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Factors Influencing Russian Force Modernization

Dr. Lester Grau and Charles K. Bartles¹
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A wide-spread Russian perception is that Russia is back as a significant Eurasian power whose opinions and desires need to be understood and accommodated. Russia has regained its national pride, confidence and sense of destiny. Russia still feels threatened from the south and the west and is taking political and military steps to deal with that unease. Historically, Russia feels most secure when it has a strong leader and a strong military. Russians are willing to forego much in order to ensure their security. There are perceived internal and external threats to the Russian state and Russia is addressing these through military reform, military restructuring, force modernization, equipment modernization as well as domestic security restructuring and modernization. Understanding those factors that drive these actions facilitates and potential forms of future war may assist understanding Russian official statements and actions.

External Factors

The Character of Future War

Russia and the Soviet Union have always been primarily a ground power, with the Navy and Air Force functioning as supporting services. After the Second World War, the Soviets believed that future modern warfare would closely resemble the battles they had fought in the last years of the war, albeit with nuclear weapons.² The military that the Russian Federation inherited in the 1990s had a bloated command structure designed for the command and control of literally thousands of divisions, regiments, and battalions, with the vast majority of these units being 'skeleton units' manned by small cadres that would help flesh out the unit with conscripts and reservists in the event of a mass mobilization. This type of structure was ideal for fighting large-scale state-on-state warfare like the Soviet Union experienced in World War II, but it became apparent after the Cold War that Russia would most likely face a different type of conflict in the future.

¹ Lester W. Grau and Charles K Bartles are analysts at the Foreign Military Studies Office (FMSO) at Fort Leavenworth, Kansas. The authors assume responsibility for the accuracy of the source documentation of the cited material, that no classified material was used and that the article conforms to copyright and usage permissions. The observations, opinions and assertions expressed in this article are those of the author and do not represent the official policy or position of the Oxford Changing Character of War Centre, the University of Oxford, the FMSO, the Department of the Army, Department of Defense, the U.S. Government or any other part of the U.S. Government. The FMSO assesses regional military and security issues through unclassified open-source media and direct engagement with foreign military and security specialists for professional military education and to advise leadership on issues critical to the U.S. Army and the wider military community. © 2018 Changing Character of War Centre. Material in this publication is copyrighted under UK law. Individual authors reserve all rights to their work and material should not be reproduced without their written permission.

² Christopher N. Donnelly, *Red Banner: The Soviet Military System in Peace and War*, first edition. Coulsdon, Surrey: Jane's Information Group, 1988. pp. 180-182.

In recent years, Russia's conflicts have been on a much smaller scale, namely the counter-insurgency effort in the North Caucasus, and the 2008 Russia-Georgia War. Beliefs about the changing character of future war and the lessons learned from Russia's post-Soviet military experience drove Russia to reform the military district system and transition from a division/regimental to a brigade structure. These reforms were intended to streamline command and control, in order to give the Russian military a command structure more capable of responding to regional and low-intensity threats.

Military District System Reform

One of the highest-profile command and control changes that Russia made was the reform of the military district system. This reform did not just condense six military districts into four (later five), but also significantly changed command relationships. In the Soviet system, the military district commander (there were up to 16 military districts during Soviet times) was responsible for garrisoning, training, rear area logistical support, protection of strategically vital areas, and coordination of civil defense. These missions were his primary concern, and fulfilling them involved pre-conscription training, conducting the fall and spring conscription campaigns, operating military state farms, doling out pensions, among other things. In wartime, the military district was responsible for conducting mass mobilization, including preparation of units for combat, transportation of units to the front, logistical support, and replenishment. The military district commander was not responsible for operational control of most units in his territory.³ This responsibility generally lay within the Branches of Arms (Ground Forces, Air Force, Navy, etc.) in peacetime.

The 2010 reform gave the military district commander operational control of most military and MoD forces in their respective regions, with the exception of all nuclear and certain strategic assets such as the Strategic Rocket Forces (RVSN), Airborne (VDV), and GRU spetsnaz units. At this time, the military districts were renamed "Operational Strategic Commands" (OSK), although the term "military district" is still used when referring to the organization when it is involved with more mundane rear-services activities. In 2014, the Russian Federation established the Arctic Operational Strategic Command, based upon the Northern Fleet Headquarters at Severomorsk. In sum, the reform of the military district system did far more than reduce the number of military districts, it also changed command and control relationships in a way very similar to the way that US command and control relationships were changed by the Goldwater-Nichols Department of Defense Reorganization Act of October 4, 1986.

