

POLITICKÉ VEDY / POLITICAL SCIENCES

Časopis pre politológiu, najnovšie dejiny, medzinárodné vzťahy, bezpečnostné štúdiá / Journal for Political Sciences, Modern History, International Relations, security studies

URL of the journal / URL časopisu: <http://www.politickevedy.fpvmv.umb.sk>

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Article / Článok: **Modernization of the Armed Forces of the Russian Federation after the Russian-Georgian Conflict**
Publisher / Vydavateľ: **Fakulta politických vied a medzinárodných vzťahov – UMB Banská Bystrica / Faculty of Political Sciences and International Relations – UMB Banská Bystrica**
DOI: <https://doi.org/10.24040/politickevedy.2021.24.2.62-86>

Recommended form for quotation of the article / Odporúčaná forma citácie článku:

Bučka. P. – Marek. J. – Pástor. R. 2021. Modernization of the Armed Forces of the Russian Federation after the Russian-Georgian Conflict. In *Politické Vedy*. [online]. Vol. 24, No. 2, 2021. ISSN 1335 – 2741, pp. 62-86. Available at: DOI: <https://doi.org/10.24040/politickevedy.2021.24.2.62-86>

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MODERNIZATION OF THE ARMED FORCES OF THE RUSSIAN FEDERATION AFTER THE RUSSIAN-GEORGIAN CONFLICT

Pavel Bučka – Ján Marek – Rudolf Pástor*

ABSTRACT

Russia was implementing massive military equipment modernization programs in order to bring all Russian branches of the Federation Armed Forces from Soviet era robust as well as obsolete massive forces to new modern military force. This article analyses significant military armament modernisation projects implemented and ongoing in the Russian Federation conventional forces in Ground Forces, Aerospace Forces and Naval Forces in order to reduce technological gaps between Russia and other world military powers. The objective of the research is to find out, based on available open sources information analysis, how Russia introduced lessons learned from the latest conflicts, gradually developing its Armed Forces in such specific areas like personnel, command and control reform, and unmanned and robotic vehicles' introduction into Russian Federation Armed Forces. The major results are that wide scale military modernization projects have been adopted in all Russian Federation Armed Forces including major branches Ground Forces, Aerospace Forces and Naval Forces. The Russian Federation defence industrial complex is highly involved in modernisation programs and based on its strategic position in the Russian economy coming from the Soviet era legacy, playing crucial role in it. The practical implications of the research point to the fact that, despite inherited outdated technology, Russia, thanks to new armaments projects, is levelling out the differences between the great powers and is once again becoming a major strategic player.

Key words: Modernization, personnel, command and control, Ground Forces, Aerospace Forces, Naval Forces.

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DOI: <https://doi.org/10.24040/politickevedy.2021.24.2.62-86>

Introduction

At least the last two conflicts in which Russia drew on the capabilities of the full range of its Armed Forces (Georgia in 2008 and Syria in 2015) clearly illustrates the changes that have occurred in the Russian army over the past years after Cold War.

While the conflict with Georgia lasted only five days, Russia used its full conventional capabilities in it, including long-range bombers and short-range ballistic missiles. The Russian Naval Forces carried out landing operation with several airborne battalions airlifted from thousands of kilometres away. Totally and up to 30,000 Russian troops were involved in the operation. This number had exceeded the small contingent deployed in Syria, which has remained below 10,000 troops of the Russian Federation Armed Forces (RF AF). Victory over Georgia was quick and decisive, but the opponent was very weak. Moreover, the operation revealed problems in the RF AF so lesson learned had been adopted and resulted in subsequent reforms, which were long, turbulent as well as painful and sometimes inconsistent.

Compared to 2008, today's RF AF is smaller and it has less manpower capable to deploy smaller number of armoured fighting vehicles, aircrafts, ships, and ammunition than it did 12 years ago. To compensate for this, Russia has worked hard to increase the efficiency and combat readiness of the armed forces.

The conflict in Syria provided a natural opportunity to analyse the success of these reform efforts, identifying which new capabilities the RF AF have acquired in the past decade as well as where these reforms fall short.

RF AF reform through comprehensive approach towards its conventional military capabilities development and modernization presents priority to promote Russian Federation (RF) interests in neighbouring countries, which requires security assistance including financial support and expenditures in order to follow national security interests after the Soviet Union had collapsed.

The dynamics of the security assistance including military assistance provided by RF to neighbouring countries namely Abkhazia (ABK), Armenia, Kazakhstan, Kirgizstan, Moldova, Tadzhikistan and South Ossetia (Khrolenko, 2019) is constant in order to prevent adversaries to get closer to RF borders and to keep them as far as possible from the strategic depth of the RF territory. Without knowledge of RF AF status and their latest military capabilities development and modernization, which is long-term priority for RF, we cannot gain any real picture about its military power, which presents main tool to promote

RF national interests beyond its territory, but still considered by RF to be sphere of its interests.

Before ruling any court on the solved scientific problem of selected aspects of conventional forces development and modernization of the Russian federation armed forces after Russian-Georgian conflict, we try to determine how it coincides with objects that are already known to us and how they differ from them. For this reason, we used the method of comparison in the research, which is of great importance in clarifying the processes of change, development and dynamics of the researched problem and the regularities of its development. In addition, qualitative methods of information analysis and synthesis were used, which are used at all stages as well as at all stages of scientific research.

