



## The Russian Army: Organization and Modernization

Aleksei Ramm

Military Commentator at the Izvestia Multimedia Information Center, Moscow

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## Abstract

In this CNA occasional paper, Aleksei Ramm, one of Russia's leading military journalists, discusses the evolution and modernization of the Russian Army over the past decade. This report examines the major reforms that redefined the Army's mission and capabilities, including the dramatic reconfiguration of the service's organizational relationships and management system and the extensive modernization of weaponry, C4ISR, and other capabilities. The paper outlines the evolution of Russian Army military technology and the associated changes in how the ground forces execute their tactics, techniques, and procedures today. The report also discusses the implications of these changes for the future operational readiness of the Russian military.

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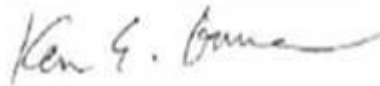
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Approved by:

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Ken Gause, Research Program Director  
Adversary Analytics Program  
Strategy, Policy, Plans & Programs Division

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# Contents

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<b>The Russian Army: An Overview</b> .....	<b>1</b>
The Russian Army Mission and Role within the Armed Forces.....	1
Joint and Combined Teams .....	3
The Modern Russian Army: From “New Look” Brigades to Gerasimov’s Divisions .....	8
Combined Arms Army .....	11
Division and Regiment .....	19
<i>What is in the division asset?</i> .....	21
<i>Battalion Task Force</i> .....	24
<i>Brigades</i> .....	25
<b>Evolution of Firepower, C4I, and Unmanned Systems</b> .....	<b>28</b>
Command, Control, Communications, and Intelligence .....	28
C4 and Changes to the Organization.....	33
C4 Future .....	36
Unmanned Aerial Systems.....	36
Reconnaissance and Fire Contour.....	38
<b>Lessons Learned in Syria in the Army Evolution</b> .....	<b>45</b>
What Do the Lessons Learned in Syria Really Mean?.....	45
Promotion to District Commander.....	47
Firepower, Summarizing the Foregoing.....	48
<b>Figures</b> .....	<b>52</b>
<b>Abbreviations</b> .....	<b>53</b>

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# The Russian Army: An Overview

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In Russia, the Army has traditionally been the leading branch of the military. It has been, and remains, numerically the largest service in terms of personnel, weapons, and military equipment. According to Russian military doctrine, the Army's primary mission is to repel enemy aggression in the continental theater of military operations, protecting territorial integrity and securing national interests.

Over the past decade, the Russian Army has undergone two major reforms: a dramatic redefinition of the service's organizational relationships and system of management, together with extensive modernization of capabilities, from weapons to command and control (C2). This process of reorganization, shaped heavily by the armed forces' experience in Syria, is now almost complete. A new C2 system has finally emerged, referred to as a "distributed" architecture in Russian military parlance. During a time of war, the Army plans to employ mission-tailored combat groupings to replace the traditional *brigade-division-field army* hierarchy.

This new structure emphasizes the integration of unmanned aerial systems (UASs) and automated C3-C4IS (Command, Control, Communications, Computer, Intelligence, and Satellites) in its structure and working relationships. The latter, C3-C4IS, is an essential battlefield and theatre command component. Moreover, the troops have significantly increased the firepower brought to the battlefield. Combining C4ISs and UASs, Russian commanders utilize an effective engagement mechanism to defeat any target by artillery fire or missile strike in real time, which will be discussed later as recon-fire and recon-strike loops.

## The Russian Army Mission and Role within the Armed Forces

According to field manuals, the Army accomplishes its mission by defeating the enemy in a so-called *combined arms* operation, which is defined as "the combined, or joint, operation of Army combat, combat support, and combat service support formations, aviation, and, when in the coastal areas, Navy vessels. These coordinate their effort on time and place to accomplish a

mission via joint concept and operation planning.”<sup>1</sup> The concept of *combined arms* operations places emphasis on armored and motorized infantry formations.

The Syria campaign was influential in developing these concepts, even if it was mainly fought by the Russian Aerospace Forces, with support from the Navy. Russian media extensively covered air strikes and cruise missile launches by submarines and surface warships. Nevertheless, it was the Russian Army that received more medals and honors than its sister services. The Army also suffered the majority of battle deaths in the course of the campaign. Lieutenant-General Valery Asapov, Chief of Staff of the Russian Armed Forces in Syria, was killed in the Euphrates crossing by government troops on September 23, 2017.<sup>2</sup> Prior to the Middle East, he was in charge of the 5th Combined Arms Army stationed in the Eastern Military District. In late 2016, Colonel Ruslan Galitsky, a military advisor to the Syrian army, died in Aleppo.<sup>3</sup> Before Syria, he served as Commander of the 5th Armored Brigade in the Eastern Military District.

At present, the Russian armed forces are undergoing what has been termed an Army occupation. Army combined arms officers are occupying key positions with important authorities across the military. Colonel-General Sergei Surovikin, the former Commander of the Eastern Military District, was appointed Commander-in-Chief of the Aerospace Forces. He is an iconic combined arms officer, who has gone throughout the entire chain of command—from Infantry Platoon Leader to Division, Combined Arms Army, and Military District Command. Recently there is word that Lieutenant-General Oleg Makarevich may be appointed Commander-in-Chief of the Navy.<sup>4</sup> Like Sergei Surovikin, he commanded the 42nd Guards Infantry Division (Republic of Chechnya) and a Combined Arms Army. General Makarevich then served as Superintendent of the Combined Arms Academy, an Army educational institution that provides graduate-level instruction to senior military officers.

Successful leadership of the Russian contingent in Syria is logically the reason for these appointments of Sergey Surovikin and Oleg Makarevich. Thus, General Surovikin, a long-standing commander of the Russian Armed Forces in Syria, led a successful advance from

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<sup>1</sup> “Общевойсковой бой,” Министерство обороны Российской Федерации (Минобороны России) <http://encyclopedia.mil.ru/encyclopedia/dictionary/details.htm?id=7346@morfDictionary>.

<sup>2</sup> *Генерал-лейтенант Асапов погиб при обстреле в Сирии*: NTV25, Sep. 24, 2019), Video.

<sup>3</sup> “Погибшего в Сирии полковника Галицкого похоронили под Москвой,” Mir 24, Dec. 10, 2016, <https://mir24.tv/news/15434089>.

<sup>4</sup> Роман Крецул et al., “Генералы песчаной карьеры: в армии стартует масштабная ротация руководства,” *Izvestia*, Feb. 14, 2019, <https://iz.ru/845320/roman-kretcul-aleksei-kozachenko-aleksei-ramm-andrei-fedorov/general-y-peschanoi-karery-v-armii-startuet-masshtabnaia-rotatciia-rukovodstva>.

Palmyra to Deir ez-Zor and crossed the Euphrates River. In the course of the Syrian campaign, key command positions were occupied by combined arms officers and generals. They were responsible for both the supervision of their troops and operation planning. In recent months, Russian media reported a deployment of military specialists to Venezuela, another grouping led by an army combined arms officer, Colonel General Vasily Tonkoshkurov,<sup>5</sup> who currently holds the position of the Chief of Staff of the Army.

## Joint and Combined Teams

Presently, Russia has nearly completed a reform of its central military administration authorities and military districts. This reorganization has clarified the independent authorities of the Army High Command versus those of military districts. The High Command of the Army is currently responsible for doctrine, military policy, and weapons procurement for combined arms formations throughout the organizational chart, which spans from a unit section all the way to a combined arms army (in between are the intermediate units—platoon, company, regiment, independent battalion, brigade, division, and corps). Yet it has no authority to give a direct order to the troops because the chain of command goes through the military district (see Figure 1). The High Command has a few direct reporting units, including training centers and military schools (institutes, schools, and academies).

Meanwhile the military district is in charge of combat employment and field training of its subordinate combined arms formations. Each district currently comprises several combined arms armies—from two to four per district. Some districts also field army corps and independent combined arms divisions or brigades.<sup>6</sup> The only exception is the Northern Fleet Strategic and Operational Command, which incorporates brigades and divisions of surface ships and submarines. However, the rise of military formations in the Arctic region will inevitably increase the role of combined arms units in the Northern Fleet.<sup>7</sup>

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<sup>5</sup> Иван Апулеев, “«Ничего загадочного»: российские военные прилетели в Венесуэлу,” *Газета.Ru*, Mar. 24, 2019, <https://www.gazeta.ru/army/2019/03/24/12263425.shtml>.

<sup>6</sup> “Положение о военном округе Вооруженных Сил Российской Федерации,” Министерство обороны Российской Федерации (Минобороны России), Nov. 17, 2011, [https://doc.mil.ru/documents/extended\\_search/more.htm?id=10801103@morfNPAProject](https://doc.mil.ru/documents/extended_search/more.htm?id=10801103@morfNPAProject).

<sup>7</sup> “Структура Северного Флота,” Министерство обороны Российской Федерации (Минобороны России), <https://structure.mil.ru/structure/okruga/north/structure.htm>.



Figure 1. Structure of the Russian Ministry of Defense as of 2016



Source: Lester W. Grau and Charles K. Bartles.<sup>8</sup>

The Division, the Corps, and the Combined Arms Army are the backbone of the military district and its principal strike force. These formations are employed to create **joint** and **combined teams**, the concepts often encountered in public sources and writing discussing modern

<sup>8</sup> Lester W. Grau and Charles K. Bartles, *The Russian Way of War*, Foreign Military Studies Office, 2016, <https://www.armyupress.army.mil/Portals/7/Hot%20Spots/Documents/Russia/2017-07-The-Russian-Way-of-War-Grau-Bartles.pdf>.



Armed Forces of the Russian Federation. Yet, what are these so-called **joint** and **combined teams**?

The **combined team**<sup>9</sup> is a **temporary** formation that incorporates the troops of various combat and combat support arms. The combined arms brigade, or division, is the centerpiece of a joint team. It is mission reinforced with field artillery, UASs, engineers, electronic warfare, and the like, as well as air defense battalions, both fixed wing and rotary wing squadrons. The division or brigade staff leads the team planning and coordinates its effort. Each combined arms division activates its so-called **division assets**: regiments (field artillery, air defense) and independent battalions (military intelligence, engineer, etc.), which, as part of the combined team, provide combat and combat service support.

Unlike the combined team, the **joint team**<sup>10</sup> is either **temporary** or **permanent**. It is a larger formation activated on the basis of a combined arms army, which includes electronic warfare brigades, aviation divisions and regiments, and other formations. Each joint team leverages the so-called **army assets**: formations directly subordinate to the combined arms army. The assets incorporate field artillery, air defense, missile, military intelligence, and command brigades. These army assets, as in the case of the division, are tasked with combat and combat service support of the joint team. The Aerospace Force contributes its regiments and independent squadrons to the joint team. As can be discerned from exercises, these are typically army aviation and close air support regiments, along with independent Su-30SM/Su-34 fighter and Su-24 tactical bomber squadrons. Any joint team generally adopts several squadrons of attack and transport helicopters, together with tactical aviation.

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<sup>9</sup> “В Туве завершилось учение с горной мотострелковой бригадой Центрального военного округа,” Министерство обороны Российской Федерации (Минобороны России), Nov. 16, 2018, <https://syria.mil.ru/news/more.htm?id=12200038@egNews&>.

<sup>10</sup> “В Каспийске создана основа межвидовой группировки войск ЮВО,” Zvezda, Dec. 5, 2018, <https://tvzvezda.ru/news/forces/content/201812051641-mil-ru-ismi5.html>.

Figure 2. A combination of tanks and helicopter gunships drastically increases combined arms firepower



Source: Russian Defense Ministry.<sup>11</sup>

The Navy contributes to the joint and combined teams with its fast attack and assault landing craft, frigates, and diesel-electric submarines. These support combined arms formations with amphibious assault and fire support, while defending the coastline.

<sup>11</sup> “Под Таганрогом проведена генеральная тренировка динамического показа боевых возможностей военной техники на форуме «Армия-2019» в Ростовской области,” Министерство обороны Российской Федерации (Минобороны России), Jun. 26, 2019, [http://mil.ru/army2019/news/more.htm?id=12238592@egNews&\\_print=true](http://mil.ru/army2019/news/more.htm?id=12238592@egNews&_print=true).

Joint teams are either **operational**<sup>12</sup> or **strategic**.<sup>13</sup> To put it simply, the **operational** level team encompasses one combined arms army and its asset. The C4IS is provided by the combined arms army staff. The **strategic** level team includes **several operational ones**. The C4IS is provided by the military district's wartime leadership, which is the Joint Strategic Command (OSK).<sup>14</sup>

Alongside joint teams based on Army assets, the Joint Strategic Command uses independent Navy and Aerospace Force task-organized groupings. When the command (OSK) is conducting an offensive, operational joint teams, reinforced by Navy vessels and aviation, break enemy defenses and exploit their success. At the same time, an independent Aerospace Force team gains air superiority and an independent Navy team,<sup>15</sup> when nearby the relevant coast, provides dominance at sea.

The Russian contingent in Syria is a textbook example of a joint team that comprises Aerospace Force and Navy elements, combined arms and electronic warfare formations, the marines, airborne troops, and so on. At different stages of the Syrian campaign, the team could be considered operational or strategic in nature. Russia's experience in Syria has influenced thinking on the composition of said joint and combined teams. Earlier in exercises and maneuvers, these temporary formations were activated by a single military district. Today exercises reveal that the combined arms army staff (and the Army assets supplied) may come from one district, while the combined arms formations are supplied by the command of a different district. There are also experiments to activate two or three joint teams from a single combined arms army command staff and component units.