Regiment/Division to Brigade Transition

The regimental/division structure that Russia inherited from the Soviet Union is a vestige of the Soviet conscript-based Army oriented to large-scale warfare, a structure that was officer heavy. Russia's civilian leadership, and some elements in the military leadership, believed the Armed Forces structure should emulate the more modular forces that were quelling the insurgency in Chechnya and the North Caucasus during the early 2000s. (Russia had been experimenting with composite battalions which were operating with generally positive results.) The Russian leadership was also aware of the U.S. and other countries transition to a brigade structure, believing that smaller, more modular, units were better suited for counterinsurgency operations and small regional conflicts that they would most likely face in the future. In terms of command and control, and force projection, these reforms are important for several reasons. The first is that they are responsible for consolidating the division/regimental structure (8,000-10,000 personnel) into modular maneuver brigades of approximately (3,000-4,500 personnel), each capable of conducting independent action and providing its own organic support. (The difficulties of deploying and supporting a brigade is an order of magnitude easier than doing so for a division.)

³ Ibid, 149-151.

Charles K. Bartles, "Defense Reforms of Russian Defense Minister Anatolii Serdyukov," *The Journal of Slavic Military Studies*, Vol. 24, No. 1, 2011.

The transition to brigade structure not only reduced a level of management, but was also instrumental in reducing the bloated officer corps. When Russia converted to the brigade structure, it also designated all units as “permanent readiness units,” eliminating all “cadre units” and the positions of the cadre that manned them (mostly officers). To understand the impact that this change had on the officer corps, consider that in 2008, the Russian Armed Forces was short of some 40,000 officers. By 2010, after the elimination of officer cadre positions and downsizing of most headquarter elements, the Russian Armed Forces had such an abundance of officers that in some cases lieutenants were placed in NCO positions.⁴

Partial Transition Back to the Regiment/Division

Although the Russian Ground Forces mostly transitioned to a brigade structure during the ‘New Look’ reforms, a few divisions remained. The Russian Federation is now reintroducing the division into its organizational structure in a few key locations. The general consensus of Russian opinion on the reason for this conversion is that antiterrorist operations are now less of a concern (which the brigade is better suited), while the possibilities of peer-to-peer conflict are on the rise (for which the division is better suited).

These divisions are reportedly intended to deter a NATO invasion. Of particular interest is where these divisions are located. All new divisions are located in the Southern Military District; and southern half of the Western Military District. These dispositions should be expected, the Southern Military District is adjacent to (or contains) hotspots and/or territorially disputed areas such as Abkhazia, South Ossetia, conflict areas in Eastern Ukraine, the Crimea, and Georgia, a country Russia fought a war with in 2008. Although a few divisions have been formed in the Western Military District, near the Ukrainian and Belarussian border, no divisions have been formed near the Baltics, despite Russian claims these divisions are intended to combat NATO. The Russians have been adamant that they have no desire for territorial expansion in the Baltics, Russia’s decision not to place divisions near this area may be a way of messaging this intent.

The exact structure of these divisions has yet to be announced, but it is likely these units will not be fully manned. The typical structure of a motorized rifle division consists of 3 motorized rifle regiments, 1 tank regiment, 1 artillery regiment, 1 air defense regiment, and a few separate battalions, companies, and platoons. (Tank divisions have a similar structure, but 1 motorized rifle regiment, and 3 tank regiments.) In current practice, most divisions are missing 1 or more motorized rifle or tank regiments. There is a high likelihood that these ‘missing’ regiments are intended to be fleshed out with reservists in the event of large-scale mobilization, similar to the cadre system the Russians maintained before the 2008 ‘New Look’ reforms. This may appear to be rolling back the ‘New Look’ reforms, but this is not the case. Prior to 2008, most divisions had a very low level of combat readiness, most divisions had difficulty even fielding a single battalion tactical group for operations in Chechnya and the 2008 Russo-Georgian War. Today, all brigades and divisions are considered ‘permanently ready,’ usually having manning levels of over 80%, with each maneuver brigade and regiment (supposedly) capable of forming at least one battalion tactical group.

