

Jacek Meissner

Wojskowa Akademia Techniczna

Streszczenie w języku angielskim rozprawy doktorskiej pt.

„Przeskok generacyjny rosyjskiego kompleksu wojskowo-przemysłowego w kontekście zagrożeń dla wschodniej flanki NATO”

(The generational transition of the Russian military-industrial complex in the context of threats to NATO's eastern flank)

SUMMARY

The Russian Federation poses a constant and existential threat to the security of the member states of the North Atlantic Treaty Organization (NATO), in particular for the countries located on the eastern flank of the Alliance, including the Republic of Poland. At the same time, Russia is participating in an ongoing arms and technology race. A consistent armament policy, development of the potential of the defence industry, as well as the use of disruptive and emerging technologies (EDT) are crucial for introducing new generation military technology into the armed forces, developing military capabilities and maintaining technological primacy or trying to reduce the distance to adversaries.

Therefore, the objective of the dissertation was to present the potential of the Russian military-industrial complex in the area of new-generation military equipment and new technologies with military applications in the context of its possible use by the Russian Federation in an armed conflict with the North Atlantic Alliance on its eastern flank. It is also important to assess the impact of this potential on future military capabilities of the Russian Armed Forces and the implications for the future political and military situation in the Central and Eastern European theatre of war.

The author confirmed the hypothesis that the Russian Federation, in the era of dynamic technological progress, will have significant problems to remain a leading global actor in the development of future weapons systems and to use these achievements to gain a military advantage in a potential military conflict on NATO's eastern flank. At the same time, despite

problems of various nature (economic, financial, technological), Russia will be consistent in pushing for technical modernization and will have achievements in selected fields.

Studies have shown that Russia has significant problems in generational transition in the development and implementation of new generation weapon systems, as well as in the development of new technologies for military needs. As a result, although Russia's actions lead to a worsening security environment, at the same time the operational capabilities of the Russian Armed Forces will be limited, especially in the face of technological progress in the West.

The research includes the following main parts. The first part is a chapter devoted to methodological questions. The second part is an analysis of the security environment and military theatre, as well as Russian military strategies, doctrines and concepts. The third part presents the current state of the Russian Armed Forces and the Russian military-industrial complex, i.e. the Russian industrial and technological base of the defence sector. The next, fourth part is devoted to research on the technical modernization of the Russian Armed Forces, Russian armament policy and the development of new generation military equipment. The fifth part is an analysis of Russia's potential in the area of EDT, including the mechanisms of their development. The sixth part presents the impact of the use of new generation weapons systems in military conflict. The last, seventh part is devoted to conclusions for Poland in the field of armament policy.

Source analysis was chosen as the main research method, which is supplemented by in-depth, non-standardized and unstructured expert interviews and technological forecasting (trend model using numerical data).

The analysis of the security environment shows the deteriorating security situation in the world and in the region, a significant cause of which are the actions of the Russian Federation. The foreign and security policy pursued by this country, as well as strategic documents and publications in the field of Russian military thought, as well as the observation of undertaken activities (e.g. aggression against Ukraine in 2014 and a full-scale invasion in 2022) show consistency in pursuing neo-imperial policy, contestation of the international order, revanchism and rebuilding influence. Combined with the nature of Russian statehood, this shows the reality of the threat to NATO, especially its eastern flank. The remedy for this is pursuing an assertive policy combined with consistent armament and building economic strength, which can constitute the basis for deterrence and, if necessary, provide conditions for defence.

The analysis of Russian strategies, military doctrine and, more broadly, the Russian vision of conflicts and the Russian concept of new generation warfare indicate the maturity and innovation of Russian military thought. Ambitious assumptions of conducting an intense military conflict with a high saturation of modern military technology (e.g. unmanned systems, long-range weapon), combined with hybrid methods and active measures, constitute a great challenge for NATO countries, their armed forces and the entire security system. However, the verification of these assumptions in the context of the war with Ukraine showed their high imperfection in implementation. However, it should not be assumed that Russia will not draw conclusions from this and will not improve and adapt its own solutions, which was visible in the subsequent phases of the war with Ukraine. Especially taking into account that potential conflict with NATO would be of a completely different nature.

The state of the Russian Armed Forces, including transformation, size, structure, control and command system, as well as changes that have occurred or are planned as a result of the war with Ukraine, indicate that Russia not only has ambitions, but also has some potential to maintain the status of a major power, and a state capable of destroying European security. The reforms of defence ministers A. Serdyukov and S. Shoigu have their advantages and disadvantages, adapting the Russian Armed Forces more or less successfully, firstly to a local conflict, and then again to a larger-scale conflict. The Russian army is plagued by numerous problems, many of them structural, and similar phenomena also occur throughout the Russian state, society and economy. This means that although the Russian Armed Forces pose a real challenge to NATO, if Russia decides to engage in a full-scale armed conflict, these problems may result in its defeat.