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<sup>12</sup>During the exercise, military groupings and units worked out the issues of deployment into predetermined areas and the organization and support of multi-type force groupings (forces) in preparing and executing coastal defense operations. See: "Стратегическое командно-штабное учение «Восток-2014»," Министерство обороны Российской Федерации (Минобороны России), Sep. 19, 2014, [https://function.mil.ru/news\\_page/country/more.htm?id=11982843@egNews](https://function.mil.ru/news_page/country/more.htm?id=11982843@egNews).

<sup>13</sup>(«Созданы межвидовые группировки на стратегических направлениях») "В Москве состоялось расширенное заседание Коллегии Министерства обороны Российской Федерации," Министерство обороны Российской Федерации (Минобороны России) Feb. 27, 2013, <http://mil.ru/mcis/news/more.htm?id=11650595@egNews>.

<sup>14</sup> «повышение боевых возможностей межвидовых группировок войск военных округов» (enhancing the combat capabilities of interspecific groupings of troops in military districts) "Начальник Генштаба ВС РФ генерал армии Валерий Герасимов встретился с представителями военно-дипломатического корпуса," Министерство обороны Российской Федерации (Минобороны России), Dec. 14, 2015, <https://stat.mil.ru/elections/news/more.htm?id=12071701@egNews&>.

<sup>15</sup> "Разнородная группировка кораблей Каспийской флотилии отработала вопросы борьбы с терроризмом в море," Министерство обороны Российской Федерации (Минобороны России), Sep. 17, 2015, <http://economy.mil.ru/economy/news/more.htm?id=12056490@egNews>.

## The Modern Russian Army: From “New Look” Brigades to Gerasimov’s Divisions

Over the past decade, the Russian Army has undergone several complex transformations. These began with the so-called “New Look”—the reform proclaimed by Russia’s former Defense Minister Anatoly Serdyukov and Army General Nikolai Makarov, the then-Chief of General Staff. Today some military experts and journalists attribute Russia’s military success in Crimea and Syria to the Makarov-Serdyukov reform. Yet, in this author’s opinion, such assertions ring hollow.

The New Look reforms were initiated after the Russo-Georgian conflict in late August 2008. Although the Russian army proved successful, the war revealed quite a large number of deficiencies, failures, and challenges to be addressed. The most visible problem was poor coordination between various combat arms and branches.<sup>16</sup> In fact, the Air Force and the Army’s combined arms formations conducted their own separate wars. Electronic warfare systems effectively suppressed Georgian communications but also seriously hindered the ability of Russian troops to communicate in South Ossetia.<sup>17</sup> Meanwhile, the Air Force suffered severe and significant losses from friendly fire inflicted by its own ground forces.

Subsequently, the Ministry of Defense declared two central aims for the New Look reforms: development of a new C2 system, together with transition to fully manned deployable military formations. These initial changes resulted in a three-level C2 system. The first level comprised the General Staff, the second a military district, and the third a combined arms brigade.<sup>18</sup> The new chain of command lacked the *division-combined arms army* level. What previously constituted army assets became subordinated to the military district itself. During a period of threatened conflict, several operational-level teams were to be fielded. Each team, as envisioned during that reform phase, encompassed several brigades and support units led by a temporary staff, which itself was to be activated from the military district command.

Yet the first military exercise following this reform, Caucasus 2009 (held in the summer of 2009), demonstrated the system’s ineffectiveness. The military district command failed to

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<sup>16</sup> Michael Kofman, “Russian Performance in the Russo-Georgian War Revisited,” War on the Rocks, Sep. 4, 2018, <https://warontherocks.com/2018/09/russian-performance-in-the-russo-georgian-war-revisited/>.

<sup>17</sup> «Наземные станции Сухопутных войск ВС РФ одинаково эффективно подавляли линии связи – как грузинские, так и собственных войск.» (Russian Armed Forces’ Ground stations were equally effective in suppressing communication lines - both Georgian and their own.) Алексей Рамм, “Электронная война – мифы и правда — часть II,” ВПК, Oct. 5, 2015, <https://vpk-news.ru/articles/27410>.

<sup>18</sup> Дмитрий Болтенков et al., “Реформирование Сухопутных войск Российской Федерации”, in *Новая Армия России*, ed. М. Барабанов (Moscow: ЦАСТ, 2010).

simultaneously activate the required number of temporary staffs. Therefore, the idea to deactivate combined arms armies was dismissed in favor of their replacement with *operational commands*. Subsequent exercises under this concept also showed that they were unable to properly cope with their mission and associated tasks. Hence, the New Look reforms were sharply rebuked by both officers and civilians.

In autumn 2012, a corruption scandal led to the dismissals of Minister of Defense Anatoly Serdyukov and Chief of General Staff Nikolai Makarov. Sergei Shoigu took control of the Defense Ministry, and Colonel General Valery Gerasimov took over as Chief of General Staff. In 2013 Gerasimov became the mastermind behind a new military reform launched in the Ministry of Defense to address the criticisms levied against the New Look reforms of 2008 through 2012. It is widely believed that Gerasimov's policies simply abolished the most unpopular decisions made by the former Minister of Defense, such as Serdyukov's decision to deactivate divisions and regiments and replace them with numerous brigades. Hence, Gerasimov's changes were nicknamed the Ultra-New Look, suggesting continuity.<sup>19</sup>

The new leadership was keen to emphasize the reasoning behind their policies: "In order not to repeat the past mistakes, changes should be carefully and thoughtfully considered and pondered." Their first decision was to reactivate combined arms divisions, initiated personally by Russian President Vladimir Putin. His address to the Federal Assembly of May 2013 declared the revival of the Tamanskaya and Kantemirovskaya Divisions,<sup>20</sup> which under the New Look reform had been reorganized into brigades. To emphasize some of the unpopular choices made by Serdyukov and Makarov, the reorganization had struck the most storied armored regiment in the Soviet and Russian Army—the 1st Chertkovsky Guards Armored Regiment, named after Soviet Marshal M. Katukov. The regiment, bestowed with the Orders of Lenin (twice), Red Banner, Suvorov, Kutuzov, and Bogdan Khmel'nitsky, was disbanded with its colors and legacy and transitioned to the 8th Mountain Infantry Brigade of the Southern Military District. Ironically, that brigade actually fielded no tanks.<sup>21</sup>

The choices made during the New Look reforms were ultimately tested in Crimea and during the deployment along the Ukrainian border in 2014. Gerasimov's efforts to change the military once more had not yet gained momentum, in part because of the resources required to effect them. Russian troops participating in operations of 2014 utilized the dysfunctional force

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<sup>19</sup> Алексей Рамм, "Сверхновый облик Сухопутных войск," *ВПК*, Sep. 9, 2013, <https://www.vpk-news.ru/articles/17376>.

<sup>20</sup> "В России воссозданы Таманская и Кантемировская дивизии," *TASS*, May 4, 2013, <https://tass.ru/arhiv/522424>.

<sup>21</sup> Николай Сурков, "Первые «Арматы» получают таманцы," *Izvestia*, May 12, 2017, <https://iz.ru/news/704000>.

structure and operation planning inherited from the New Look. The Russian operation in Crimea was widely considered a success. During the annexation of Crimea, the Army rapidly deployed two large combat teams along the Ukrainian border in the Belgorod and Rostov regions. Problems emerged, however, when the Army was tasked to force-generate these two combat groupings. In April 2014, four combined arms regiments and 27 battalion tactical groups were deployed along the border. These numerically significant formations were under command of the 58th and 20th Combined Arms Armies, representing the Western and Southern Military Districts.<sup>22</sup> As anticipated, running such a large number of troops turned out to be problematic. There were visible logistical challenges to keeping these units in the field because neither the armies nor the military districts had the necessary amount of combat service support elements.

When these combat formations were subsequently employed, the two combined arms army staffs and military districts faced serious challenges in command and control. In addition to supplies and maintenance, they were tasked with communications, intelligence, and other requisite missions. The concerns and criticisms sounded at the onset of the New Look reforms back in 2009 finally came true. The war plunged Russian troops into command chaos. They failed to execute joint operation plans. Moreover, when analyzing what happened, we should keep in mind that the New Look had initially envisioned the complete deactivation of combined army staffs. If that plan had been put into action in 2009, the Western and Southern Military Districts would have saddled themselves with command over the entire cross-border force.<sup>23</sup>

In 2014, the General Staff had to improvise to overcome the situation at hand. The Chief of General Staff personally activated several temporary operational division staffs. These were manned by officers from various military districts and combined arms armies. The Russian-Ukrainian border area was divided into several sectors, each coordinated and supervised by an operational staff that directly supervised combat service support, communications, military intelligence, and unmanned aircraft. During operations, the staff responsible took command over assigned combined arms unit brigades, battalion task forces, and field artillery elements. If fighting shifted to a different sector, these formations were reassigned to the responsible operational staff. The lessons from this experience in 2014 led to another reorganization process, when the Russian government green-lighted Gerasimov's ideas for a second reform.

What is the essence of the new reform? It puts an emphasis on a combined arms army-division level. These become “motherboards” (to borrow from IT terminology) that then activate various RAM and sound and graphics adapters—which in this case are combined arms

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<sup>22</sup> Михаил Барабанов, “Принуждение к миру-2: ближайшая перспектива России на Украине,” *Однако*, Dec. 2014-Jan. 2015, <http://www.odnako.org/almanac/material/prinuzhdenie-k-miru-2-blizhayshaya-perspektiva-rossii-na-ukraine/>.

<sup>23</sup> Алексей Рамм, “Проверка Украиной,” *ВПК*, Apr. 27, 2015, <http://vpk-news.ru/articles/25027>.



formations. That said, the division and army staffs are not empty. As mentioned earlier, they retain standing combat support and combat service support elements. The new system, termed “distributed” among the military, marks a paradigm shift in the Soviet and Russian military school. The Soviet army traditionally relied on an ironclad force organization with a fixed organizational structure. Today, only the army-level assets retain a sense of permanent organization.

To demonstrate this newfound flexibility in force structure, we can compare and contrast the 49th Combined Arms and the 1st Armored Armies, both of which have a deployable army set. The 1st Army uses several infantry and armored divisions and brigades, whereas its counterpart from the North Caucasus has just two combined arms brigades, one of which is designated as a mountain infantry unit.

In peacetime, Soviet divisions and armies were strictly tied to their stations, traditionally within one region. Associated units were therefore colocated with command staff. Gerasimov’s latest reorganization changes this geographically fixed approach. Until 2014, the 41st Combined Arms Army of the Central Military District was entirely stationed in Western Siberia. Now its brigades are located in the Urals and even in the Tuva Republic.<sup>24</sup>

Why do the combined arms armies incorporate infantry and armored divisions or brigades? As mentioned above, the army command as a service administers and supervises combat training. That is the supervision found to be lacking under the New Look reforms when military districts had come under enormous pressure, failing to provide their brigades with due administration and supervision. The 7th US Army Infantry Division is a fine example to illustrate the approach to force provision versus fielding in combat. It incorporates brigades deployed to the Korean Peninsula and reassigned to the 2nd Infantry Division in time of war. Yet, when stationed in the continental United States, the 7th administers and supervises combat training of these brigades.

## Combined Arms Army

At present, the Russian military has 12 combined arms armies: 3 in the Western Military District, 2 in the Central, 3 in the Southern, and 4 in the Eastern (see Figure 3). Four Army Corps have also been deployed in independent operational areas. Russia’s military leaders tried various ways to organize the armies. Finally, in 2016 and 2017, the current army composition of core assets emerged, incorporating combat support and combat service support units. Today

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<sup>24</sup> “Главе Тувы представили нового командира 55-й мотострелковой (горной) бригады,” Правительство Республики Тыва, Jan. 15, 2018, [http://gov.tuva.ru/press\\_center/news/activity/34729/](http://gov.tuva.ru/press_center/news/activity/34729/).



just two armies, the 58th Combined Arms and 1st Guards Tank Army, have managed to reach full strength. The other 10 armies are still striving to meet that goal.