Conscript and Contract Manning

Soviet, and subsequently Russian beliefs on the character of future war would have profound impacts on the Russian military’s personnel system. After the Second World War the Soviets believed that the future of modern warfare would closely resemble the battles they had fought in the last years of the war, albeit with nuclear weapons. These battles would require vast numbers of troops organized in divisions, army groups, and fronts to execute high speed maneuver warfare to penetrate enemy defenses and then exploit these successes. Consequently, the Soviets believed that the enlisted force that would be required to fight in future battles would resemble the enlisted force that fought in the

⁴ Igor Ivanov, “Boys with Military Stripes: Where Are the Future Suvorovs and Zhukovs to Be Trained,” *Rossiyskaya Gazeta* Online, 1 April 2010, <http://www.rg.ru/2010/04/01/armiya.html>.

Second World War. To mass a large army without bankrupting the economy, the Soviets retained their universal conscription system. The intent was that all males would receive a basic level of military training during their two-year stints and would then be able to return to civilian life. These former conscripts would infrequently be called for musters, and would be called *en masse* in the event of a mobilization. This system had an unintended consequence for the strong NCO corps that the Soviets had inherited from the Tsarist Army. The two-year conscription model for enlisted personnel had no real career path for enlisted personnel who desired to serve past their initial conscription length. The strong NCO corps that emerged after the Second World War soon disappeared, as these NCOs either left the service or became commissioned officers. In the Soviet Armed Forces, officers, not NCOs, became the primary small unit leaders and trainers.⁵

This system began experiencing problems as the Soviet Armed Forces began to modernize rapidly in the 1960s and 1970s. Technically advanced equipment requires skilled and well trained labor to operate and maintain it. Since two-year conscription terms were considered insufficient time to train individuals to perform complex technical tasks, Soviet officers performed duties that would normally be performed by NCOs in Western armies. The Soviets believed this was an inefficient way of managing manpower, and decided to create “warrant officer” positions primarily to maintain and operate advanced equipment. These warrant officers, recruited from conscripts who had completed their initial tours, were generally not viewed favorably by the officer corps, since the best conscripts who wanted to continue their military service were enrolled in military academies. Russian warrant officers relieved some of the technical and small unit leadership burdens that were placed on officers, but were never well regarded as an institution and had little in common with Western NCOs and warrant officers.⁶

Soon after the collapse of the Soviet Union, then Russian President Yeltsin mentioned abolishing the conscription system. Conscription was very unpopular due to problems with hazing, and the popularity was even further lowered due to the effects of the turbulent financial situation, which was devastating the Russian Armed Forces. Due to the economic situation, little progress was made towards full enlisted professionalization, but Russia did start its first “contract NCO” program, which allowed enlisted soldiers to serve with better pay and privileges, such as not living in barracks.

Russia has maintained a hybrid system of conscription and contract service to the present day. Russia’s hybrid conscript/contract Manning system has been somewhat controversial in the Russian military leadership due to concerns about the reserve system. Some generals have lamented the idea of completely abolishing the conscription system, because they believe such a reform would deprive Russia of a large strategic reserve with at least some military training.

Currently, Russia has a one-year conscription service term. Most Russian commanders agree that a one-year draft period is believed to be too short to instill effective fighting skills for an infantryman, so conscripts are usually routed to combat support positions (drivers, cooks, laborers, etc.), while contract NCOs fulfill the “trigger puller” positions in combat arms units. This system is creating considerable difficulty for combat service support units that require skilled labor (such as mechanics), as they are forced to work with high percentages of conscripts who are unable to master complex skill sets in such a short time. The net result of this situation is that maneuver commanders are unhappy with the level of support they have been receiving from certain combat support elements (mainly maintenance). In 2017, the Russian media reported that there are more servicemen serving in the Russian Armed Forces as contract NCOs, than as conscripts.⁷

⁵ Aleksandr Pinchuk, “The University for Sergeants,” *Krasnaya Zvezda* Online, 23 November 2012, <http://www.redstar.ru/index.php/2011-07-25-15-57-07/item/5984-serzhantskie-universitetyi>.

⁶ Donnelly, *Red Banner*, pp. 180-182.