1. Russian Federation Armed Forces personnel reform

Reforms undertaken after the war with Georgia prioritized a reduction in the total number of personnel in the RF AF, as well as the share of officers in it. Russia aimed to abandon a Soviet style army with a large number of understaffed "skeleton" military units for a smaller but more mobile army, which theoretically remains at a high level of permanent readiness.

Central to these reforms was the challenge of personnel fill. From 2007 to 2008, the term of conscript service in the Russian army was reduced from two years to one. Most contract (professional) soldiers were concentrated in the elite military units of the Airborne Forces and in the permanent readiness units based in the North Caucasus. Despite laws explicitly prohibiting sending conscripts into combat, some ended up on the front lines in Georgia in 2008 (Bakunin, Chizhov, 2008). Even in the North Caucasus Military District, which was the best-manned district after the wars in Chechnya, conscripts constituted a majority in many combat units. However, the Georgian conflict's brevity and success meant there was no concomitant societal outrage.

However, with a shortened term of conscript service and a limited pool to draw on, the RF Ministry of Defence proved unable to draft enough conscripts to staff even the reduced army. As a result, in 2012, instead of a planned million-person force, RF fielded fewer than 800,000 military personnel. This demonstrated that without a substantial increase in the number of contract personnel, RF AF could not be fully staffed (Nikolsky, 2012). Plans to save on personnel costs in this way were abandoned, and from 2012 onwards, the number of contract soldiers in RF AF began to grow steadily. By early 2015, for

the first time, the number of contract soldiers exceeded the number of conscripts, (Ministry of Defence, 2014) which could be considered an important watershed in the history of the modern RF AF. Starting from 2017, for the first time in Russian history, all sergeant positions were manned by contracted soldiers (Ministry of Defence, 2017c). This means that typical "*sergeant*" roles in Russian Armed Forces in section of commanders, deputy platoon commanders, armoured fighting vehicle commanders, and special vehicles driver operators (Ministry of Defence, 2016) were manned by better prepared and more experienced personnel. Conscripts were used in basic combat roles, such as a rifleman or a machine gunner, (Gerasimov, 2017, p.384) and in support units. This significant increase in the number of contract soldiers allowed Russia to avoid using conscripts in the operation to annex Crimea and in eastern Ukraine. Conscripts were not sent to Syria, either. This means that Russia is now able to conduct small and medium scale military operations, including expeditionary, solely using military professionals. They are more experienced and effective and better disciplined. Furthermore, professional military casualties are expected to result in less public anger than conscript does.

Non-commissioned officer (NCO) reform is an especially fundamental change compared to previous decades, when even in the elite military units of Special Forces and airborne troops many NCOs were ordinary conscripts. A new, professional NCO corps is intended to preserve military traditions and be the backbone of a more professional army. Such an approach is promising, but the transition is only in its fifth year, and the results are not yet clear.

Moreover, the principle of mixed staffing presents its own problems, the largest of which is unequal levels of training. For example, as of now, out of any three battalions in each regiment or brigade of the Ground Forces, only two are staffed by contract soldiers and ready for immediate action at best (Gerasimov, 2017). One of the goals of the "*New Look*" reform was to make the military units fully combat ready. However, full professionalization is beyond the horizon.

Maintaining a level of about 400,000 contract soldiers was another serious challenge for the RF MoD. After the war with Georgia and at the beginning of the reform effort, the salaries of contracted soldiers were quite competitive, allowing the army to attract hundreds of thousands of young people. However, following budgetary constraints meant that army salaries did not grow apace with national averages, and military service became less attractive.

Since January 1, 2018, the salaries of contract soldiers and officers have been increased by 4 %. The same increase was promised for 2019 and 2020

(Ministry of Defence, 2017b). However, this raise remains below official projected inflation figures. Today, the career of a professional soldier looks less attractive even for those coming from poorer, rural regions. Inadequate wages also reduced the quality of applicants, creating serious doubt, that government planned to achieve 499,200 contract soldiers by 2020 were realistic (Ministry of Defence, 2017a). However, if it is unable attract enough contract soldiers, the shortage will likely be compensated for by keeping conscript numbers at close to previous levels. Russia is currently at the bottom of a "*demographic pit*." This means that a historically low number of young men only about 600,000 reach conscript age every year. Nevertheless, drafting just 200,000-250,000 of them has proven feasible (TASS, 2018c).

The quality of personnel has increased not only through professionalization, but also thanks to an improved training system for officers and soldiers. Since 2013, large scale surprise inspections, complex two-sided tactical exercises, and major sports like army competition events such as "*Tank Biathlon*" and "*Air Darts*" have made the Russian Armed Forces much more "*fit*" and prepared for real deployment. Ammunition consumption in exercises has increased by 5-7 times compared to 2012. Fuel consumption in driver's training increased threefold (Vesti Primoria, 2014). Tempered by surprise inspections and large-scale exercises, RF military logistics have improved it dramatically, as witnessed in Syria and Ukraine.