Figure 3. Russian ground forces dispositions as of 2016

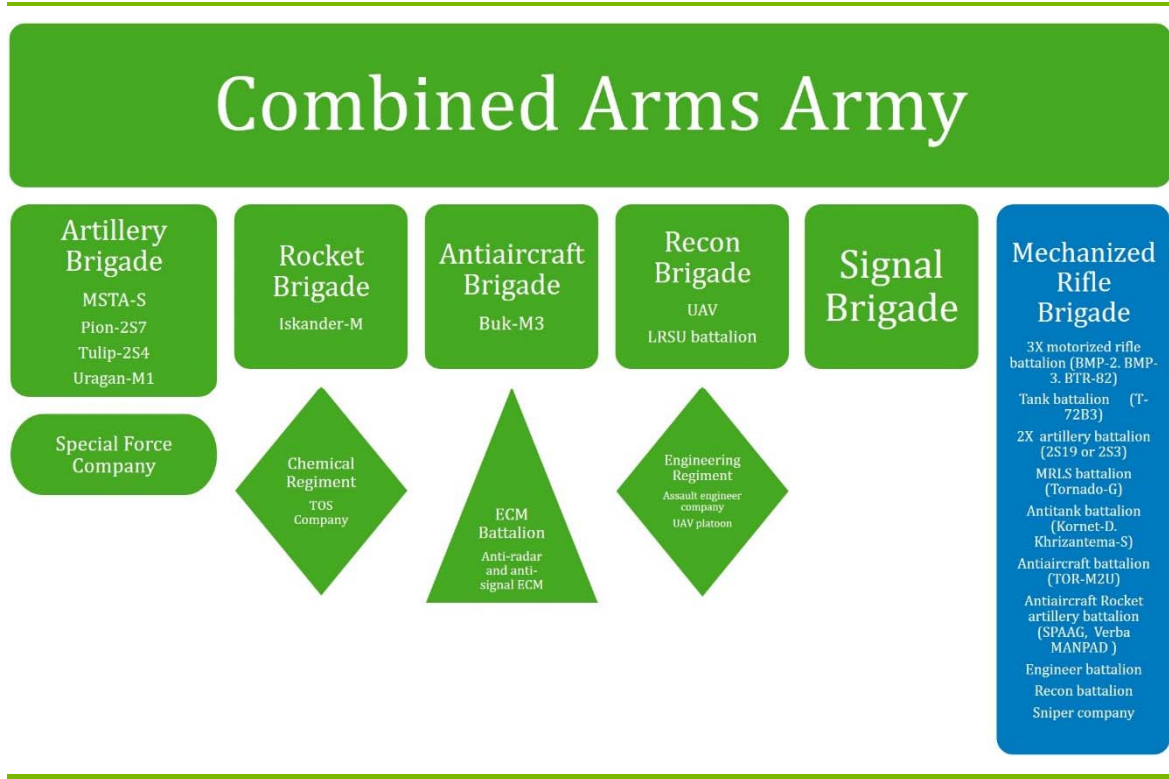


Source: Lester W. Grau and Charles K. Bartles.<sup>25</sup>

What is a standard army kit, and how has the organization of the combined arms army been affected by lessons learned from the Syrian campaign? We address these questions in the paragraphs that follow (see Figure 4).

<sup>25</sup> Grau and Bartles, *The Russian Way of War*, 29.

Figure 4. Combined arms army structure



Source: Author’s own work.

The Command Brigade (CB) provides C4I and combat service support to the army staff. It comprises seven battalions tasked with radio-relay, satellite, and other communications, as well as three independent companies utilizing high-bandwidth wireless data networks.

The Field Artillery Brigade (FAB) encompasses several artillery and Multiple Launch Rocket System (MLRS) battalions.<sup>26</sup> Its tube artillery consists of either the 2S19 self-propelled artillery systems or their towed variant, the 2A65. The brigade’s 2S19s are slowly being replaced with the 2S35 Koalitsiya-SV tracked and wheeled self-propelled howitzers. The Ministry of Defense is planning to activate several artillery battalions operating the towed version of the Koalitsiya-

<sup>26</sup> Евгений Андреев, Богдан Степовой, and Алексей Рамм, “Артиллерия наращивает мощь,” *Izvestia*, Dec.14, 2017, <https://iz.ru/675176/evgenii-andreev-bogdan-stepovoi-aleksei-ramm/artilleriia-narashchivaet-moshch>.

SV.<sup>27</sup> The replaced 2S19s and 2A65s will be transitioned to artillery regiments of combined arms divisions and artillery battalions of combined arms brigades.

Lessons learned in Syria led to the reintroduction of heavy artillery batteries, including the 240-mm 2S4 Tulpan mortars and 2S7 Pion/Malka self-propelled cannons<sup>28</sup> along with a UAV company as part of FABs.<sup>29</sup> The 220-mm Uragan self-propelled MLRS, the main rocket artillery type found in the Russian armed forces, is being succeeded by the enhanced Uragan-M1. There is hardly any information about the newer system, just a few images of trials. Uragan-M1 is also a 220-mm MLRS, but its rockets are held in quick-detachable tubes to simplify reloading. This super-Uragan that fires conventional rockets and guided munitions is fully automated and integrated into a single battlefield information space. Yet existing Uragan systems will not be deactivated, but transitioned to the artillery regiments of combined arms divisions. The FAB also uses an antitank battery of long-range Khризантема antitank guided missiles (ATGMs),<sup>30</sup> but so far these batteries have not been activated in all of the artillery brigades.

The Missile Brigade (MB) fields the Iskander mobile short-range ballistic missiles that succeeded the now-obsolete Tochka systems in the Army. The latter are to be completely decommissioned by 2020.<sup>31</sup>

The mission of the Air Defense Brigade (ADB) is being reassigned because of the gradual replacement of the Buk-M2 anti-aircraft missiles with the advanced M3 variants.<sup>32</sup> The latter missiles have an effective range of over 70 km, while the former have a range of up to 50 km. Earlier anti-aircraft brigades covered army headquarters, field artillery, and missile brigades.

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<sup>27</sup> Богдан Степовой and Алексей Рамм, "Гаубица с доставкой: разработан мобильный вариант комплекса «Коалиция»," *Izvestia*, Dec. 14, 2018, <https://iz.ru/814718/aleksei-ramm-bogdan-stepovoi/gaubitca-c-dostavkoi-razrabotan-mobilnyi-variant-kompleksa-koalitsiia>.

<sup>28</sup> Сергей Вальченко and Алексей Рамм, "Дальнобойный «Пион» сделают высокоточным," *Izvestia*, Jan. 30, 2018, <https://iz.ru/699322/sergei-valchenko-aleksei-ramm/dalnoboynyi-pion-sdelaiut-vysokotochnym>.

<sup>29</sup> "У артиллеристов 2-й общевойсковой армии ЦВО в Оренбургской области появится подразделение БПЛА," Министерство обороны Российской Федерации (Минобороны России), Nov. 16, 2018, [https://function.mil.ru/news\\_page/country/more.htm?id=12204273@egNews](https://function.mil.ru/news_page/country/more.htm?id=12204273@egNews).

<sup>30</sup> Алексей Рамм, Александр Круглов, and Евгений Дмитриев, "На пляж с «Хризантемами»: береговые бригады

усиливают артсистемами," *Izvestia*, Jan. 15, 2019, <https://iz.ru/832205/aleksei-ramm-aleksandr-kruglov/naplazh-s-khrizantemami-beregovye-brigady-usilivaiut-artsistemami>.

<sup>31</sup> Алексей Рамм, Дмитрий Литовкин, and Евгений Андреев, "«Точку» поставят в 2020 году," *Izvestia*, Jun. 2, 2017, <https://iz.ru/news/722504>.

<sup>32</sup> "Новейшие зенитные ракетные комплексы «Бук-М3» отправят в Сибирь," *Izvestia*, Mar. 11, 2019, <https://iz.ru/854765/2019-03-11/noveishie-zenitnye-raketnye-kompleksy-buk-m3-otpraviat-v-sibir>.

The newer Buk-M3 covers the entire combined arms army to provide an air defense barrier around combined and joint teams.

The Independent Military Intelligence Brigade (IMIB)<sup>33</sup> is a recent development within the combined arms structure. So far, just two brigades have been activated in the 58th<sup>34</sup> and 1st Guards Armored Armies. Because IMIB organization is classified, media are strictly denied photos and names of the personnel. The brigade is known to field speculative fire reconnaissance detachments—squadrons (or troops)—tasked with reconnaissance by fire behind enemy lines. The IMIB also allegedly operates a detachment of signals intelligence.

The Nuclear, Biological, and Chemical Defense (NBC) Regiment's mission, before the Syrian campaign, was to decontaminate troops and terrain to mitigate enemy's NBC hazards. Nowadays, it is somewhat different. The regiment comprises a battery of TOS-1A Soltzenek heavy flamethrowers.<sup>35</sup> These reinforce advancing troops. TOS-1As are part of maneuver formations order of battle (the system features a tank chassis) to strike enemy fortifications. The NBC Regiment also includes a battalion laying smoke screens. The regiment is not tasked with combating complex chemical agents so much as rapidly detecting and mitigating any hazards from improvised chemical devices.

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<sup>33</sup> Алексей Рамм and Алексей Козаченко, "Охладить тыл противника: как сейчас выглядит быт разведчика," *Izvestia*, Nov. 5, 2018, <https://iz.ru/808027/aleksei-ramm-aleksei-kozachenko/voennye-razvedchiki-sto-let-po-druguiu-storonu-linii-fronta>.

<sup>34</sup> "100-я отдельная разведывательная бригада (в/ч 23511)," *Войсковые Части России*, Feb. 27, 2016, <https://voinskayachast.net/suhoputnie-voyska/specialnie/vch23511>.

<sup>35</sup> Алексей Рамм, Александр Круглов, and Богдан Степовой, "По «Солнцепеку» — в каждую армию," *Izvestia*, Feb. 27, 2018, <https://iz.ru/709319/aleksandr-kruglov-bogdan-stepovoi-aleksei-ramm/po-solntcepeku-v-kazhduiu-armiiu>.

Figure 5. A participant in the reconnaissance competition at Russia's International Army Games



Source: Russian Defense Ministry.<sup>36</sup>

The Engineer Regiment (ER), like the NBC Regiment, has reorganized its structure and reassigned its mission following Syria and Ukraine. It has deactivated any battalions using heavy engineering and road-building equipment to replace them with assault engineer companies, also known as “stormtroopers” in military slang. These units assault fortified enemy positions, buildings, and man-made facilities.<sup>37</sup>

Assault engineers wear sophisticated personal protective gear. Their tactics are similar to those of National Guard special operations detachments. In assault operations, soldiers carry

<sup>36</sup> “Отличники войсковой разведки,” Министерство обороны Российской Федерации (Минобороны России), <http://mil.ru/files/files/armygames/scouts.html>.

<sup>37</sup> Алексей Козаченко and Алексей Рамм, “«Первые экзоскелеты мы ожидаем уже в следующем году»,” *Izvestia*, Sep. 14, 2018, <https://iz.ru/781466/aleksei-kozachenko-aleksei-ramm/pervye-ekzoskelety-my-ozhidaem-uzhe-v-sleduiushchem-godu>.



ballistic shields and operate remote cameras to inspect premises. In 2019, stormtroopers will take the deliveries of the first passive exoskeletons (no servo drives or motors).

The Syrian campaign also stands behind an increase in the number of personnel tasked with demining and mine clearance. The ER is supposedly activating independent companies using ground unmanned systems—both mine-clearing robots and unmanned ground assault vehicles. The latter should provide mission support to assault engineers.

Last year, combined arms armies began activating Electronic Warfare Battalions (EWBs).<sup>38</sup> Their structure, like that of the IMIB, is classified. Supposedly, these encompass the Leer-3 drone/electronic warfare company to suppress enemy wireless communications.

The army asset also comprises special operation troops (SOTs).<sup>39</sup> At present, two such detachments are known (with the 49th Army and, recently activated, with the 20th Army).<sup>40</sup> Their assignment is unclear, especially considering the Special Operations Squadron (Troop) within the IMIB. The information available supposes that the detachment provides forward observation for the Iskander. SOT soldiers may be involved in assault operations, unlike their IMIB counterparts that are primarily tasked with reconnaissance in the enemy rear.

The army asset will supposedly incorporate one Combined Arms Brigade. In March 2018, Oleg Salyukov, the Commander in Chief of the Army, said, “Yet combined arms brigades remain self-sustained deployable formations. The Army retains its divisions and brigades to comprise well-balanced combat teams capable for a variety of missions.”<sup>41</sup>

These days, there are independent combined arms brigades, as part of the army asset, in five combined arms armies. What are they for? In fact, they reincarnate the vision of Nikolai Ogarkov, the former Chief of the General Staff of the Soviet army, on independent quick-reaction teams.

If the enemy line of defense is breached, the brigade goes through to smash the rear. And if the enemy breaks through friendly defenses, the brigade is a standby reserve to repel the advancing force. The brigade can also be divided into battalion task forces organized from its infantry and armored battalions. These can reinforce combined arms regiments and divisions.

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<sup>38</sup> Александр Круглов and Николай Сурков, “Пехоту прикроют электронным «зонтиком»,” *Izvestia*, Oct. 10, 2018, <https://iz.ru/744402/aleksandr-kruglov-nikolai-surkov/pekhotu-prikroiut-elektronnym-zontikom>.

<sup>39</sup> Евгений Дмитриев and Алексей Рамм, “«Искандеры» получают «глаза» в тылу врага,” *Izvestia*, May 22, 2017 <https://iz.ru/news/711110>.

<sup>40</sup> “Подразделение спецназа создано в 20-й общевойсковой армии ЗВО в Воронежской области,” *TASS*, Dec. 19, 2018, <https://tass.ru/armiya-i-opk/5932035>.

<sup>41</sup> “Сухопутные войска сохраняют как бригады, так и дивизии,” *RIA*, Mar. 7, 2018, <https://ria.ru/20180307/1515903674.html>.

Figure 6. An upgraded T-72 tank in a defensive exercise against “enemy” forces



Source: Russian Defense Ministry.<sup>42</sup>

If one looks into the army asset structure, the absence of combat service support becomes evident. The army used to utilize an Independent Combat Service Support Brigade (ICSSB)<sup>43</sup> that, upon the introduction of the distributed command system, was put under the military district supervision. When the joint team is activated, the ICSSB is deployed into a mission-tailored operational team that encompasses the entire brigade or some of its battalions.