⁷ Andrey Sokolov, “The Contract Recruitment System Has Proven Its Effectiveness,” *Oriyentir* Online, 1 August 2017, <http://orientir.milportal.ru/wp-content/uploads/2017/08/8.17.pdf>

The Reserve System

The Russian Federation Ministry of Defense has been tinkering with wide-scale reforms of the military reserve system for several years, with varying degrees of success. The current reserve system was inherited from the Soviet Union, and was designed for supporting a doctrine that required maintaining a large strategic reserve of troops that could be mobilized in the event of large-scale warfare. It was composed of conscripts and officers who had completed their mandatory service obligation and had been discharged from active service, with rare and infrequent call-ups to test mobilization capabilities. There has been some debate about whether Russia needs to maintain a large strategic reserve or should switch to more of an operational reserve. Opinions vary between two major camps, the reformers saying that an operational reserve would do far more to enhance security because an operational reserve would be smaller, better trained, more able to quickly become combat ready in a national emergency, and more likely to be called in an emergency, while older retired senior officers that believe that the capability to mass mobilize should be maintained at all costs. Debate on this issue appears to be settled, as Russia is increasing both capabilities.

The large strategic reserve will be developed by maintaining the universal conscription system and increasing the size and scope of Volunteer Society for Cooperation with the Army, Aviation, and Navy (DOSAAF) programs that provides military training and militarily useful skills to Russian youth. In conjunction, the Russian Armed Forces are attempting to develop an operational reserve along two different models. The first model, is reminiscent of the US style of an operational reserve, with reserves reporting for duty and serving alongside active service members or serving in reserve units that support the active component. This system consists of an active reserve component conducting annual training requirements, receiving monthly stipends, and being completely voluntary. The intent is to maintain a cadre of officers and enlisted soldiers who regularly train at a mobilization center or with particular active units, and in the event of mobilization, the reservist would be called to duty to provide support or backfill as needed.⁸

The second model involves the use of reservists in stand-alone units called 'territorial-defense battalions.' (Russia experimented with these in the Vostok-2014 military exercise.) Territorial defense units have appeared elsewhere in Eastern Europe and usually consist of relatively lightly armed infantry who are assigned to secure critical infrastructure in the rear. These forces are not intended to serve in high-intensity combat operations, or abroad. The intent of this form of an operational reserve is to unburden the active duty force of these duties, allowing the latter greater freedom of movement to conduct combat operations.⁹

Sixth Generation Warfare and Precision Strike

In the aftermath of Desert Storm in 1991, the late Major General Vladimir Slipchenko (1935-2005) considered the implications of the U.S.'s rout of the Iraqis. Slipchenko was keenly aware of former Chief of the Soviet General Staff, General Nikolai Vasilyevich Ogarkov's writings about "revolution in military affairs" and "weapons based on new physical principles," believing that Desert Storm was the first appearance of "sixth generation warfare."¹⁰ Slipchenko did not believe that this generation of warfare had fully come into being, instead believing that the 'informationalizing' of warfare and using precision strike

⁸ Bogdan Stepovoy, Aleksey Ramm, and Yevgeniy Andreyev, "In the Reserve, on Contract," *Izvestiya Online*, 13 February 2018, <https://iz.ru/706732/bogdan-stepovoi-aleksei-ramm-evgenii-andreev/v-rezerv-po-kontraktu>. Vladimir Pasyakin, "Reservists: on the Line," *Flag Rodiny Online*, 13 September 2016, http://sc.mil.ru/files/morf/military/archive/FR_2016-09-12.pdf.

⁹ "Four Territorial Defense Subunits Manned by Reservists Taking Part in Kavkaz-2016 in the Southern Military District," *Ministry of Defense of the Russian Federation Online*, 6 September 2016, http://function.mil.ru/news_page/country/more.htm?id=12094815@egNews.