However, the RF AF reserves have shown little improvement, owing to failed attempts to depart from the Soviet concept of a large but poorly trained reserve. Moreover, with the current reduction in the number of conscripts, the total number of available reserve soldiers is also on the decline. After the success of a small-scale pilot program in several regions, a new reform was launched in 2018 for the entire country. It makes it possible for individuals to sign a contract for reserve service that commits them to one month per year on active duty, complemented through 2-3 days training per month. The aim is to maintain highly qualified military personnel on which the Armed Forces can draw upon in times of need (Izvestia, 2018) However, even if this approach is broadened and proves effective, it is unlikely to be sufficient for a major, high-quality expansion of the Armed Forces.

To sum up, general professionalization of the Armed Forces including sergeant Corps professionalization, improved training and bringing up to 2/3 of RF AF to permanent-ready status are the most significant changes implemented through personnel reform in RF AF.

2. Russian Federation Armed Forces Command and Control

Both Soviet and Russian troops have traditionally experienced difficulties with command and control (C2), with Ground Forces, often suffering from unreliable communications and problems with navigation, especially in unfamiliar territory. This was confirmed again in 2008 during the conflict with Georgia, when the Russian forces showed extremely poor situational awareness, experienced problems with military communication, and demonstrated limited coordination between different force branches (CAST, 2010).

The government introduced major changes in the C2 system in the recent years, rebuilding it from the ground up on the strategic, operational, and tactical levels. A high-tech, joint National Defence Management Centre in Moscow replaced the Soviet era command centre of the MoD and the General Staff in 2014. It manages the entire RF AF and Strategic Nuclear Forces, oversees combat operations in real time and tracks vital everyday activities including exercises and logistics functions (TASS, 2014).

The RF AF procure several thousand units of modern communication equipment each year. In 2017 alone, they procured 4,000 pieces of strategic and operational level equipment and 49,000 tactical level devices. That same year, the FR MoD declared 58 % of its communication equipment to be new and modern (Ministry of Defence, 2017a). The new equipment made it possible to monitor strikes on important targets in Syria in real time: live video from the unmanned aerial vehicles (UAV) "*Forpost*" was streamed simultaneously at the Khmeimim headquarters and the National Defence Management Centre in Moscow.

The government created similar but smaller military control centres at each of the four military districts, which can be used as backups for the centre in Moscow. Russia plans to develop high-tech stationary and mobile command centres on the army level in the future and procure 32 *Akacia-M* mobile complexes for army's automatization by the end of 2020 (Ministry of Defence, 2018).

In 2008, military units coordinated between each other using civilian cell phones (Bakhur, 2008). For example, the war commander of Russian 58th Army struggled to establish communication with army units and was forced to use a satellite phone borrowed from a newspaper correspondent (McDermott, 2009). Since then, significant progress has been made. Elite Special Operation Forces deployed to Syria in a tactical capacity use individual sets of *Strelec* equipment.

Each soldier can receive encrypted radio communication with commanders and within units. Platoon commanders and scouts can transmit the coordinates of detected targets through digital encrypted communication channels to headquarters in real time, interact with artillery and aviation, and have access to satellite communication. This allows them to be integrated into automated control systems. Russia is actively developing its own version of the joint battlespace information system, which gathers information from different kinds of sensors and different branches of RF AF and allocates targets for the military automatically. In Syria, a few of the best trained and most well equipped fighters and staff officers were employing new communication and control equipment, but it was not clear if these systems had been mastered by more common military units in Russia. Of course, *Strelec* and *Ratnik* equipment are widely used in all major exercises, but they, and Russian command and control systems as a whole, remain untested in real, largescale combat. It brings us to conclusion that Russia's key new capabilities in C2 present a joint National Defence Management Centre with wide automatization of military operations control through improved communication equipment.

3. Unmanned and robotic vehicles

Successful development of the C2 system would have been impossible without the widespread deployment of small reconnaissance drones on tactical and operational levels. Today, drones are one of Russia's fastest growing military capabilities. Russia's extensive use of UAVs in Ukraine and Syria provides a case study of how a problem identified in the 2008 in Georgia campaign was resolved (Giles, 2017). The war with Georgia demonstrated the Russian army's catastrophic deficiency in this crucial component of modern warfare. The Russian forces used only one complex with several *Pchela-1T* UAVs during the operation, and even the official RF MoD press was forced to admit that this complex was hopelessly outdated and useless (Gettinger, 2014). The only way to gather information was via old-fashioned photographic reconnaissance undertaken by *Su-24MR* aircraft. At the same time, Georgia used several effective reconnaissance drones, including *Hermes 450* of the MALE class, which were bought from Israel.

In 2009, the RF MoD conducted comparative tests of all models of drones that were developed by Russian enterprises. That same year, the RF MoD decided to purchase two models of Israeli drones, the MALE-class *Searcher II*

and the tactical *Skylark*. In 2011, the RF MoD began to reinvest in the development of Russian drones and financed several light models.

In 2013, after a few years of research and development and testing, the RF MoD began to supply UAVs to the Ground Forces. By the end of 2015, the number of drones deployed with the troops had increased from a few dozen to 1,720 units (Ministry of Defence, 2015). This pace of development relied substantially on commercial off-the-shelf components available on the international market. The most common type of Russian light drones, the *Orlan-10*, consists almost entirely of imported components, including key parts such as its engines, video cameras, and flight control systems (Informnapalm, 2018).