<sup>42</sup> “Мотострелковые соединения ЮВО в Северной Осетии завершили активную фазу двухстороннего тактического учения на полигоне Тарское,” Министерство обороны Российской Федерации (Минобороны России), Nov. 18, 2018, <http://mil.ru/mcis/news/more.htm?id=12200346@egNews>.

<sup>43</sup> “Срывов в снабжении армии и флота не было,” *Krasnaya Zvezda*, Dec. 21, 2018 <http://redstar.ru/sryvov-v-snabzhenii-armii-i-flota-ne-bylo/>.



Unlike the army, the corps does not have an asset, just a command battalion. Yet recently the 11th Army Corps (Kaliningrad) activated an independent armored regiment.<sup>44</sup> The corps accomplishes its missions in an independent area of responsibility with adverse climate and terrain<sup>45</sup> where the army is oversized, while the division is undersized. The corps is supposedly deployable into several combined teams.

## Division and Regiment

Currently, the Army combined arms divisions are classified into Infantry (motorized rifle), Armored (tank), and the so-called 21st Century (Future Division). The first includes two or three infantry and one armored regiments, and the second includes two or three armored regiments (e.g., the 90th Armored Division deploys three armored regiments, whereas the 4th Guards Armored Division deploys only two) and one infantry regiment.

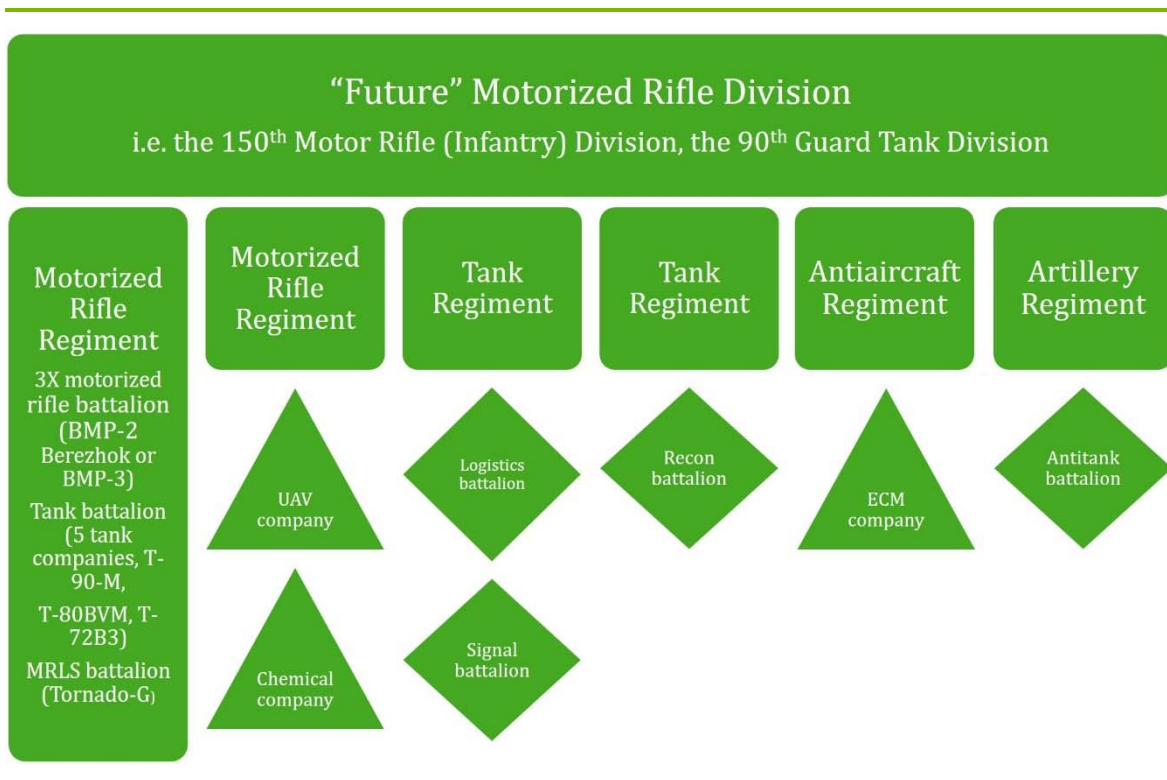
The 21st Century Division organizational chart is of intense interest. The division comprises two armored and two infantry regiments. Nowadays the only Future Division, the 150th Infantry, was activated by the 8th Guards Combined Arms Army (see Figure 7). It is worth noting that its armored battalions are organically close to the so-called independent armored battalions—over 50 main battle tanks organized into five armored companies. What is the vision for the 21st Century Division? It is a de facto ready-for-action combined team. Battalions and regiments are rapidly transformed into self-sustained task forces reinforced with artillery, air defense, and engineers from the division asset.

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<sup>44</sup> Центр АСТ, “Калининградской области сформирован 11-й отдельный танковый полк,” ВМРД, Jan. 23, 2019, <https://bmpd.livejournal.com/3503082.html>.

<sup>45</sup> Алексей Рамм and Евгений Андреев, “Защиту Заполярья усилили с суши,” *Izvestia*, Apr. 13, 2017, <https://iz.ru/news/681638>.

Figure 7. "Future" Motorized Rifle Division



Source: Author's own work.

The Ministry of Defense is clearly unwilling to transfer its divisions to a single organization, as it was in the Soviet Army and before the New Look. As was mentioned earlier, the division and its asset are the centerpiece of the combined team. These can be mission-tailored considering the assignment and the situation.

Figure 8. The T-72B3 tank practicing operations in extreme conditions



Source: Russian Defense Ministry.<sup>46</sup>

### *What is in the division asset?*

The Field Artillery Regiment (FAR) operates the 152-mm 2S19 or 2S3 Akatsiya self-propelled howitzers. The latter will be decommissioned in favor of the MSTA-S transferred from artillery brigades. The FAR also employs one Grad battalion of multiple rocket launchers, currently replaced with the enhanced Tornado-G. As mentioned previously, some artillery regiments

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<sup>46</sup> “Под Оренбургом экипажи танков Т-72Б3 совершенствуют навыки экстремального вождения,” Министерство обороны Российской Федерации (Минобороны России) <http://mil.ru/elections/news/more.htm?id=12219067@egNews>.

currently deploy Uragan MLRS batteries and battalions.<sup>47</sup> Independent UAS platoons are supposedly being activated within artillery regiments to provide, among other things, unmanned forward observation.<sup>48</sup>

The Air Defense Regiment (ADR), until recently, covered the division headquarters and field artillery components. The regiment uses the Tor and the Osa-AKM anti-aircraft systems currently being deactivated, because of the strong stand of Russian defense leaders in favor of the Buk-M2,<sup>49</sup> which has a killing range that provides air defense for the entire team.

The Command Battalion (CB) provides C4I. It encompasses several companies tasked with radio (based on command vehicles), radio-relay, and satellite communications. CB detachments also organize and administer the command post.

The Reconnaissance Squadron (RS) comprises three troops. Two operate the BRM-1K reconnaissance fighting vehicles, infantry fighting vehicles, and armored personnel carriers. The third, airborne reconnaissance company (performs tasks similar to US Army Long Range Surveillance Units), gathers intelligence in the enemy rear.<sup>50</sup>

The Anti-Tank Battalion (ATB) encompasses several Shturm ATGM batteries. At present, the battalion is gaining strength to field the Kornet-D and the long-range Khrizantema.<sup>51</sup>

The Sustainment Battalion (SB) consists of several companies to supply food, fuel, ammunition, equipment, and the like. The other companies are tasked with maintenance and repair of armored, automotive, and special vehicles.

The UAS Company, as was mentioned earlier in the paper, is composed of platoons to operate various unmanned aircraft, such as Granat, Tahyon, Eleron-3SV, and Orlan-10. The company is expected to field a platoon of unmanned combat aerial vehicles.

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<sup>47</sup> «принято решение радикально усилить огневую мощь артиллерийских подразделений в общевойсковых (мотострелковых и танковых) дивизиях и бригадах. В частности, в них появятся дивизионы тяжелых реактивных систем залпового огня «Ураган»» (“A decision has been made to radically increase the firepower of artillery units in combined arms (motorized rifle and tank) divisions and brigades. In particular, divisions of “Uragan” heavy rocket launcher systems will be part of these formations) Андреев, Степовой, and Рамм, “Артиллерия наращивает мощь.”

<sup>48</sup> Алексей Рамм, “Российская артиллерия получит беспилотники для борьбы с радарными,” *Izvestia*, Oct. 10, 2016, <https://iz.ru/news/636937>.

<sup>49</sup> Николай Сурков and Алексей Рамм, “Пехота и танки получают новый зенитный купол,” *Izvestia*, Dec. 22, 2017, <https://iz.ru/685386/nikolai-surkov-aleksei-ramm/pekhota-i-tanki-poluchat-novy-i-zenitnyi-kupol>.

<sup>50</sup> Алексей Михайлов, “Минобороны пересаживает разведчиков с «Тигров» на «Рыси» и «Коршуны»,” *Izvestia*, Apr. 1, 2016, <https://iz.ru/news/608291>.

<sup>51</sup> Алексей Рамм, “Российскую пехоту закроет противотанковая стена,” *Izvestia*, Oct. 2, 2017, <https://iz.ru/650402/aleksei-ramm/rossiiskuiu-pekhotu-zakroet-protivotankovaia-stena>.

The division will also supposedly activate Engineer and NBC Battalions.

As is known, the Defense Ministry procured tank support fighting vehicles to field a company of BMPT Terminators. These will enter service with the 90th Armored Division. What units will employ them in fighting? The BMPT Company will presumably be organized within the division to augment its combined arms battalions and regiments. The vehicles will be attached for the assault on enemy fortifications and in close urban areas. The company can also be used as an antitank reserve.

Armored and Infantry Regiments are similar in their organizational charts. They encompass four combined arms battalions (three Armored and one Infantry—Armored Regiment, three Infantry and one Armored—Infantry Regiment). The regiments also comprise field artillery and air defense battalions, a reconnaissance troop, a sniper company, and various combat support and combat service support components.

Note that the combined arms regiments have increased their firepower through the adoption of MLRS batteries and, for the air defense, the Tor-M<sup>52</sup> and the advanced 57-mm Derivatsiya anti-aircraft artillery.<sup>53</sup>

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<sup>52</sup> Алексей Рамм, “Мы сбиваем всё, что шевелится», *Izvestia*, Mar. 28, 2019, <https://iz.ru/857786/aleksei-ramm/my-sbivaem-vse-cto-shevelitsia>.

<sup>53</sup> Николай Сурков, “Войсковая ПВО даст отпор высокоточному оружию», *Izvestia*, Dec. 28, 2017, <https://iz.ru/688854/nikolai-surkov/voiskovaia-pvo-dast-otpor-vysokotochnomu-oruzhiu>.



Figure 9. A motorized rifle unit machine gun operator



Source: Russian Defense Ministry.<sup>54</sup>

### ***Battalion Task Force***

The battalion tactical groups (BTGs), activated by combined arms brigades, were the New Look's essential idea. They date back to the Second Chechen Campaign when personnel shortages made regiments send one reinforced battalion to the area of operation. After that, war battalion task forces (BTFs) gained popularity. The military finally issued operational procedures regulating their activation, but the New Look revealed an obvious weak spot—the battalion-brigade bond. The brigade was capable of activating only a single full-sized BTG that

<sup>54</sup> "Подразделения российской военной базы в Абхазии в рамках внезапной проверки боеготовности остановили наступление условного противника," Министерство обороны Российской Федерации (Минобороны России), Mar. 16, 2017.

encompassed one field artillery battalion, an armored company, an ATGM battery, air defense, and so on.

In that scenario, the brigade was deprived of the substantial part of its firepower, especially taking into account its tasks in the defensive and offensive. Therefore, the reactivation of regiments was a reasonable compromise. In fact, the present-day combined arms regiment is a ready-made, self-sufficient task force. Yet the Army has not abandoned the idea of BTGs. When necessary, the regiment can activate two battalion task forces. Unlike the New Look, the Gerasimov task force is not entirely a temporary formation. Its organization is clearly defined, and the personnel have added incentives when assigned to the battalion task force.

As we mentioned earlier, the regiment is capable of activating two BTFs. The first force, referred to as the *reinforced* one, comprises two infantry battalions, two armored companies, and an artillery battalion deprived of an artillery battery. The second, the *mobile* one, consists of an infantry battalion, an armored company, and an artillery battery.

We should point out that the Minister of Defense and the Chief of the General Staff often mention BTGs in their remarks and addresses.<sup>55</sup> In March 2019, for instance, Sergei Shoigu said that “there are 136 battalion tactical groups in the Russian army manned by military professionals.” At the same time, it is a mistake to believe that the Army fields only BTGs to conduct operations. As stated earlier, although the BTGs are somewhat formalized, they are mission-tailored formations to tackle *narrow* challenges. So one is likely talking about a rapid-reaction battalion task force in each regiment and brigade. When there is no need to deploy a full regiment or division, several BTGs will accomplish the mission.