¹⁰ Sixth generation warfare follows "fifth generation warfare," which focused upon the role of nuclear weapons. Slipchenko also believed that since the major powers (U.S./Russia) could not be successful with nuclear first use, they would not be used, resulting in a nuclear stalemate.

systems were its first manifestations. Sixth generation warfare is characterized by the increasing use of precision guided munitions (PGMs) and the growing importance of the informational aspects of war (information/psychological operations, C4ISR, Electronic warfare, cyber warfare, etc.). Usually when Russian security professionals are discussing “new generation warfare,” this is the context in which they are thinking.¹¹

Non-Contact Warfare

Slipchenko eventually came to believe that sixth generation warfare would be fully manifested with the emergence of “non-contact warfare,” which can be roughly defined as a type of warfare that is conducted by long-range and distant means, such as advanced cruise missiles and long-range drones. Such warfare would require not only advanced new weapons, but also a sophisticated C4ISR system to provide targeting data for these weapons. In the Russian view, the U.S. Prompt Global Strike concept is a prime example of “non-contact warfare.”¹² Russia is not sitting idly by while the U.S. develops sixth generation warfare capabilities. The Soviet Union, and now Russia, have long worked on the development of twin concepts for the detection and assured destruction of high-value targets in near-real time. Its current iteration is referred to as the reconnaissance fire system [разведывательная-огневая система]. This system is being implemented through the *Strelets* C4ISR system that allows servicemen to task tactical and operational-level fires by linking sensor, C2, and fire assets. (*Strelets* has reportedly been successfully deployed and battle tested in the Russian Armed Forces.) In the words of Deputy Chief of Staff of Ground Forces, Major General Vadim Marusin, “today the cycle (reconnaissance – engagement) takes literally 10 seconds.”¹³

Unmanned Aerial Vehicles

U.S. UAV usage has been of great interest in the Russian Federation, but Russia is taking a different path in its UAV development. While the U.S. has pioneered the use of UAVs as mobile firing platforms, Russia has been more interested in the ISR aspects of UAVs. Undoubtedly, Russia will eventually field a UAV that can function as a firing platform, but in the Russian view, it is far better to use a UAV accurately to direct cheap artillery rounds for an extended duration, than to have a UAV that just fires a missile or two and then needs to return to base.

Air Defense and Electronic Warfare

Due to U.S./NATO airpower and concerns about sixth generation warfare, air defense and electronic warfare are high priorities for Russian development. Overlapping Russian air defense capabilities are not only intended to destroy aircraft, but also cruise missiles, ballistic missiles, and even low-earth orbit satellites (S-500/A-235). Electronic warfare capabilities are capable of disrupting the satellite and terrestrial communications infrastructure, and precision navigation and timing (GPS/GLONASS) capabilities which sixth generation warfare systems require.

¹¹ Jacob W. Kipp “Russian Sixth Generation Warfare and Recent Developments,” *Eurasia Daily Monitor* Online, 25 January 2012, Vol. 9, No. 17, <https://jamestown.org/program/russian-sixth-generation-warfare-and-recent-developments/>.

¹² Peter A. Mattsson, “Russian Military Thinking – A New Generation of Warfare,” *Journal on Baltic Security*, Vol. 1, No. 1, 2015.

Charles K. Bartles, “Russian Threat Perception and the Ballistic Missile Defense System,” *The Journal of Slavic Military Studies*, Vol. 30, No. 2, 2017, pp. 152-169.

¹³ Aleksandr Stepanov, “Find and Destroy in Seconds: How Reconnaissance Works,” *Moskovskiy Komsomolets* Online, 2 November 2017, <http://www.mk.ru/politics/2017/11/02/nayti-i-unichtozhit-za-sekundy-kak-rabotaet-voennaya-razvedka.html>.

Lester W. Grau and Charles K. Bartles, “The Russian Reconnaissance Fire Complex Comes of Age”, *Changing Character of War Research Papers*, May 2018. <http://www.cw.ox.ac.uk/russia-nordic-baltic-defence-security>

Domestic Factors

Formation of the National Guard

In 2016, the Russian Federation established the National Guard of the Russian Federation [Федеральная служба войск национальной гвардии Российской Федерации (Russian: Росгвардия/*Rosgvardiya*)]. It is unlike the US National Guard, as these well-trained troops are on active duty with an internal security focus, performing such duties as dealing with riots and domestic unrest. This new independent agency reports directly to the Russian President (under his roles as Supreme Commander-in-Chief and Chairman of the Security Council), and is a distinctly separate entity from the Russian Armed Forces. *Rosgvardiya* controls most of Russia's internally-oriented militarized intelligence and security services, to include: The Ministry of Internal Affairs- Internal Troops (MVD-VV), Special Rapid-Response Detachment (SOBR), the Special-Purpose Mobile Detachment (OMON), the MVD Prompt-Response and Aviation Forces' Special-Purpose Center, and aviation subunits. The precise number is classified, but estimates of the total personnel controlled vary from 200,000 to 400,000 uniformed personnel.¹⁴