As a result, a full complex of two light, truck based *Orlan-10* UAVs with payload and ground equipment costs the RF MoD only \$600,000 (zakupki.gov.ru). Even the procurement of hundreds of such UAVs is not prohibitively expensive.

The Ground Forces own the majority of the 2,000 UAVs in operation, (David, 2019) but UAVs are also increasingly being used in the navy, and several dozen small UAVs are currently employed to guard mobile launchers in the Strategic Missile Force.

Each motor rifle and tank brigade or regiment has created separate companies of tactical UAVs. Special sections for the use of unmanned vehicles now exist at brigade, division, corps, and army headquarters. With the increased use of drones, the RF Ground Forces have gained improved reconnaissance capabilities and artillery effectiveness (Lavrov, 2017). Now, drones are included in every major exercise involving RF AF artillery.

Russia can nowadays conduct real time reconnaissance at a range of up to 250 km with dozens of *Forpost* drones and hundreds of *Orlan* drones, which can monitor a range of up to 120 km. Short-range reconnaissance and fire direction using *Eleron-3* UAVs gives RF AF unprecedented situational awareness on the tactical and operational level.

Using drones in Syria was intensified by two and a half times over the course of the first two years of Russian operations, demonstrating the growing centrality of these systems to Russia's mission. Initially, UAVs carried out about 400 sorties per month, but in October 2017, at the peak of the fight against ISIS, they were used about 1,000 times. In total, Russian drones carried out 23,000 sorties with a total flight time of 140,000 hours in less than three years (Krasnaya Zvezda, 2018).

In 2011, the RF MoD began developing a family of three heavy reconnaissance and strike drones; though owing to the complexity of these projects they are far from complete. Prototypes weighing 1.2 tons ("*Orion*") and 7.6 tons ("*Altius*") performed test flights but it seems that there are years from being implemented. The pace of development of the most ambitious platform, the 20-ton strike drone "*Ohotnik*," is even slower and the prototype is not yet flight ready.

Heavy strike drones are among the most important UAV components missing from the Russian army. However, in the coming years, strike drones of heavy or at least intermediate class (such as the recently presented "*Corsair*") are likely to be employed. Russia is also working on acquiring ground "*robots*," or remotely controlled combat vehicles. Over the past few years, Russia has developed a whole line of robots, from small reconnaissance robots to massive (and futuristic) 11-ton, heavily armed *Uran-9* (Bendett, 2018).

The RF MoD is in no hurry to buy robots in large quantities. Many military robots were sent to Syria to test the concept. Combat experience with the *Uran-9* indicated that the technology is still immature (Andrei-bt.livejournal.com, 2018). However, both light and heavy unarmed robots have proven useful and their procurement has increased. Based on open sources analysis we can summarize that Russia is operating more than 2,000 light reconnaissance drones and dozens of MALE-class reconnaissance drones which can promote their functions within close integration between them and artillery systems in the battlefield. Besides that, Russia does have assortment of ground engineering robotic vehicle in the military inventory what presents the new military capabilities in possible military operations.

4. Russian Federation Land Forces

The war with Georgia showed that Soviet era land equipment was critically worn out and did not meet the requirements of modern warfare. Since that time, the RF Land Forces have received thousands of new and modernized units of armoured combat vehicles and weapons.

Despite this, the armament of Russia's Ground Forces is not significantly different than it was during the conflict in Georgia. The sheer size of the Ground Forces makes it resistant to largescale change. Even updates to uniforms required several years of effort. Replacing heavy equipment was further complicated by the fact that the Ground Forces were not made a priority in the

2010-2020 State Armament Program. As a result, by the end of 2017, only 42% of their equipment was new or modernized (Izvestia, 2017) the lowest percentage among all military branches.

The new armoured vehicles procured cannot be truly called modern. *T-72B3* tanks, *BMP3* infantry fighting vehicles, *BTR-82AM* armoured personnel carriers, and self-propelled howitzer *MSTA-S* are modernized versions of Soviet equipment. Their purchase is a temporary solution because new platforms of armoured vehicles are being tested but far from mass production. Even the modernization of Russia's significant weapon, main battle tanks, was severely limited for economic reasons. The upgraded *T-72B3*, implemented in 2011, did not receive radically increased protection or firepower capabilities relative to the baseline *T-72B* model. Analysis of their combat performance in Syria and Ukraine showed that this new modification was lacking in key areas. In 2016, Russia began using an advanced *T-72B3(M)* model, which included much better protection from cumulative ammunition strikes and additional removable armour for urban environments (Livejournal, 2017b). The protection of the *T-90A* tank used in Syria was also deemed insufficient, necessitating replacement with the newest *T-90M*, which is equipped with better armour. The first battalion of these new tanks was employed in the Ground Forces in 2018 (TASS, 2018c).

The RF MoD signed a contract to supply two battalions with experimental *Armata* main battle tanks and one battalion with heavy *T-15BMPs*, built on the *Armata* chassis, for a trial operation. Tests of about 100 vehicles will be completed not earlier than in 2020 (TASS, 2018a). Other new systems, including an infantry fighting vehicle, armoured personnel carrier, and self-propelled artillery system, are also in their trial phases.