## Brigades

As previously stated, the Defense Ministry and the Army Command have no plans to drop the idea of combined arms brigades. Nowadays, the Russian army incorporates over 20 combined arms brigades. Yet soon the number will decrease because some will be reorganized into divisions. The remaining brigades can be divided into two categories. The first is the joint team deployable reserve, which is part of a combined arms army. The second can be defined as geographic brigades. This includes brigades to operate in special geographical areas, where a full-sized division seems impractical.

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<sup>55</sup> “Число контрактников в российской армии за шесть лет выросло вдвое,” *RIA*, Mar. 11, 2019, <https://ria.ru/20190311/1551688468.html?fbclid=IwAR1B7XK9Ek6C2YphgLX5qamw0jTOfRCxyB79BaQc-Tcnx-RIYLVi95fD16k>.



To illustrate, consider the 80th and 200th Infantry Brigades of the 14th Army Corps of the Northern Fleet. These brigades are tailored for Arctic warfare. The 2nd Guards Army includes the 30th Infantry Brigade,<sup>56</sup> which uses UAZ (Ural Automotive Factory) fighting pickups to operate in the desert and steppe. The 55th and the 34th Independent Infantry Brigades are for the mountains. Their soldiers are battle trained in mountain areas.

Figure 10. A motorized rifle company during a river crossing



Source: Russian Defense Ministry.<sup>57</sup>

Each geographical brigade has its own unique organization. The 55th and the 34th have mountain infantry companies (mountain climbers) as well as cavalry platoons riding horses.

<sup>56</sup> Алексей Рамм, “Минобороны формирует сверхлегкие бригады,” *Izvestia*, Oct. 21, 2016, <https://iz.ru/news/639226>.

<sup>57</sup> “На Кольском полуострове проведено батальонное тактическое учение,” Министерство обороны Российской Федерации (Минобороны России), Sep. 7, 2012, <http://mil.ru/mpc/news/more.htm?id=11345675@egNews>.

The 80th and 200th include dog-sled detachments and units operating DT-10 and DT-30 two-unit transport vehicles.

Though combined arms brigades greatly vary in their structure, they share a general organizational vision: a brigade incorporates three or four combined arms battalions, a reconnaissance squadron, one antitank and two field artillery battalions, an MLRS battery, air defense battalions, an engineer company, a sniper company, and so on.

# Evolution of Firepower, C4I, and Unmanned Systems

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## Command, Control, Communications, and Intelligence

The interoperability of the military services—the Army, the Navy, and the Aerospace Force—within joint and combined teams is a topical issue.

The Gerasimov system contains three crucial components to establish and maintain the C4I. For these components, however, such a flexible system would have been impossible. These are C4 and C4I systems. In Russia, they are generally known as automated command and control systems (ACCS), including the ESU TZ tactical-level C4 (command, control, communications, computers) and the Akatsiya-M and the Strelets C4I (command, control, communications, computers, and intelligence). They establish a unified battlefield information space to provide fire support and command troops in real time. An equally important component is the unmanned aerial systems (UASs). This section will present descriptions of all of these components.

The C4/C4I introduction dates back to the Soviet army. However, the collapse of the USSR suspended those initiatives for quite a while. The requirements for the unified tactical-level C4 (branch-company-battalion-regiment-brigade) were issued in the mid-2000s.<sup>58</sup> The Sozvezdie (Constellation) Company was designated the leading defense contractor for the development of a new tactical-level system, the Sozvezdie.

Simultaneously, the Defense Ministry initiated the development of joint C4/C4Is to command and control between the services. The interoperability of these systems was clearly stipulated. Moreover, the military obliged communication equipment manufacturers to develop new radio stations compatible with these C4/C4Is.

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<sup>58</sup> “Комплекс ЕСУ ТЗ: желаемое и действительное,” *Army News*, Nov. 23, 2010, <https://army-news.ru/2010/11/kompleks-esu-tz/>.

Figure 11. Streletz C4I is a crucial command element in a combined arms army



Source: Russian Defense Ministry.<sup>59</sup>

Sozvezdie is a complex system involving several subsystems<sup>60</sup> for the artillery, air defense, electronic warfare, and other units. It was widely promoted during the New Look, yet the situation was never particularly bright. The C4 concept at the time had serious drawbacks in its vision, which seriously delayed new software solutions. Several battalion sets were eventually manufactured and deployed to the 19th and the 5th Infantry Brigades.<sup>61</sup> The system

<sup>59</sup> “Авианаводчики ЗВО осваивают комплекс разведки, управления и связи «Стрелец»,” Министерство обороны Российской Федерации (Минобороны России), Feb. 15, 2016, <http://mil.ru/elections/news/more.htm?id=12078317@egNews>.

<sup>60</sup> *Army News*, Dec. 2011, <http://sc.mil.ru/files/morf/military/archive/12.12.2011.pdf>.

<sup>61</sup> “Комплекс ЕСУ ТЗ апробировали в бою,” Созвездие, Nov. 1, 2011, [http://www.sozvezdie.su/news/r1\\_p/kompleks\\_esu\\_tz\\_aprobirovali\\_v\\_boyu/](http://www.sozvezdie.su/news/r1_p/kompleks_esu_tz_aprobirovali_v_boyu/).

was often involved in brigade and battalion exercises. Yet the troops and the developers ended up facing operational problems. The C4 system within a battalion failed, as did the interoperability between various arms and branches.

In the meantime, the Airborne Troops were mastering another C4, the Andromeda. Unlike the Sozvezdie, it had no technical and software problems. Therefore, at the exercises held between 7th Airborne Division and the 19th Independent Infantry Brigade at the Raevsky training ground,<sup>62</sup> the paratroopers outplayed their combined arms counterparts. The Andromeda showed its full technical superiority over the Sozvezdie.

In 2012, the Ministry of Defense and the Military Industrial Commission considered the abolishment of the Sozvezdie project in favor of a completely new tactical C4I. Yet the discussion led to a compromise: proceed with the Sozvezdie on a deep revision of the entire project, including the vision. In 2013, the Sozvezdie project replaced its main developer.<sup>63</sup>

Initially, the Sozvezdie was intended for linear hierarchy to simplify its integration into the then-current communications of combined arms formations. Yet exercises revealed deep vulnerabilities of any hierarchically rigid C4. If several links are disabled (e.g., the command post and the terminals of several company commanders are destroyed in battle), the Sozvezdie is no longer fully operational.

At the same time, the Ministry of Defense introduced a new demand for the developers—a net-centric C4. That required both software changes and new technological solutions. Since 2013, all the vehicles delivered to the Army have used terminals and communications compatible with the C4I. The Ministry of Defense simultaneously launched large contracts to modernize the in-service equipment. So the major BMP-2 infantry fighting vehicles were upgraded.<sup>64</sup>

Unfortunately, since 2013 the tactical-level C4 has been one of the most highly classified issues in the Russian army. Any information currently available in the open-access literature describes the vision and solutions applied in the obsolete Sozvezdie. It is yet unknown when the trials of the modernized tactical-level C4—the ESU TZ—began; however, the system was fielded and used on the Ukrainian border. The Syrian campaign became a real test for the ESU TZ. It was integrated with the C4s used in other services and supposedly contributed to the

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<sup>62</sup> Дмитрий Кандауров, “Учения «Кавказ-2012»: послесловие,” *Арсенал Отечества*, no. 2 (2012), <http://otvaga2004.ru/armiya-i-vpk/armiya-i-vpk-rusarmy/kavkaz-2012/>.

<sup>63</sup> “А.Ю. Беккиев назначен генеральным конструктором АСУВ ТЗ,” *Созвездие*, May 8, 2013, [http://www.sozvezdie.su/news/archive1/ayu\\_bekkiev\\_naznachen\\_generalnim/](http://www.sozvezdie.su/news/archive1/ayu_bekkiev_naznachen_generalnim/).

<sup>64</sup> Алексей Михайлов, “Минобороны модернизирует советские БМП-2,” *Izvestia*, Apr. 5, 2013 <https://iz.ru/news/547971>.

effective interaction between the Army and the Aerospace Force. At the same time, the military avoided any red-on-red fire incidents with its Syrian allies.

Until the end of 2020, the Army will deploy at least 40 ESU TZ brigade sets. In 2018, the Ministry of Defense signed a contract for the procurement and maintenance of the system until 2027.<sup>65</sup> Technically, the ESU TZ encompasses a single network of terminals and command post vehicles. The terminals are mounted on platoon and company command vehicles. They exchange data via standard communication protocols, provide situational awareness on the electronic map and display any other data for the platoon leader and company commander.

The second level comprises command post (CP) vehicles used by battalion, squadron, and independent company commanders as well as by brigade, regiment, and division commanders and their executive officers. Each CP vehicle contains communication and data processing systems to be operated either in the vehicle or remotely in the command center.

As mentioned earlier, the ESU TZ is a net-centric system. Therefore, the two levels are integrated into a single network. If one or more elements are disabled, the system remains stable.

KRUS Strelets development started in 2007.<sup>66</sup> This system had always been considered by the military in conjunction with the ESU TZ. Official publications often emphasize its focus on the military intelligence and special operations, but this is not the case. The Strelets system is a tactical-level C4I subsystem creating a soldier-squad link. Therefore, it is fielded with infantry units. Strelets provides situational awareness between the squad leader and the higher command in real time. It transmits target altitudes for air, artillery, and, recently, sea-based cruise missile strikes.<sup>67</sup> Syrian campaign videos often display soldiers operating Strelets terminals to provide forward air control. The commander also tracks his subordinates, who carry special small-sized terminals, in order to command them in real time. If necessary, the information can be transferred to the higher command authority. In the future, the Strelets will transmit information on the health and ammunition of each soldier.

The Strelets system, however, has several disadvantages. The main one is the size. While a soldier carries a small-sized pager, a commander wears a vest loaded with communications,

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<sup>65</sup> "Созвездие' поставит Минобороны единую систему управления войсками," *RIA*, Dec. 22, 2018, <https://ria.ru/20181222/1548474088.html>.

<sup>66</sup> Кирилл Рябов, "КРУС «Стрелец»: комплекс разведки, управления и связи," *Army News*, Jan. 21, 2019, <https://army-news.ru/2019/01/krus-strelec-kompleks-razvedki-upravleniya-i-svyazi/>.

<sup>67</sup> Алексей Рамм, "Морпехи наведут «Ониксы» и «Калибры»," *Izvestia*, Apr. 13, 2017, <https://iz.ru/news/678116>.



wireless antennas, a rather cumbersome tablet computer, and batteries. The commander also has to wear personal protection equipment and carry ammunition. Therefore, video chronicles of the Russian strikes in Syria allegedly display a lightweight kit to provide guidance to aviation and artillery: a tablet computer, a DCC (distance-and-coordinates calculator), and a communications module. Meanwhile, recent exercises showed platoon and section leaders wearing the full Strelets set, which is still quite heavy.

The next most important C4 system is the Akatsiya-M,<sup>68</sup> an army corps and combined arms army C4. As stated earlier, its development began in line with the tactical-level C4.

The Akatsiya-M combines two systems. The Akatsiya (without M) is an administration and troop management system to exchange documents (official letters, reports, requests, etc.) within the combined arms army. It became fully operational in 2011. The Akatsiya-M provides C4 over combined and joint teams in real time. It encompasses four all-terrain trucks that carry communication equipment and information processing systems. Each Akatsiya set costs about one billion rubles.

In addition to combat C4s, the Defense Ministry develops command capabilities for its combat service support elements. In 2016, troops fielded the Vektor system for real-time tracking of transportations to check cargo, vehicle health, and route. A more sophisticated system is being developed to track combat vehicles in real time and report on their health, resources, and spare parts for the replacement. Recently, the combined arms army's service support elements have allegedly adopted a C4 system that monitors the supplies and fuels in combat and combat support units and checks their availability in depots. This system was designated as Palas<sup>69</sup> and tested at the Tsentr-2015 exercise.<sup>70</sup>

So, what is a single C4 space in the joint team? Its centerpiece is the Akatsiya-M that interoperates with the ESU TZ tactical-level C4 as well as the Vektor and the Palas combat service support C4s. Akatsiya plays an important role in troop administration and supervision.

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<sup>68</sup> Алексей Рамм and Александр Круглов, "Минобороны развернет «Акацию» за 21 млрд," Jul. 5, 2018, <https://iz.ru/761052/aleksei-ramm-aleksandr-kruglov/minoborony-razvernet-akatciiu-za-21-mlrd>.

<sup>69</sup> "Лекция на тему «Основы применения АСУ МТО ВС РФ»,» «Военная академия материально-технического обеспечения им. генерала армии А.В. Хрулёва» Министерства обороны Российской Федерации, Apr. 21, 2017, <http://vamto.net/news/lektsiya-na-temu-osnovy-primeneniya-asu-mto-vs-rf.html>.

<sup>70</sup> "Новые комплексы АСУ, применяемые на СКШУ «Центр-2015», значительно повышают эффективность выполнения задач подразделениями МТО," Министерство обороны Российской Федерации (Минобороны России), <https://syria.mil.ru/news/more.htm?id=12056022@egNews>.



