERSECURITY\\_RO.pdf](https://www.eca.europa.eu/Lists/ECADocuments/BRP_CYBERSECURITY/BRP_CYBERSECURITY_RO.pdf).

**Foggo, James, Nicholas Nelson, Joanna Van Der Merwe, and Nico Luzum.** 2022. “Elevating Our Edge: A Path to Integrating Emerging and Disruptive Technologies.” <https://cepa.org/comprehensive-reports/elevating-our-edge-a-path-to-integrating-emerging-and-disruptive-technologies/>.

**Georgopoulos, Giorgos, and Tate Nurkin.** 2020. “The current state of AI in defence and security.” <https://www.defenceiq.com/defence-technology/whitepapers/the-current-state-of-ai-in-defence-and-security>.

**Hartwig, Ben.** 2021. “Lessons learned: Cybersecurity in the defense industry.” <https://www.defenceiq.com/air-land-and-sea-defence-services/case-studies/lessons-learned-cybersecurity-in-the-defense-industry>.

**Joint Publication 3-12.** 2018. "Cyberspace Operations." Joint Chiefs of Staff, US Army. [https://irp.fas.org/doddir/dod/jp3\\_12.pdf](https://irp.fas.org/doddir/dod/jp3_12.pdf).

**Ministry of National Defence.** 2021. "Military Strategy of Romania." <https://www.mapn.ro/legislatie/documente/STRATEGIA-MILITARA-A-ROMANIEI-ENG.pdf>.

**MSpoweruser.com.** fără an. *IBM bate Microsoft la acuratețea recunoașterii vorbirii.* Accessed 6 January 2023. <https://mspoweruser.com/ro/ibm-beats-microsoft-speech-recognition-accuracy/>.

**Mureșan, Mircea, Gheorghe Ilie, Vasile Grad, and Alexandru Mihalcea.** 1995. *Advanced technology and the military field.* Bucharest: Military Publishing House.

**NATO.** 2022. "NATO 2022 Strategic Concept." [https://www.nato.int/nato\\_static\\_fl2014/assets/pdf/2022/6/pdf/290622-strategic-concept-ro.pdf](https://www.nato.int/nato_static_fl2014/assets/pdf/2022/6/pdf/290622-strategic-concept-ro.pdf).

**NATO.** 2021. "NATO Advisory Group of Emerging and Disruptive Technologies." Annual Report. [https://www.nato.int/nato\\_static\\_fl2014/assets/pdf/2022/7/pdf/220715-EDT-adv-grp-annual-report-2021.pdf](https://www.nato.int/nato_static_fl2014/assets/pdf/2022/7/pdf/220715-EDT-adv-grp-annual-report-2021.pdf).

**Pătrașcu, Petrișor.** 2020. "Risk and uncertainty in cyberspace." *Bulletin of "Carol I" National Defence University* vol.5 (nr.4).

**presidency.ro.** 2020. "The National Defence Strategy of the country for the period 2020-2024." [https://www.presidency.ro/files/userfiles/Documente/Strategia\\_Nationala\\_de\\_Aparare\\_a\\_Tarii\\_2020\\_2024.pdf](https://www.presidency.ro/files/userfiles/Documente/Strategia_Nationala_de_Aparare_a_Tarii_2020_2024.pdf).

**Prisăcaru, Dan.** 2021. *In the outpost of the fight for survival.* Bucharest: Military Publishing House.

**Zamfir, Cătălin, and Lazăr Vlăsceanu.** 1998. "Dictionary of sociology." Bucharest: Babel Publishing House.