Artillery, however, has changed more significantly than other Ground Forces weapons since the Georgian war. Suppression of the enemy with superior firepower remains a preferred tactic of the Russian Ground Forces. Because of this, Russia deploys substantially more artillery with its units than does the United States or other NATO countries (Boston – Massicot, 2017).

In Georgia, Russian regimental and brigade commanders lacked the intelligence capabilities to reconnoitre and direct artillery fire at long distances. Light and simple drones, capable of monitoring artillery for its full range of up to 120km, are now included in brigades. Additionally, target coordinates can be obtained from external sources using new automatic control systems. Thus, even basic combat structures can put these new long-range and high-power artillery capabilities to good use.

A serious enhancement of the Ground Forces' capabilities resulted from their re-equipment with new short-range ballistic missiles. In the conflict with Georgia, 20-30 old *Tochka-U* missiles were used, and nearly all were equipped with cassette warheads because of their low accuracy. The replacement of these old missiles, which only have a range of 120km, is almost finished. By the end of 2018, all 12 deployed brigades of operational-tactical missiles were fully rearmed with the new ballistic *Iskander-M* missiles, which possess a range of 500km (Livejournal, 2016). With much better accuracy, four times the range, and twice the number of ready to launch missiles in each brigade, this represents a radical improvement in the capabilities of the Russian Missile Forces.

Moreover, a new and unexpected addition to missile brigades is the *Iskander-K* model equipped with ground-based *R-500 (9M728)* cruise missiles. According to the Russian military, these missiles, although closely resembling the sea-based *Kalibr*, possess a heavier and more powerful warhead, but have a smaller range of under 500 km. The United States, however, believes that Russia has developed and deployed another cruise missile, designated the *9M729*, that could be an extended-range variation on the *Iskander-K* (Pifer – Meier, 2018). If this missile has a range of over 500km, as the United States believes, it is in violation of the 1987 Intermediate Range Nuclear Force Treaty (Gordon, 2017).

Whatever the real range, the introduction of cruise missiles into the missile brigades makes missile troops more flexible and versatile. For the first time in the post-Soviet period, Ground Forces have received long range weapons capable of delivering nonnuclear precision strikes of up to 500km against key enemy targets. This means the *Iskander* can reach targets of strategic importance in the enemy's rear area. It is also almost impossible to effectively defend against combined attack by advanced ballistic and cruise missiles (Kube, 2017).

Plans following the war with Georgia to unite the airborne troops, marines, and Spetsnaz units into a separate "*Mobile Forces*" entity were never implemented. However, airborne troops are increasingly becoming light ground troops. They have grown in numbers and have received additional armoured vehicles, including tanks. The naval infantry has also received armoured vehicles and tank companies. On their basis, a future expeditionary infantry core will be formed, capable of operating outside the country (RBC.ru, 2018).

Yet, it remains difficult to move these "*Mobile Forces*." The air transport fleet has not grown, nor has the number of amphibious ships. Thus, strategic manoeuvring by Russia's new, heavier troops is possible only by ground-based methods.

We can assume that despite all shortcomings, the Ground Forces significantly improved their permanent readiness system of the most of the forces with better operational and strategic level mobility, equipped with improved missile troops with ballistic and cruise missiles.

5. Russian Federation Aerospace Forces

In Georgia, the Russian Air Force was burdened by the obsolescence of its planes, helicopters, tactics, and weapons. For the entire duration of the conflict, Russian aircrafts used only unguided weapons, with the exception of a few anti-radar missiles. Due to poor training and a shortage of pilots, flight instructors were sent out on combat sorties.

Aviation and Ground Forces conducted effectively separate campaigns and coordination of actions between them sometimes took up to a day. There were cases of "*friendly fire*" on Russian ground troops by aircraft and of retaliation by the former. The Russian Air Forces lost six planes in five days. All of this meant that Russia's substantial numerical advantage was not translated into battlefield results.

This experience led the RF MoD to emphasize air force modernization. Operations in Syria demonstrated how radical these changes were. In a dramatic structural reform, Russia's Air Forces, Army Aviation helicopters, long-range Air Defence, and Space Forces have been combined to form the new Russian Aerospace Forces. The Aerospace Forces are responsible for all aircraft, anti-missile Defence, military space satellite launchers and maintenance of the RF MoD's entire satellite constellation. In addition, procurement changes have enabled Russia to update an entire generation of aircraft and equip forces with new models of precision weapons (Ministry of Defence, 2021).

The RF Air Force and Air Defence received the biggest share of funding from the 2010-2020 RF State Armament Program. This made it possible to update aircraft inventory by purchasing new airplanes and helicopters, rather than simply upgrading the old ones. With the influx of funds, the Russian Defence industry was able to quickly ramp up production of new aircraft and helicopters after signing contracts with the RF Ministry of Defence.

In total, Russia's Air Forces received almost 500 new combat aircrafts and more than 500 new helicopters. In addition, a few hundred older airplanes were modernized. The average share of new and modernized weapons in the Aerospace Forces reached 72.8 % (72% in the Air Force, 68% in Air Defence

Forces, and 81% in Space Forces), making this branch of forces the most advanced in the Russian military (Gavrilov, 2017).