## C4 and Changes to the Organization

Large-scale introduction of C4s led to organizational changes, starting with communications units. The Communications Troops reform has become an important achievement of the New Look. In 2009, communications companies, battalions, and brigades were reorganized into command ones.<sup>71</sup> Before proceeding, a short explanation is in order. Until 2009, the Russian army had the so-called “commandant units”: a commandant platoon within a combined arms regiment, a company within a brigade and/or a division, and a battalion in a combined arms army. These were tasked with the command postdeployment, operation, security, and force protection.

The New Look stitched commandant and communications units into a single command unit. That reorganization established special detachments within command companies, battalions, and brigades responsible for C4 terminals at command posts.

The ESU TZ and the Strelets rely on advanced communications providing digital information exchange. In its origin, KRUS Strelets was developed to interoperate with the Akveduk family that comprised some 20 models of radio sets—from handheld tactical to CP vehicle. The large-scale procurement of Akveduks was initiated in 2008, just after the military conflict with Georgia, to utilize them from sections to brigades through companies, battalions, and regiments. The Akveduk was fielded in Crimea and along the Ukrainian border. A limited amount was subsequently deployed to Syria. Yet the Defense Ministry was not satisfied, in general, with this family of communications equipment, especially with its tactical radios—bulky items carried in special backpacks with the straps to fix an antenna and a communication mode selector.

In 2015, without much fanfare, the Defense Ministry initiated procurement of the enhanced Azart family that incorporates only three radio stations, designated P, N, and BV. Later the Azart-P found itself in Syrian chronicles. Outwardly, this station resembles the US Harris. Yet its distinguishing feature is an antenna that looks somewhat like a police baton.

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<sup>71</sup> A. Ramm, *Russian Army’s Communication Systems and Setup*, Center for Analysis of Strategies and Technologies, 2018.

Figure 12. The sixth-generation Azart radio station (advanced versions of the system, already mastered by soldiers, are entering the service in great numbers)



Source: Russian Defense Ministry.<sup>72</sup>

Another key element is the P-240I-4 Pereselenetz digital communications vehicle.<sup>73</sup> These are operated by command companies and battalions of combined arms brigades and regiments. The Pereselenetz provides communications between command posts in the field. It is equipped with the Akveduk-25U radio station, a radio relay station, digital radio relay equipment, a terminal, an incoming message processor, an unsecure line switch, et cetera. The Pereselenetz

<sup>72</sup> “В миротворческую бригаду ЦВО поступили радиостанции шестого поколения «Азарт»,” *Министерство обороны Российской Федерации (Минобороны России)*, Dec. 5, 2014, <http://mil.ru/elections/news/more.htm?id=12003072@egNews>.

<sup>73</sup> A.V. Karpenko, “Цифровой комплекс связи П-240И-4 «Переселенец»,” *Оружие Отечества*, Oct. 21, 2016, <http://bastion-opk.ru/p-240i-4-pereselenec/>.

established over 100 secure communication channels with the total bandwidth of over 2,000 Kbps. Its transmission range exceeds 40 km.

In 2011 and 2012, command brigades and battalions activated communications companies to deploy wireless high-speed networks. These utilize the Redut-2US<sup>74</sup> to provide continuous C4 data exchange.

The Redut-2US is mounted on the KamAZ-63501 all-terrain eight-wheeler. This carries data transmitters on a 32-meter-high telescopic mast. According to the official documents, “The system deploys multi-hop communication lines that simultaneously transmit digital information at the speed of 5-155Mbps into 4 directions as well as broadband wireless networks for up to 200 subscribers with the speed of up to 37Mbps.”

In fact, Redut and Pereselenetz serve a separate purpose, combining command posts into a single wireless network. Yet they serve different command levels. While the Pereselenetz is a tactical system, the Redut is an operational one. The exercises revealed C4 demands for secured communication channels to provide operational stability. Therefore, in 2018, command units encompassed encryption detachments, most likely company-sized. These operate the Nickel,<sup>75</sup> a classified system that, according to the official information available, “features various interfaces and protocols to provide data encryption for the majority of communication channels.”

Based on the lessons learned in Syria, Russian combined arms army communications brigades and battalions are transitioning to the *modular* organization.<sup>76</sup> These modules deploy a command post tailored for the tactical situation. Because the Defense Ministry does not disclose the structure of its modular units, it is only known that the first modular battalions and brigades were field-tested during the Zapad-2017 (West 2017) exercise.

One assumes that the modules are company-sized detachments using satellite, radio relay, and other communication equipment, just like the systems responsible for the smooth C4—the Redut-2US and the Nickel. The modules are employed when a combined arms army activates

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<sup>74</sup> “Комплекс П-260Т Редут-2УС / модуль Р-431АМ МИК-МКС,” *Military Russia*, Apr. 28, 2013, <http://militaryrussia.ru/blog/topic-740.html>.

<sup>75</sup> “Секретная связь: от тайнописи до криптомаршрутизатора,” *Krasnaya Zvezda*, Mar. 25, 2019, <http://redstar.ru/zasekrechennaya-svyaz-ot-tajnopisi-do-kriptomarshrutizatora/>.

<sup>76</sup> Борис Денисов, “Деятельность Управления связи штаба объединенного стратегического командования Южного военного округа в 2017 году,” *Связь в Вооруженных Силах Российской Федерации* (2017), <https://army.informost.ru/2018/pdf/37.pdf>.

several joint teams and in the combined team self-sustained operations. Considering the situation and the mission assigned, these are reinforced with two or more modules.

## C4 Future

At present, the Defense Ministry has moved to the next generation C4—the so-called “single information space.”<sup>77</sup> Command posts of all levels are united into a single network that controls any real-time battlefield developments while any user is granted instant access to the data stream. The first exercise involving a unified information space was held in 2012. Then the technology was tested in Syria. The next stage will introduce artificial intelligence C4 elements to assist commanders in decision-making on the battlefield. The single information space provides combined arms staffs with a tremendous amount of information. The AI analyzes the set parameters to provide a combatant commander with a variety of options for the situational development.

The Ministry of Defense hopes the C4 will result in significant advantages over the enemy in decision-making. Theoretically, while the adversary is still assessing the situation, Russian units will already have been issued with combat, combat support, and combat service support operation orders.

## Unmanned Aerial Systems

Today, UASs are a priority for the Russian military. The Army and the Aerospace Forces operate the largest drone fleets. Combined arms brigades and divisions and army artillery brigades, according to their organizational chart, include a UAS company. Unmanned aircraft are also used in Army electronic warfare units.<sup>78</sup> Yet, at the time of the writing of the paper, UAS companies were not activated in every brigade or division. In the spring of 2018, officials reported on 67 UAS companies in the Army, the Airborne Troops, and the Naval Infantry Troops. These operated more than 2,000 drones.

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<sup>77</sup> “Военные связисты создали для войск ЗВО единое информационное пространство,” Министерство обороны Российской Федерации (Минобороны России), Sep. 4, 2012, <https://structure.mil.ru/structure/okruga/west/news/more.htm?id=11336940@egNews>.

<sup>78</sup> Алексей Рамм and Богдан Степовой, “Безлюдный флот,” *Izvestia*, Apr. 21, 2018, <https://iz.ru/732935/aleksei-ramm-bogdan-stepovoi/bezliudnyi-flot>.

Figure 13. Unmanned aerial systems are an indispensable attribute in any Army exercise



Source: Russian Defense Ministry.<sup>79</sup>

Each UAS company comprises three to four platoons and a maintenance detachment. Each platoon uses either the Orlan-10 or the Eleron-SV or the Granat-4 drones. Granat and Eleron platoons are attached to regiments and battalions, and sometimes even to companies while the longer range Orlan-10 remains at the disposal of the brigade or division commander. Along with UAS companies of combined arms brigades and divisions, drones are used in the combined arms army electronic warfare battalion. The battalion or, according to some sources, the company is tasked with the suppression of enemy wireless communications, operating the RB-341V Leer-3.<sup>80</sup>

<sup>79</sup> “2-я армия ЦВО получила на вооружение беспилотники нового формата,” Министерство обороны Российской Федерации (Минобороны России), Nov. 2, 2017, <http://mil.ru/et/news/more.htm?id=12149257@egNews>.

<sup>80</sup> Алексей Рамм and Владимир Зыков, “Российская армия получила сотовое оружие,” *Izvestia*, Jan. 25, 2017, <https://iz.ru/news/659503>.



The Leer is based on the Orlan-10 and carries radio and cellular network countermeasures. The RB-341 serves as a cell tower to send SMS, audio, and, in the future, short video messages. The modernized version of the Orlan-10 entered the service with UAS platoons of artillery brigade UAS companies. These aircraft detect enemy artillery radars with an onboard sensor suite that takes radio emissions and identifies its type and signal strength. Then the Orlan takes a position over the radar to observe and guide the strike.

This Orlan-10 version is designated the UARS (unmanned artillery reconnaissance system). Its tests were completed at the end of 2016. However, the Defense Ministry is facing some problems in the organization of its UAS units. The key problem concerns the qualification criteria. At first, every soldier was instructed in how to operate the drone. Yet the idea failed.<sup>81</sup> UAS operators are trained in the State Unmanned Aviation Center, Kolomna, Moscow Region. First, they apply to undergo a two-stage selection procedure. In the first stage, the unit selects volunteers with technical education. The second stage takes place at the center; the candidate takes an exam and a psychological test and goes through an interview.

At this time, the Defense Ministry is transitioning to the next UAS stage. Some defense officials claim that the Army will soon activate medium-range drones carrying radars, an electronic reconnaissance suite, and assault weapons. These are likely the Korsar family displayed in the Victory Parade. After adopting the Korsar, the Army may organize them into platoons within UAS companies.

The Russian Ministry of Defense broadly covers the development of its unmanned combat ground vehicles. There have been reports that the Uran family has entered service. On May 9, the robotic system was displayed at the Red Square Victory Parade, but we see no evidence of any active incorporation of these systems into the structure of combined arms regiments, divisions, and brigades. Our assumption is that ground-based combat robots are not a priority mission for the Army.

## Reconnaissance and Fire Contour

These days, the Defense Ministry mentions the **Reconnaissance and Fire Contour (RFC)** in practically every official report on exercises and combat training. What is this concept?

The RFC is the united reconnaissance and fire support (artillery, short-range missiles, and aircraft) mechanism. The command post receives target information, processes it, and

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<sup>81</sup> Роман Крецул and Алексей Рамм, “Дрон в боевых условиях,” *Izvestia*, Oct. 12, 2018, <https://iz.ru/785792/roman-kretcul-aleksei-ramm/dron-v-boevykh-usloviakh>.

executes an order to fire support assets. The Russian military implemented the RFC because of the introduction of capable C4. In the future, artificial intelligence may distribute targets and calculate the required ammunition to engage them.<sup>82</sup>

Many Defense Ministry publications also mention the *Reconnaissance and Strike Contour (RSC)*.<sup>83</sup> The concepts of RFC and RSC appeared in the early 2010s with the introduction of the unmanned aircraft and the Strelets C4I. The RFC will supposedly combine UASs, tube artillery, and multiple-launch rocket systems, whereas the RSC uses short-range missiles, manned aircraft, and high-precision weapons. The separation between the RFC and the RSC was conceived as a temporary division before the existence of a single information space, when the military employed several independent systems instead of a single net-centric one.

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<sup>82</sup> генерал-лейтенант Сергей Кузовлев «Самое пристальное внимание мы также уделяем готовности личного состава эффективно вести маневренно-оборонительные и маневренно-наступательные действия в назначенной полосе с применением разведывательно-огневых контуров (РОК). Напомню, что тактика РОК является элементом сетецентрической войны, которая ориентирована на повышение боевых возможностей перспективных формирований в современных войнах и вооруженных конфликтах за счет достижения инфокоммуникационного превосходства, объединения участников военных (боевых) действий в единую сеть. Суть тактики применения РОК заключается в том, что автоматическая система, на основании данных, полученных от артиллерийских разведчиков, распределяет огневые задачи между подразделениями, находящимися на данном участке фронта, исходя из того, какие артсистемы оптимально подходят для уничтожения той или иной цели.» (Lieutenant General Sergey Kuzovlev “We also pay close attention to the readiness of personnel to effectively conduct maneuver-defensive and maneuver-offensive operations in the designated lane using reconnaissance and fire contours (ROC). Let me remind you that the tactics of the ROC is an element of network-centric warfare, which is aimed at increasing the combat capabilities of promising formations in modern wars and armed conflicts by achieving info-communication superiority and uniting participants in military (combat) operations into a single network. The essence of the tactics of using a missile defense system is that the automatic system, based on data received from artillery scouts, distributes fire missions between units located in a given sector of the front, based on which artillery systems are best suited to destroy a particular target.”) Ю. Селезнев, “Мастерство куется в поле,” *Army News*, Feb. 2, 2019, <http://army.milportal.ru/masterstvo-kuetsya-v-pole/>.

<sup>83</sup> «Войска отрабатывают задачи в составе разведывательных огневых и ударных контуров, с применением различных видов боевого маневрирования» (Troops are practicing reconnaissance fire and strike contours, using various types of combat maneuvering) “Генерал Дворников рассказал о роли российских баз в Южной Осетии, Абхазии и Армении,” *Государственное информационное агентство Рес*, May 22, 2018, [http://cominf.org/node/1166516572?fbclid=IwAR0ivk50UqJJQT-RhVVVaN\\_mip6VlmaTVVdVNf6RitENWSgpKMKVIDzS4STo](http://cominf.org/node/1166516572?fbclid=IwAR0ivk50UqJJQT-RhVVVaN_mip6VlmaTVVdVNf6RitENWSgpKMKVIDzS4STo).