Russia's militarized intelligence and security services are now mostly consolidated under three main government bodies, the Ministry of Defense (MoD), Federal Security Service (FSB), and *Rosgvardiya*, instead of being spread through a myriad of ministries, services, and agencies. This alteration was likely due to shifting attitudes on the nature of both internal and external sources of threat. Russia's Soviet legacy made stove-piped militarized intelligence and security agencies the norm, as the Soviets were leery of investing all military power in a single organization or ministry, due to fears of a coup.

Since the Russian civilian leadership now has few concerns about its ability to control these militarized security and intelligence services, the Russian Federation has been trending towards the consolidation of these organizations' powers to reduce bureaucracy and redundancies. In recent years, Russia has also been particularly concerned about (allegedly) foreign-sponsored 'color revolutions'. The formation of a single military command to put down an insurrection may have been the impetus for creation of *Rosgvardiya*.¹⁵

One interesting possibility that has been proffered is that *Rosgvardiya* could be used for peacekeeping purposes, but the prospect seems unlikely. Aside from all other descriptions of the National Guard having an inherently internal security function, the Russian Federation already has a robust peacekeeping apparatus in the Ministry of Defense.¹⁶ It seems unlikely that the Russian Federation would use *Rosgvardiya* for peacekeeping purposes, as it does not have a sufficient logistical structure for extraterritorial deployments. Although if Russia desired to maintain a "lighter footprint" (police vs. military presence) in her "near abroad", it could be a possibility.¹⁷

Arms Procurement Process

The Russian Federation has demonstrated an impressive ability to design and rapidly field new large end items such as tanks, BTRs, and BMPs, a process which takes substantially longer in the U.S. One example is the fielding of Russia's T-14 tank mounted on the *Armata* chassis. In March of 2016, Sergey Chemezov,

¹⁴ Aleksandr Igorev: "A Place in the Formation Has Been Designated for the Russian Guard: The President Has Defined the Missions of the New Service," *Kommersant* Online, 12 April 2016. <http://www.kommersant.ru/doc/2961750>.

¹⁵ Charles K. Bartles, "Getting Gerasimov Right," *Military Review*, Jan/Feb. 2016, Vol. 96, No. 1, pp. 30-38.

¹⁶ Traditionally, peacekeeping duties were the sole purview of the Russian Airborne (VDV), which has one dedicated peacekeeping brigade (31st Air Assault Brigade at Ulyanovsk) and dedicated battalions in each of the four airborne divisions. In the last few years Russia has expanded the number of peacekeeping forces by designating dedicated peacekeeping battalions in each of its naval infantry brigades and transitioning the 15th Motorized Rifle Brigade in Samara to the first dedicated motorized rifle peacekeeping brigade in the Russian Armed Forces and another brigade has been stood up in Tuva.

¹⁷ Aleksandr Boyko, "Why Russia Needed a National Guard," *Komsomolskaya Pravda* Online, 6 April 2016, <http://www.kp.ru/daily/26510/3382734/>.

Lester W. Grau and Charles K. Bartles, *The Russian Way of War: Force Structure, Tactics, and the Modernization of the Russian Ground Forces*. Fort Leavenworth: FMSO, 2017. pp. 368-370.

head of the Russian state corporation Rostec, announced that the T-14 tank had already begun serial production.¹⁸ That statement has since been “walked back,” and the *Armata* is currently slated for deployment in 2020, but if held to this schedule, the *Armata* would be a good example of the Russian ability to field equipment many times quicker than comparable U.S. systems.¹⁹

The fielding of the *Armata* chassis appears not to be the exception, but the rule, as it apparently takes about 5-10 years from the beginning of the Russian design process until serial production begins for most major Ground Forces/Airborne end items, if the initial prototype is deemed viable. (Air and naval systems take much longer) The Ground Forces’ 2S35 *Koalitsiya-SV* howitzer (replacement for the *Msta-S* 2S19 howitzer), the Russian Airborne’s 2S36 *Zauralets-D* mortar/howitzer (replacement for the 2S9 *Nona*) and the 2S25 *Sprut-SD* light tank have all taken about 5-10 years to get from the issue of requirement/ initial design concept to the serial production phase.²⁰ Problems delaying the production of Russian armaments, in regard to ground combat vehicles, are usually in regard to the state’s financial resources, and not due to bureaucratic, parliamentary, or production constraints.²¹