The top priority was the purchase of new fighters. The principal innovation of *Su-30M*, *Su-35S*, *MiG-29SMT* models was multifunctionality. Air Force fighters were inherited from the USSR in the 2008 and could not be used for effective strikes against ground targets, but the new generation of fighters and bombers used in Syria were widely employed for ground strikes with unguided and precision weapons, including anti-ship missiles.

The improvement of fighter capabilities for air superiority were closely connected with the increased purchases of modern *R-77-1* medium range air-to-air missiles with active radar homing. These missiles significantly increase the capabilities of Russian fighters in beyond visual range air combat. The forces purchased and received two hundred units in 2016-2017 and have already equipped them on Russian planes in Syria (Majumdar, 2017).

In 2008, Russia's strategic long-range aviation comprised more than one hundred heavy bombers, but they had little utility in Georgia. Strategic bombers simply did not possess non-nuclear precision weapons. Thus, only denuclearized *Tu-22M3s* were sent to the theatre to strike targets with freefall bombs from low altitudes. They targeted a military airbase, army bases, and a railway station defended by Georgian troops. Yet the bombers proved to be vulnerable even to a weak Georgian Air Defence. One *Tu-22M3* was shot down (Aminov, 2008).

Over the past decade, the capabilities of strategic aviation have grown significantly. This has included the modernization of dozens of aircrafts, which are now equipped with new non-nuclear guided weapons, *X-555* cruise missiles including more accurate and low observable *X-101*. Moreover, while it still lacks guided weapons, the *Tu-22M3* has been modernized and its new computerized *Gefestsights* enable the delivery of more accurate strikes by unguided bombs from higher altitudes.

The Air Forces relocated one squadron of twelve bombers to *Mozdok* airfield in the Russian Caucasus in November 2015 and carried out flights from the base to Syria during the kinetic periods of the conflict. In total, these seemingly obsolete bombers carried out more than one hundred and forty sorties. *Tu-22M3* continues to be the most common type of long-range aviation aircraft used by the Russian military, mainly because it is cheaper to use than larger strategic missile carriers are. After the use of *Tu-22M3s* in Syria, the RF MoD decided to extend the life of these aircraft by upgrading and equipping them with new cruise missiles (Ramm, 2017) The *Tu-22M3* will also be able to carry the newest hypersonic *Kinzhal*

missiles (TASS, 2018b). These new weapons will greatly increase the combat capabilities of long-range aviation in conventional nonnuclear conflicts without increasing the number of airplanes.

While in the process of purchasing new aircraft, much less attention was given by the RF MoD to high precision weapons for aviation. The main armament of Russian aviation consists of unguided "*dumb*" bombs and various cluster munitions. Although the RF MoD never disclosed how many smart weapons were used, we can estimate that the ratio of guided to unguided systems used by Russia in Syria is likely somewhere between that of U.S. Air Forces in Operation Desert Storm against Iraq in 1991 and that of allied forces against Yugoslavia in 1999.

According to media reports, development and procurement of smart ammunition became one of the top priorities in the new State Armament Program for 2018-2027, and should improve the situation significantly (TASS, 2017).

Russian air Defence was minimally active in the conflict with Georgia, but the air Defence inventory has also been substantially updated. Aerospace Forces received 44 battalions of new *S-400* anti-aircraft missile systems, allowing them to rearm 18 regiments and 1 training unit (Livejournal, 2017a).

Part of the reform aimed to increase the space capabilities of the Aerospace Forces, and they now also control the military satellite constellation. At the time of the war with Georgia, Russia did not have a single active optical reconnaissance satellite in the Earth's orbit, after the last Soviet satellite failed in the early 2000's. However, the new army command and control system demanded better satellite communications, a fully functioning GLONASS satellite navigation system, and potent satellite reconnaissance.

The Aerospace Forces used more than 10 remote sensing satellites from the first days of military operations in Syria (O'Connor, 2017). The restoration of the *GLONASS* satellite constellation is among the most important recent achievements of the Aerospace Forces. Twenty-four operational satellites in orbit are necessary for Russia's *NAVSTAR* GPS to be fully available around the globe.

Comparing the results of military operations in Georgia and Syria, we can see that a fully functioning satellite navigation system allows Russia to use more precision weapons.

All new long-range air, sea, and land-based cruise missiles, ballistic missiles of small and intercontinental range, drones, and command and control systems rely on it.

Thus, the key new capabilities for the Aerospace Forces presents acquisition hundreds of new aircraft, non-nuclear cruise missiles as well as new generation of precision weapons for tactical aviation and functioning communication and navigation satellite constellation.

6. Russian Federation Naval Forces

Almost the entire Russian Black Sea Fleet, including small antisubmarine corvettes and even minesweepers, was involved in the conflict with Georgia. The only sea skirmish with small Georgian ships ended without results, but the surprise landing of Russian paratroopers by three large amphibious assault ships on Abkhazia's beach had a major effect on the strategic situation on the ground.

Despite this, the Russian Navy proved of little value for supporting ground operations. Despite its impressive numbers, it was useless to the Ground Forces except for small-scale tactical assault landing or, perhaps, for creating an air Defence "umbrella" in the coastal regions. This might be among the reasons the navy was prioritized in the State Armament Program for 2010-2020 with 23,4 % of all expenses allocated to fleet modernization. This included plans for the construction of sixteen submarines, eight of them nuclear, and fifty one large surface ships over ten years (Pukhov, 2012).