Figure 14. Missile and artillery capabilities in a combined arms army



Source: Infographics by Maxim Gordienko.

For example, the Strelets originally had a capability to directly interact with the aircraft equipped with the Gefest suite,<sup>84</sup> while Orlan-10s initially lacked capabilities to guide fire support. Therefore, Orlan and Strelets operations were combined. The former located and identified the target, while the latter put target coordinates on an electronic map.<sup>85</sup>

Yet now the creation of a unified information space is pushing out the concept of RSC<sup>86</sup> in favor of Integrated Reconnaissance and Fire Contours (IRFC). The exercises held involve net-centric IRFCs based on newer C4 systems. The interoperable contours are classified into tactical (battalion-regiment), operational (brigade-division), and prestrategic (army corps-combined arms army).

To illustrate, the infantry squad locates an enemy command post and uses the Strelets to upload target information to the single information space. Then the higher command (regiment-division-brigade-army) makes a decision on the means of engagement. If a combined arms brigade or a regiment conducts a self-sustained mission—without any attached artillery and aircraft—the contours involve only brigade and regiment fire support elements.

The UAS and the Strelets are the RFC-essential components. Theoretically, target information can be provided by any soldier equipped with a C4 terminal. Yet UAS and Strelets operators, as exercises and then the Syrian campaign revealed, are the key target information providers. In 2016, the Ministry of Defense released a video of the Orlan and probably the Eleron-3SV in Syria. The footage captured a drone guiding artillery fire. Little information is available on the principle of operation of the enhanced aiming system set on the UAS. Yet, considering Defense Ministry reports, the system is actively used on the battlefield.

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<sup>84</sup> SVP enables the operator to hit ground targets with conventional free-falling bombs with high accuracy. For this, the SVP conducts complex calculations, analyzing the flight parameters of the aircraft, the weather, and the coordinates of the target, as well as the ballistic characteristics of the ammunition.

<sup>85</sup> “Военнослужащие на Южном Урале увеличили дальность ведения разведки в четыре раза,” Министерство обороны Российской Федерации (Минобороны России), Jun. 26, 2018, [https://function.mil.ru/news\\_page/country/more.htm?id=12182846@egNews](https://function.mil.ru/news_page/country/more.htm?id=12182846@egNews).

<sup>86</sup> “Ударные и разведывательные контуры ВДВ объединят под одно командование,” *Военное обозрение*, Aug. 1, 2017, <https://topwar.ru/121652-udarnye-i-razvedyvatelnye-podrazdeleniya-vdv-obedinyat-pod-odno-komandovanie.html>.

The UAV-guided artillery strike eliminated militants that had launched improvised drones against the Hmeymim air base. The video was released by the Defense Ministry press department.<sup>87</sup>

The RFC introduction and combat upgrades return deactivated artillery systems to the Army: the 203-mm 2S7 Pion/Malka long-range cannons and the 2S4 Tulpan heavy mortars. These are cheap and very effective counterparts to air strikes.<sup>88</sup> Modernized Tulpans and Pions feature ESU TZ terminals and advanced communications to receive coordinates and ammunition data to engage the set targets. In the future, the 2S7 and the 2S4 will adapt to use guided munitions.

In addition to heavy artillery, the RFC led to a deep modernization of the Army field artillery: the 152-mm 2S19 MSTA-S, the 2S3 Akatsiya, and even the 122-mm 2S1 Gvozdika.<sup>89</sup> The Akatsiya and the Gvozdika adapted the ECU-TZ while the 2S19 was transformed into an automated artillery system. In real time, the 2S19M2 receives target coordinates and ammunition data to engage. Then it automatically processes the data and positions itself toward the targets. Finally, upon the commander's execution order, the system (also automatically) delivers a group of rounds to the target.

Earlier in the spring, Defense Minister Sergei Shoigu said UASs reinstated the need for the 152-mm Krasnopol rounds. These are laser guided by the ground-based forward observer. Developed in the early 1990s, they were never used because of the complex deployment of the targeting station. Rocket artillery and short-range missiles are also being integrated into the RFC. Grad, Smerch, and Uragan launchers are equipped with advanced communications and ESU TZ terminals. The advanced Tornado family (Tornado-S and Tornado-G) and the Uragan-M1 are delivered with the C4 capabilities.

Also, in the near future, the modernization of the Grad MLRS will begin. Updated systems will receive automated guidance and aiming systems, as well as the latest topographic and navigation systems. Deployment time to combat will be reduced.<sup>90</sup>

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<sup>87</sup> "Минобороны опубликовало видео уничтожения боевиков, атаковавших Хмеймим," *RIA*, Jan. 12, 2018, <https://ria.ru/20180112/1512530078.html>.

<sup>88</sup> Алексей Рамм and Алексей Козаченко, "Шквал огня: как перевооружают российскую артиллерию," *Izvestia*, Nov. 19, 2018, <https://iz.ru/813215/aleksei-ramm-aleksei-kozachenko/shkval-ognia-kak-pereosnashchaiut-rossiiskuiu-artilleriiu>.

<sup>89</sup> Сергей Вальченко and Алексей Рамм, "Сирийский опыт продлит жизнь «Гвоздик»,» *Izvestia*, Nov. 17, 2017, <https://iz.ru/668996/sergei-valchenko-aleksei-ramm/siriiskii-opyt-prodlit-zhizn-gvozdik>.

<sup>90</sup> Алексей Савелов, "В Ростехе рассказали о модернизации РСЗО «Град»,» *Krasnaya Zvezda*, May 25, 2019, <https://tvzvezda.ru/news/opk/content/2019525347-1nTL5.html>.

The Strelets C4I and the Iskander-M combination were successfully field-tested in 2013. In June 2014, the Defense Ministry conducted the Arctic exercises when the Iskander battery was airlifted by the An-124 to the airfield of the city of Vorkuta. After disembarkation, the battery conducted a march to take combat positions and fire the R-500 cruise missiles. Target coordinates were issued by the Strelets.<sup>91</sup>

The RFC will gain its maximum momentum when the Army takes the deliveries of its C4I-capable vehicles integrated into a single information space—the Armata, the Kurganetz, the Bumerang, and the Koalitsiya self-propelled artillery system. The RFC joint team compatibility is also an essential issue. Alongside combined arms, the team deploys air and naval components. The military is actively working out a solution.

The Navy has already applied data provided by the Strelets and the ESU TZ to successfully engage ground targets with its artillery, the Kalibr and Onyx cruise missiles.<sup>92</sup> In autumn 2018, the Pacific Fleet held a joint exercise when its fast attack craft engaged maneuverable targets that imitated suicide-vehicle-borne improvised explosive devices.<sup>93</sup> The targets were designated and painted by a combined arms unit employing the Strelets system. The C4I was then used to forward observe the artillery strike.

As for the Aerospace Force, there are two options to interoperate aircraft with combined arms formations. In close air support, the Streletz interoperates with the SVP weapon-aiming pod (the Gefest, named after its manufacturing company). The SVP receives real-time target coordinates from ground controllers to calculate the strike. Nowadays, the Su-24M frontline bombers and the Tu-22M3 long-range bombers are equipped with the Gefest. The system proved its efficiency in Syria.

Unfortunately, Russian combined arms units do not have a system similar to the American ROVER, which allows ground troops to see what the aircraft is seeing from its aiming pod. This greatly complicates close air support for the mounted troops that do not interoperate the SVP of the Su-34 fighter-bombers, the Su-30SM, and the Su-35 multiple-role fighters.

Considering stationary targets, troop concentration areas, and artillery emplacements, combined arms formations can entirely trust the Aerospace Force. Back in 2012, they developed, tested, and adopted several airborne C4Is. In particular, the Metronom is fully

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<sup>91</sup> “На севере Воркуты прошли учения с участием ракетного комплекса «Искандер»,” *BNK*, Jun. 7, 2014, <https://www.bnkomi.ru/data/news/29174/>.

<sup>92</sup> Николай Сурков and Алексей Рамм, “Ракетные «малыши» научились обеспечивать поддержку Сухопутным войскам,” *Izvestia*, Oct. 8, 2018, <https://iz.ru/739077/nikolai-surkov-aleksei-ramm/raketnye-malyshi-nauchilis-obespechivat-podderzhku-sukhoputnym-voiskam>.

<sup>93</sup> “Российские МРК поддержат десантников артиллерийским огнём,” *Военное обозрение*, Nov. 13, 2018, <https://topwar.ru/149719-rossijskie-mrk-podderzhat-desantnikov-artillerijskim-ognem.html>.

integrated with the ESU TZ and the Akatsiya-M. It interacts with frontline bombers; in real time, the crew receives target coordinates and the beneficial avenue of approach to avoid enemy aircraft and air defense.

The RFC also encompasses strategic bombers as was proved in the aforementioned exercise in summer 2014. Along with the Iskander short-range missiles, the Tu-95MS bombers engaged targets at the Pemboy range—near the former mining town of Halmer-Yu, 60 km north of Vorkuta—with the Kh-555 air-launched cruise missiles. The Streletz provided aiming for the Tu-95MS. The exercise saw prime interaction between ground and air forces when the R-500 and the Kh-555 synchronized the launch time to simultaneously engage all the targets.

# Lessons Learned in Syria in the Army Evolution

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## What Do the Lessons Learned in Syria Really Mean?

Defense officials say that over 63,000 personnel (25,738 officers and 434 generals) have gained combat experience in Syria.<sup>94</sup> Russian President Vladimir Putin and Defense Minister Sergei Shoigu repeatedly pointed out the need to integrate Syrian experience into combat training. At first, these statements seem exaggerated. By and large, the Syria campaign is conducted against militants. The military has already gained such experience; one has only to recall the First and Second Chechen Campaigns.

The enemy in Syria lacks high-precision weapons, modern C4Is, combat aviation, electronic warfare, and air defense. The Russian Army has never been involved in direct warfare and was content with special operations, aviation, small artillery units, and military advisers. Undoubtedly, Syria has enriched the Russian military school with new tactical techniques (squad-platoon-company), such as close quarters combat, single-tank combat employment, and ATGM counteraction. These have already been integrated in the Army field manuals updated at the end of 2017 and adopted by the troops last year.<sup>95</sup>

Russia plays on the same ground with the US, UK, France, and other nations as part of the Global Coalition to Defeat ISIS. Yet the parties are diligently trying to avoid any confrontation with each other. Unfortunately, the Defense Ministry has not published any official data on the Army's involvement in the campaign. Combined arms units are known to operate as task forces (in particular, a few artillery batteries). According to the photo and video footages posted on the internet, they utilized the 122-mm D-30 and the 152-mm MSTA-B.<sup>96</sup>

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<sup>94</sup> "Минобороны в цифрах отчиталось об основных итогах операции в Сирии," *РБК*, Aug. 22, 2018, <https://www.rbc.ru/politics/22/08/2018/5b7d423e9a794780ac5f63c1>.

<sup>95</sup> Павел Иванов, "Армии предписано строить баррикады," *ВПК*, Nov. 20, 2018, <https://www.vpk-news.ru/articles/46414>.

<sup>96</sup> "Российская артиллерия в Восточной Хаме," Colonel Cassad, Jul. 27, 2017, <https://colonelcassad.livejournal.com/3568684.html>.



On May 23, 2018, the D-30 Battery of the 200th Artillery Brigade was attacked by ISIL militants in the Deir ez-Zor province.<sup>97</sup> Four soldiers were killed and three wounded in action. Yet Russian gunners skillfully repelled the attack and inflicted heavy losses on the enemy. According to the Ministry of Defense, some 50 fighters were killed.

Sometimes photographs and videos display a Russian armored detachment that encompasses several BTR-82s and T-90A tanks.<sup>98</sup> The detachment provides force protection for the artillery. These task forces are likely given a reinforcement mission to the Syrian troops in crucial areas. The internet also contains videos of Russian forward observers and air controllers. These detachments comprise two to four forward air controllers using communications, surveillance, the Strelitz, and C4I terminals.<sup>99</sup> Force protection is provided by reconnaissance and special operations units. The detachments operate the Tigr fighting and Kamaz MRAP (mine resistant ambush protected) vehicles. One should not mistake air controllers for special operations forces. The latter operate mainly in the enemy rear, whereas the former operate in the battle order of Syrian troops.

What does the *Syrian experience* mean for the Russian army? Before answering this question, one should carefully look at the foregoing statistics on the campaign participants. Officers and generals make up over 40 percent of the personnel deployed to Syria. Among them, the ratio of pilots is undoubtedly high. Yet the lists of casualties and those awarded medals prove that the Russian Armed Forces in Syria had a high ratio of combined arms officers and generals.

The Syrian campaign prime result is the experience that battalion regiment (brigade) division army officers gained in the *distributed* command system. The campaign also field-tested the RFC concept. The warfare was conducted by mission-tailored task forces and combat teams, not the formations of strict military hierarchy. Considering the tactical situation, these were deployed to various operational areas. The campaign saw active employment of C4Is and UASs.