The Russian military-industrial complex is a specific creation, especially in terms of relations with the army, among others due to the fact that it is the main source of supply of military equipment. This complex, i.e. the armament industry, military research institutes, enterprises related to the armament industry and elements of the Ministry of Defence related to the development of technology, on the one hand, are able to supply military equipment in large quantities and develop new weapon systems, on the other hand, due to the problems is highly inefficient at this.

These problems include, in particular, lack of technological and industrial competences, corruption, kleptocracy, focus on reporting on successes, lack of proper accountability, low management efficiency, limited access to components deepened by sanctions, limited availability of appropriate engineering, scientific, worker and IT human resources, collapse of

technical culture. As a result, this leads to problems with finalizing programs aimed at developing new generation weapon systems and their large-scale production and developing new technologies.

Pervasive corruption affects the condition of the entire Russian state and society, including the armament industry, academia and innovative companies. Until the outbreak of a full-scale war against Ukraine, it seemed that the technical modernization of the Russian Armed Forces was such an important priority that corruption and other negative phenomena were accepted only to a moderate extent, to a lesser extent than in other areas of Russian everyday life. The war with Ukraine showed that these phenomena also occurred to a large extent in the Russian army and military-industrial complex. Russia's industrial and technological potential is significantly influenced by issues related to the availability of components (especially electronics) and the possibility of developing and producing them independently, as well as sanctions that affect the economic and financial condition of the country and the availability of military equipment components.

Changes in the leadership of the Russian Ministry of Defence in 2024 and the appointment of technocrats associated with industry may improve technical modernization and, to some extent, limit the problems plaguing the Russian military and the military-industrial complex, but due to their deep structural nature, it does not seem that this will happen to eliminate them to a far-reaching extent.

The specific Russian armament policy, based on close links between the Ministry of Defence and the Russian Armed Forces with the military-industrial complex, allows for effective programming of technical modernization in a properly systematic manner. However, real problems occur in the implementation of specific programs. In many cases, Russia is unable to develop, and mass produce new generation weapons systems in the final configuration due to the problems described above.

Such examples include, among others: land platforms (which is particularly important in the theatre of NATO's eastern flank), such as the new T-14 Armata main battle tank, the new T-15 heavy infantry fighting vehicle, the Kurganets-25 infantry fighting vehicle, the Bumierang armored personnel carrier, the Uran-9 reconnaissance and combat unmanned ground vehicle, as well as air systems (e.g. the 5th generation Su-57 multi-role aircraft, S-70 Ochothnik unmanned aerial vehicle) and naval systems (e.g. the project 23560 Lider destroyer).

A separate category includes programs implemented relatively successfully, although not without problems (e.g. the 152 mm 2S35 Koalitsiya-SV self-propelled howitzer, rocket artillery systems, the S-500 Prometheus air defence system, cruise missiles and ballistic missiles such as Kinzhal, RS-24 Jars, RS-28 Wojewoda, 9K720 Iskander, or the project 955 Boriei submarine).

In the face of problems with new weapon systems, Russia is focusing on mass production of previous generations of military technology, such as modernizations of T-72 family tanks or Su-27 family combat aircraft (the so-called “+”/”++” versions). However, this equipment currently has no prospects, and on the future battlefield its potential will be smaller and smaller, especially in the face of an opponent with a technological advantage, such as the North Atlantic Alliance, and to some extent also some of the countries of the eastern flank and the countries with a military presence there.

Moreover, the level of losses in the war with Ukraine forces Russia to produce old-generation weapons, which reduces the scope for the armament industry to switch to a generation transition, and the Russian Armed Forces are currently too focused on ensuring the appropriate amount of equipment on the frontline. After the failure of the first stage of the full-scale war with Ukraine and the heavy losses, this conflict took the form of a material war. Russia has switched production to war mode, but this is only for the mass production of old-generation weapons. Moreover, it is often produced on the basis of reserves several decades old accumulated in storage facilities (which are not unlimited) or reconstructed equipment damaged in combat.

It should be noted that Russia is able to implement the lessons learned from the conflict with Ukraine into military requirements and industrial solutions, which could be observed in the field of UAVs. At the same time, despite extensive armament, this country is unable to remain a leading global actor in the development of new generation weapon systems and innovative technologies that will be implemented in military equipment.