However, the shipbuilding industry proved unprepared to fulfil such a large order on time. As of May 2018, the ambitious plan remains largely unfulfilled. The navy has received only ten submarines, four of them nuclear, and sixteen surface ships (four frigates, four corvettes, and eight small rocket and artillery ships). There were no indications that by 2020 there would be major improvements or that the rest of planned ships will be completed. Plans for the modernization and overhaul of combat ships seems to be also unsuccessful.

Repair delays and the decommissioning of old ships has meant that in the 12 years that have passed since the war with Georgia, the capabilities of the Russian ocean going, blue water navy have only decreased. During this time, Russia has not received a single new surface combatant of destroyer class or larger, and frigates are the biggest combat ships in the new State Armament Program for 2018-2027.

The navy has played a large role in Syria. From October 2015 to January 2018, Navy ships carried out more than one hundred cruise missile strikes against ground targets, some of them from up to 1,500 km away (Gavrilenko, 2018). The

launches were initiated from both the Mediterranean Sea and the Caspian Sea, a substantial distance from the zone of combat operations.

However, the slow pace of naval upgrades means that most of the major Russian surface combatants are legacy ships lacking weapons capable of delivering strikes far from the coast. All strikes were made from a small number of new corvettes and frigates armed with cruise missiles.

Thus, the only major improvements since 2008 are the deployment of small ships capable of launching ground attack strikes and the *Kalibr* anti-ship cruise missile. Never before have small Russian corvettes (small rocket ship in the Russian classification) or diesel submarines possessed such a long-range weapon (up to 2000 km).

These low-noise and low-cost diesel submarines, with a powerful combination of torpedoes and cruise missiles, are very effective in the coastal regions of Russia. The Black Sea Fleet has already received six *Project 636.3* (Improved *Kilo*) submarines, and Russia plans to build six more for the Pacific Fleet.

This preference for small ships and submarines indicates an unspoken gradual transformation of the Russian fleet from oceangoing "*blue-water*" ambitions to acceptance of a more realistic coastal "*green-water*" navy. The current State Armament Program (until 2027) focuses on small ships and is more realistic in this regard than its predecessor. It includes an order to build more than two dozen additional light missile corvettes in a few years for all navy fleets (Kommersant, 2017). At the same time, plans for large combat units, the size of a destroyer or larger, have been postponed for the period after 2035 (Svobodnaya Pressa, 2018) according to the Shipbuilding Strategy published in 2018.

As in other branches of the Armed Forces, expenditures for navy training and exercises have significantly increased. If the number of large ships of the Russian Navy has not increased since the war with Georgia, the existing ones have become more active and visible. From 2012 to 2018, the total number of days spent at sea by navy ships has doubled and the average duration of deployment for ships and submarines has increased by one-third (Gavrilenko, 2018). Russia is also "*showing the flag*" with ship visits to foreign ports.

Naval aviation deserves a separate discussion. By 2008, it had degraded to a completely helpless state and further weakened in the years that followed. In 2012, almost all strike aviation regiments were transferred from the navy to the Aerospace Forces. The fleet lost all its long-range *Tu-22M3s* with anti-ship

missiles, which had previously been used to attack naval targets, including carrier battle groups (Kofman, 2017).

In 2014, following a change of the defence minister and the beginning of conflict in Ukraine, the concept of fleet aviation changed again. New aviation units were formed, and Russia began to procure new aircraft and helicopters. But there are no plans to return *Tu-22M3s* to the navy. They have been moved to Russia's Strategic Forces (Sputnik, 2016).

For the only Russian aircraft carrier, a second carrier regiment was created. The first 279th Naval Air Regiment was equipped with roughly 15 *Su-33* heavy fighters but plan was to change it for twenty *MiG 29K* and four *MiG 29KUB*. These have not been produced in quite some time and remain outdated, despite some modernizations. From 2013 to 2015, the newly formed 100th Naval Air Regiment received twenty new *MiG-29K* naval fighters and four more in the *MiG-29KUB* two-seat training configuration (Navy Recognition, 2015).

In the fall of 2016, the Russian aircraft carrier Admiral Kuznetsov was deployed to the shores of Syria. The Kuznetsov's air wing consisted of all three types of Russian deck fighters from both regiments. However, this deployment was something of a disappointment. The *Su-33* could use only unguided and cluster munitions. For the few new *MiG-29Ks*, dispatch to Syria was more a trial exercise than a true combat deployment, though they were equipped with *KAB-500Kr* guided bombs. This was the first time that Russia's deck aviation was able to deliver precision strikes on the ground, albeit from a short distance. In total, only 154 sorties from the deck of the aircraft carrier were made, and one *Su-33* and one *MiG-29KUB* were lost in air accidents (Lavrov, 2018).

The State Armament Program for 2010-2020 allocated significant resources to enhancing Russia's fleet and deck aircraft. However, deployment in Syria has not confirmed the effectiveness of Russian carrier aviation. The 2018-2027 program is not so generous. It does not budget for the construction of new aircraft carriers. The small, non-nuclear Admiral Kuznetsov will remain the only carrier at the disposal of the Russian navy for the near future.