The Russian Armed Forces in Syria mastered all aspects of combined and joint teams in combat situations. That was the first time that the single operation plan and command had combined air, naval, and ground troops (special operations detachments and artillery units). In March 2018, Army General (then Colonel General) Oleg Salyukov, the Army Commander in Chief, said,

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<sup>97</sup> Николай Сурков and Алексей Рамм, “Батарею защитили огневой завесой,” *Izvestia*, May 28, 2018, <https://iz.ru/748509/nikolai-surkov-aleksei-ramm/batareiu-zashchitili-ognevoi-zavesoi>.

<sup>98</sup> Павел Иванов, “В единой маскировочной расцветке,” *VPK*, Dec. 19, 2017, <https://vpk-news.ru/articles/40480>.

<sup>99</sup> *Сирия: Смертоносная карусель — русский спецназ наводит Ми-28 на боевиков*, Youtube: RusVesna.su, Mar. 1, 2018), Video.

“Division leaders have gained the experience to command and control large tactical formations. This is the experience necessary for the future commanders of operational teams.”<sup>100</sup>

## Promotion to District Commander

Traditionally, combined arms officers are assigned the positions of military district commanders, deputy commanders, and chiefs of staff. Yet the New Look (as described below) tried to abandon the practice. Between 2010 and 2013, the Eastern Military District was commanded by Admiral Konstantin Sidenko.<sup>101</sup>

Nowadays, the Defense Ministry rejects the New Look idea, except for the Northern Fleet Strategic and Operational Command headed by Admiral Alexander Moiseev. Military district commanders and their deputies and chiefs of staff are battle-seasoned combined arms generals.

Before the Syrian campaign started, the nominee had to successfully cover certain positions. First, combined arms army commander. Then, deputy district commander. And finally, military district chief of staff. Then the candidate proceeded as Chief of the Main Operational Directorate of the General Staff. Two or three years later, the general was promoted to the military district commander.

That was the career path for Sergey Surovikin, Andrey Kartapolov, and Vladimir Zarudnitsky. Such a multistage selection procedure was thought to choose the best and give the extensive experience and skills as well as the right vision and deep understanding of strategic planning and its problems. However, Syria has significantly changed the selection criteria. The appointment is now granted to those with successful background in command of combined and joint teams. The newly appointed commanders of the Western (Colonel General Alexander Zhuravlev), Central (Colonel General Alexander Lapin), and Southern (Colonel General Alexander Dvornikov) Military Districts never served as Chiefs of the Main Operational Directorate of the General Staff.

The Eastern Military District Commander, Lieutenant General Gennady Zhidko, started as the Commander of the 2nd Guards Combined Arms Army to serve half a year as Deputy Chief of the General Staff and be finally promoted to command a military district. All the generals proved themselves in warfare. In particular, Alexander Dvornikov, Alexander Zhuravlev, and

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<sup>100</sup> “Главком рассказал о планах по структуре Сухопутных войск,” Рамблер, Dec. 22, 2017, <https://news.rambler.ru/army/38748669-glavkom-rasskazal-o-planah-po-strukture-suhoputnyh-voysk/>.

<sup>101</sup> “Константин Семенович Сиденко. Биографическая справка,” RIA, Jun. 28, 2010, <https://ria.ru/20100628/250749764.html>.

Alexander Lapin commanded the Russian Armed Forces in Syria. Generals Dvornikov and Zhuravlev were bestowed with the Hero of Russia honorary title.

There is no official information on Gennady Zhidko's battlefield career in Syria. He is known to have served two tours of duty. The first gave him the Hero of Russia, while the second put him in the position of a military adviser to the Syrian troops in their successful advance from Palmyra to Deir ez-Zor and in the Euphrates crossing.

## Firepower, Summarizing the Foregoing

The Russian joint team features unique firepower and engagement. Because of the ESU TZ, Strelets, Akatsiya-M C4Is, and unmanned aircraft, combatant commanders can defeat any targets within 500 km in real time. And these hits are not regular massive strikes delivering tons of metal, but high-precision ones, such as the Iskander or Uragan-M1 missiles or guided munitions fired by the 2S4 heavy mortars and the 2S7 long-range artillery systems, or even the long-abandoned Krasnopol guided projectiles of the 2S19 self-propelled howitzer.

The situation is roughly the same with anti-aircraft systems. The rearmament has brought in joint and combined capability for all-around layered air defense with the engagement distance of over 70 km. The troops have enhanced capabilities to counteract both enemy carrier aircraft and its high-precision weapons.<sup>102</sup> The Tor-M2 securely kills fixed and rotary wing aircraft, as well as smart bombs. Moreover, the Tor will be transferred from the division to the regiment air defense.

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<sup>102</sup> Рамм, «Мы сбиваем всё, что шевелится.»

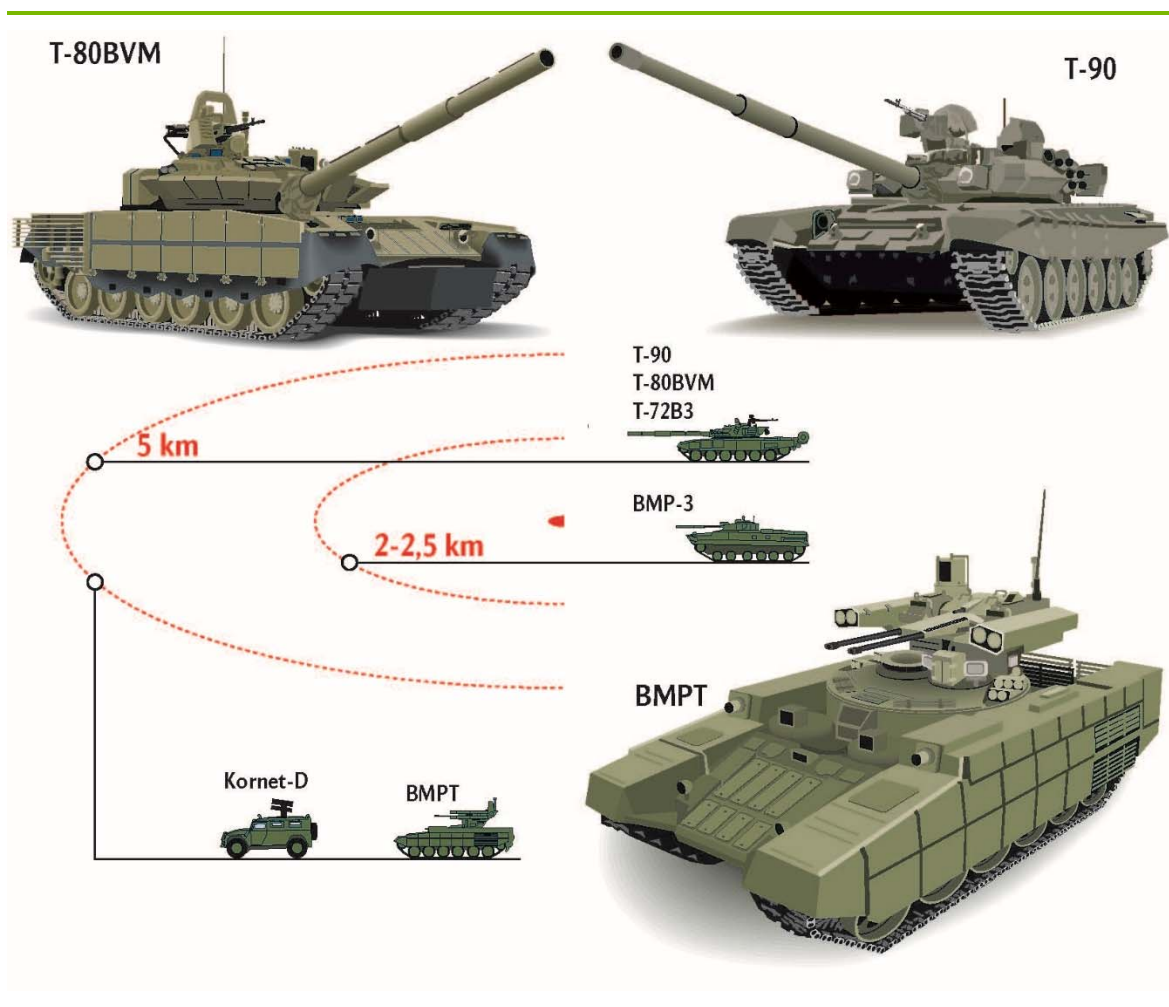
Figure 15. Air defense capabilities in a combined arms army



Source: Infographics by Maxim Gordienko.

The combined arms firepower has drastically increased within all formations, from regiments up to the army asset. So, divisions have adopted long-range anti-aircraft and artillery systems. The Defense Ministry has ordered *pocket-sized* Iskanders—a tactical missile and an advanced division fire support component—to engage targets at a distance of up to 100 km. The military is maximizing fire support at any level of the operational chain of command.

Figure 16. ATGM capabilities in a combined arms division



Source: Infographics by Maxim Gordienko.

The combination of Kornet and Kornet-D ATGMs, tank-guided missiles, and the Khrizantema long-range missile defense systems will employ antiarmored areas to eliminate enemy armored vehicles at a distance of up to 5 km.

The advanced *distributed* command system is a revolutionary solution for the Soviet and Russian military schools. The Defense Ministry has also moved forward with C4I integration. Everything is fine-tuned in a joint team. Yet how will the combination of these teams (the so-called strategic joint team) interoperate—particularly when it comes to the interaction with air and naval teams?

This stage has seen apparent difficulties that initiated the “Army occupation.” That is, combined arms officers and generals started occupying key positions in the Aerospace Force, the Navy, and in military district commands. The exercises held for the last two years have targeted interoperability between joint strategic teams, when deployed into various operational areas, and their sister teams from the Aerospace Force and the Navy.

The other essential issue is as follows: How soon will the Defense Ministry reorganize its brigades into divisions, deploy new military formations, and continue rearmament? There is a lot to do because, as was mentioned earlier, just two combined arms armies have already activated the full army asset. Yet the activation of new formations is quite a long procedure. It takes two or even three years to man, equip, organize, and deploy a combined arms regiment.

Ten years of continuous reforms have finally resulted in a new development vector. The Armed Forces have finally overcome many of the organizational challenges inherited from the USSR. The Army, unlike its sister services the Navy and the Aerospace Force, has seen a clear and precise development trajectory. There are many ambitious, but practically never implemented, projects in the *sea* and *air*. To illustrate, recall the construction of nuclear-powered destroyers or the revival of the Atlant cruisers. Such projects bring problems and distract resources. Yet they never bring the desired result.

To sum up, the Defense Ministry and Army leaders have carried out a serious military reform. The enhanced Army has already passed its battlefield exam to prove its efficiency. It has successfully employed C4Is and unmanned aircraft. These activities have established a trusted and reliable multilevel command and control system.

Meanwhile, the Defense Ministry may face financial problems in the near future. These will definitely complicate the Army’s further progress as large funds are currently allocated for the nuclear triad, the Aerospace Force, and the Navy.



# Figures

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Figure 1.	Structure of the Russian Ministry of Defense as of 2016 .....	4
Figure 2.	A combination of tanks and helicopter gunships drastically increases combined arms firepower.....	6
Figure 3.	Russian ground forces dispositions as of 2016.....	12
Figure 4.	Combined arms army structure .....	13
Figure 5.	A participant in the reconnaissance competition at Russia’s International Army Games.....	16
Figure 6.	An upgraded T-72 tank in a defensive exercise against “enemy” forces .....	18
Figure 7.	“Future” Motorized Rifle Division.....	20
Figure 8.	The T-72B3 tank practicing operations in extreme conditions .....	21
Figure 9.	A motorized rifle unit machine gun operator .....	24
Figure 10.	A motorized rifle company during a river crossing.....	26
Figure 11.	Streletz C4I is a crucial command element in a combined arms army.....	29
Figure 12.	The sixth-generation Azart radio station (advanced versions of the system, already mastered by soldiers, are entering the service in great numbers).....	34
Figure 13.	Unmanned aerial systems are an indispensable attribute in any Army exercise .....	37
Figure 14.	Missile and artillery capabilities in a combined arms army .....	40
Figure 15.	Air defense capabilities in a combined arms army .....	49
Figure 16.	ATGM capabilities in a combined arms division.....	50

# Abbreviations

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ACCS	Automated command and control systems
ADB	Air Defense Brigade
ADR	Air Defense Regiment
ATB	Anti-Tank Battalion
BTF	Battalion task force
BTG	Battalion tactical group
C2	Command and control
C3-C4I	Command, Control, Communications, Computer, Intelligence, and Satellites
CB	Command Brigade
CP	Command post
ER	Engineer Regiment
EWB	Electronic Warfare Battalion
FAB	Field Artillery Brigade
FAR	Field Artillery Regiment
ICSSB	Independent Combat Service Support Brigade
IMIB	Independent Military Intelligence Brigade
IRFC	Integrated Reconnaissance and Fire Contours
MB	Missile Brigade
MLRS	Multiple Launch Rocket System
MRAP	Mine resistant ambush protected
NBC	Nuclear, Biological, and Chemical Defense
OSK	Joint Strategic Command
RFC	Reconnaissance and Fire Contour
RS	Reconnaissance Squadron
RSC	Reconnaissance and Strike Contour
SB	Sustainment Battalion
SOT	Special operation troop
UARS	Unmanned artillery reconnaissance system
UAS	Unmanned aerial system

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