Currently, there is a noticeable trend in the world of developing EDT, especially in the civilian sector, because much larger financial resources are allocated there for this purpose and then they are adapted for military applications. This type of defence technologies, i.e. those that will have a radical impact on the operational capabilities of the armed forces in the coming future, include artificial intelligence, data, autonomy, quantum physics and computing, biotechnologies, and human extension, hypersonic, space technologies and novel materials and manufacturing methods. This phenomenon is also noticed in Russia, where – at least

declaratively – significant importance is attached to it. Dedicated institutions have been established as vehicles for the development of this type of technology for military needs. These are primarily the Foundation for Advanced Research Projects and the ERA Military Innovative Technopolis, within which innovative projects are implemented. The analysis of Russian activities in this area allows to draw four main conclusions in the field of defence innovations:

- 1) the number and budget of projects cause that they do not cover the full spectrum of capabilities of the armed forces, and therefore will not be able to secure all the future needs of the Russian Armed Forces;
- 2) the financing and importance of projects is much lower than in Western countries, which, despite the technological development of the Russian military-industrial complex and the Russian Armed Forces, will lead to a deepening of the potential gap in relation to the West and probably also towards China;
- 3) there are no mature and large-scale appropriate funds dedicated to the security and defence sector in Russia (e.g. venture capital), and in the West such instruments are an important source of innovation and adaptation of new technologies developed in the civilian sphere for military applications;
- 4) there is no data available on significant military implementations of innovations developed within the Foundation for Advanced Research Projects or the ERA Military Innovative Technopolis or in another format and their use on the battlefield (exceptions include subsequent development versions of the Lancet loitering munition). The situation is the opposite in the case of Ukraine, which operationally uses many innovations developed by startups, voluntary organizations or as part of the Brave1 defence technology cluster, e.g. various types of drones, digital battlefield management systems, mobile applications.

A picture of the possible use of new generation weapon systems and the application of emerging and disruptive defence technologies in a potential armed conflict on NATO's eastern flank was presented in all five operational domains, as well as in cross-sectional, hybrid and disruptive technologies aspects. On the one hand, the key role of complex advanced weapon systems (such as a main battle tank or a frigate) is recognized; on the other hand, the role of innovative solutions such as unmanned and autonomous systems and solutions based on digital technologies is growing. Both of these areas are key to ensuring military capabilities on the modern and future battlefield, and they are complementary to each other.

The Russian concept of next-generation warfare assumes the use of new technologies (digitalization of the battlefield, precision-guided munition, robotics, artificial intelligence, operations in cyberspace). Although this concept is of high value in terms of military thought, the Russian Armed Forces do not have an adequate resource of new generation weapon systems or innovative technologies to be able to actually implement it, which demonstrates actions against Ukraine. This means that Russia may turn more towards hybrid measures, as they can be used using Western technologies, e.g. cyber tools, internet platforms, drones, elements produced in 3D printing.

This does not mean that Russia cannot decide on military aggression, but then it would be based not on new generations of military equipment, but on mass-produced weapons of older provenance (e.g. instead of the T-14 Armata tank, modernizations of the T-72).

The Russian military-industrial complex is able to supply large amounts of military equipment to the Russian Armed Forces, which may translate into significant operational capabilities that pose a threat to the countries of NATO's eastern flank and the entire Alliance. However, the development of technology in the Western hemisphere and maintaining the primacy of NATO as a whole (in connection to investments in technology), as time progresses, Russia's potential to conduct efficient large-scale military operations will relatively weaken.

While within NATO, despite problems with maintaining the appropriate level of defence budgets of some countries and the problems faced by the armament industries, there is a gradual generational replacement of armament, EDT are being developed, and the battlefield is digitized, giving a significant advantage in information and situational awareness. In turn, the military equipment currently used by the Russian Armed Forces, even in its mass, will be able to provide increasingly smaller military capabilities, and Russia is unable to finalize a significant part of new-generation weapons programs and implement mass production.

Russia does not have the resources of the US, China, or leading European countries. These resources are the basis for the development of industrial capabilities and armed forces, and therefore allow for securing technical modernization in the long term, especially based on the national armament industry. These resources include, in particular, the strength of the economy and the level of its development, the level of defence expenditure, the level of expenditure on research and development (R&D), and the scientific, industrial and innovative potential. This is clearly illustrated by numerical data in the field of public expenditure, economy, science, and innovation.

Russian hybrid activities could transform into armed aggression if several political factors occur, such as the US military withdrawal from Europe, the US becoming involved in a conflict in the Asia-Pacific theatre, and the disintegration of Euro-Atlantic and/or European institutions. The possibility of military aggression will concern primarily the Baltic states, as they are a potentially attractive target due to their small potential and lack of strategic depth. The risk of a military attack on these countries depends on the political situation in NATO, especially in the USA and the countries of the eastern flank, and the political will in terms of readiness to engage in a military conflict.

Conclusions for Poland in the field of armament policy and investments in the development of military equipment and defence technologies indicate the need to establish a complex state armament policy (including defining the directions of development of the Polish defence industry from which given types of military equipment will be acquired) and its consistent implementation, increasing production capacity, strengthening the R&D system in the field of defence, as well as defence innovations system, along with increasing expenditure on R&D (including the establishment of strategic R&D programs, and armament and production programs), as well as development of military and technological analytics.