The only bright spot for carrier aviation from its deployment was the new *MiG-29K* fighters. After *Admiral Kuznetsov* undertakes an overhaul in 2021, these fighters will be more combat ready and will form the backbone of the air wing. With the help of their wide array of guided air-to-ground and air-to-surface weapons, *Admiral Kuznetsov* will get some real strike power. An important decision was made to equip coast-based navy aviation with new multipurpose fighters and drones. Plans call for the procurement of 50 *Su-30SM* by 2020 for the

Black and Baltic Fleets (Navy Recognition, 2015). They will be used for both fighter and attack regiments.

The Crimea-based 43rd Assault Regiment has already begun training with anti-ship X-35 missiles. Equipped with these missiles, which have a range up to 260 km, fighters can to some extent replace the regiments of the *Tu-22M3* lost by the navy. Naval *Su-30SMs* were actively used in Syria and successfully sunk a practice target of a decommissioned Syrian destroyer (Melnikov, 2018). The navy is second only to the army in its stock of unmanned aerial vehicles. Within each fleet, coastal battalions possess medium and short-range *Forpost* and *Orlan-10* UAVs. With their help, fleets will be better able to detect land and sea targets and adjust artillery and missile fire from ships. A ship-launched *Katran* rotary-wing (UAV) is under development (Novichkov, 2018). A series of naval exercises using drones started in 2017 (*Red Star*, 2017), but even before that, Naval drones were actively used in Syria to support aerospace force operations. When the development of heavy reconnaissance drones of the MALE class is completed, the fleet to monitor the seas and detect ground targets will use them. To summarize, the key new capabilities for the modern Russian Naval Forces we can consider non-nuclear long-range cruise missiles capable of attacking land targets, multifunctional small corvettes and diesel submarines as well as supersonic anti-ship missiles and multifunctional fighters with precision strike capabilities.

Conclusion

A decade of Armed Forces reforms followed the war with Georgia emphasized structural changes and mass re-equipment of all branches with new and modernized weapons implementation. Now, Russia must master its new capabilities. Even though Russia's Defence spending and pace of procurement of new armaments has slowed, the overall capabilities of the Russian Armed Forces will continue to grow as Russia makes more efficient use of available resources. Qualitative improvements of the Russian Armed Forces have already been numerous, better personnel, new command and control system, modern communication equipment as well as significantly improved situational awareness and introduction of precise weapons in all branches of Armed Forces presents changes and look impressive. Over the past five years, the share of modern weapons in the Armed Forces has quadrupled to almost 59%.

In addition, the number of contract soldiers exceeds one third of all personnel. However, success cannot be taken for granted. During rearmament, Russia has faced serious problems in transitioning to fundamentally new generations of armaments from those inherited from the USSR. This has been especially noticeable in the RF Naval Forces and in the Land Forces. To continue successfully modernizing its Armed Forces, Russia will have to overcome several key challenges in order to recruit enough qualified personnel, resolve budget and financial constraints as well as demonstrate the ability of the Defence industry to innovate and produce new types of weapons despite international sanctions and restrictions on access to financial resources.

Even with all the positive changes of the past decade, there are areas in which Russia still lacks key military capabilities. Perhaps the most importantly, it remains substantially limited in its ability to project force over long distances. Certainly, Russia's navy cannot deliver this capability. Aside from the problems described above, Russia faces a gap when it comes to amphibious assault ships. Behind them is an adventure with France's *Mistral* project, the sale that was blocked after the start of the Ukraine crisis. There is no replacement or plan B. The *Ivan Green*-class of landing ships will not solve the problem. It is inferior to *Mistrals*, moreover, its slow pace of construction means that Russia will not even be able to replace its current fleet of landing crafts, which is worn out from Syria.

Nor the strategic airlift is sufficient. Plans to restart production of *Ilyushin Il-76* transport planes have faced heavy delays. Moreover, there is no replacement for the strategic *Antonov An-124* and *An-22* military transports in sight since the breakdown of relations with Ukraine. The shortage of the *Antonovs* is especially damaging to Russia's capability to move heavy military equipment such as tanks and long-range Air Defence Systems.

Russia's ability to project force is further limited by a shortage of tanker aircraft. Their number has not increased in a decade and is sufficient for neither tactical nor long-range aviation. Russia also does not possess heavy reconnaissance or strike drones able to operate on distances of more than a few hundred kilometres. Finally, Russia lacks a sizeable number of overseas military bases, which might otherwise mitigate this deficiency of power projection tools.

These air and maritime logistics gaps will severely limit the expeditionary capabilities of the Russian military in regions that do not have land links to mainland Russian territory. As a result, Russian capacity to project force into the far abroad remains extremely limited and will not grow significantly in the near future. Moreover, although a significant improvement in Russia's military

capabilities after the war with Georgia have not changed the overall strategic balance of power. Russian forces remain inferior in all quantitative indicators not only to the NATO bloc but also to China. Even modernized conventional weapons, which are now massively procured, are often technologically inferior to their counterparts in the arsenals of advanced NATO countries (tanks are one example). The bottom line is that Russia today is an even more formidable regional military force than before, but it is still not a global one. Russia's Armed Forces are perfectly shaped to protect its territory and project power nearby, but as distance from the border increases, Russian military capability declines.

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