The Russian Federation is able to enter serial production quicker than the U.S. due to a much different arms development cycle. Capability development questions are settled in the Russian General Staff with inputs from the branch chiefs (far fewer bureaucratic hurdles in the Russian system). There also appears to be no bidding process, the same manufacturers are consistently used. Design teams are continuously employed, and kept together to start on the next system or modernization as soon as their current project enters production. Manufacturers typically build a few prototypes, if the prototype is unacceptable, the manufacture returns to the design phase. Innovations are accepted or rejected at the prototype phase, many designs make it no further than this phase. If the prototype is acceptable, improvements are made, and a test batch (approximately a battalion set) of vehicles is produced for field testing.²² This field testing takes a year or two, after which, the product is further refined and put into full serial production. If the initial prototype is deemed viable, serial production of a major end item can begin approximately five years after the receipt of requirement and the design process begins. Rarely does a new system, or system modernization, replace all previous systems. Usually a certain percentage is replaced and then the next iteration begins.

Importance of Interoperability, Modularity, and Cost

Another reason that Russia is able to reach serial production quickly is the emphasis on interoperability and modularity.²³ All new Russian designs for BTRs and BMPs (*Armata*, *Kurganets*, *Atom*, BTR-82, BMD-4M) are manufactured to accept BMP-3 turret specifications. Manufacturers only have to design for the weapon capability and turret specification. (Mobility characteristics are determined by the chassis selected.) In situations where the chassis is not sufficient (such as ground pressure issues resulting from heavier loads), instead of developing a new chassis, the existing chassis are heavily modified. For example, the BMD-4M chassis had additional road wheels mounted to support the heavier components of the 2S25 *Sprut-SD* light tank, and the *Armata* chassis can have the engine situated in the front (BTR/BMP) or rear (tank) as needed.

¹⁸ “Tanks A Lot: Russia’s Advanced Armata T-14 ‘Already in Serial Production,’” *Sputnik Online*, 14 March 2016, <http://sputniknews.com/russia/20160314/1036238101/russia-armata-production.html>.

¹⁹ Nikolay Surkov, Aleksey Ramm, and Yevgeniy Andreyev, “The Taman Division, the ‘Division of the Future,’” *Izvestiya Online*, 22 February 2018, <https://iz.ru/708875/nikolai-surkov-aleksei-ramm-evgenii-andreev/tamanskaia-diviziiia-budushchego>.

²⁰ “Zauralets self-propelled artillery weapons to enter service in Russian Airborne Troops in 2019,” *Interfax*, 6 October 2014.

“The ‘Zauralets’ Self-Propelled Artillery System Has Completed Preliminary State Trials,” *Lenta Online*, 5 October 2015, <http://lenta.ru/news/2015/10/05/zauralets/>.

²¹ This explanation of Russian armament procurement is specifically in reference to ground combat vehicles (BTRs, BMPs, tanks, howitzers, etc.), and does not pertain to shipbuilding and aviation which have far different timelines and significantly more problems with their production processes.

²² Sergey Mikhaylov, “The Armed Forces Are on the Upswing,” *Stoletiye Online*, 7 October 2014, http://www.stoletie.ru/obshchestvo/armija_na_podjeme_129.htm.

Grau and Bartles, *The Russian Way of War*, pp. 368-370.

²³ Aleksandr Kurennoy and Aleksey Naryshkin: “Vyacheslav Khalitov, Deputy Director of the Uralvagonzavod Science and Production Corporation Open Joint-Stock Company for Specialized Technology,” transcript of Arsenal radio program posted on *Ekho Moskvy Online*, 26 January 2015, <http://m.echo.msk.ru/interview/detail.php?ID=1480668>.

Russia's unified design standards make many combinations of turrets and chassis possible, despite being produced by different manufacturers, a beneficial situation for the export market. Russia has made great strides to promote modularity, but they admit far more must be done, particularly in the area of information networking between different systems, a must for network-centric warfare.²⁴

It appears that cost (both production and operation/maintenance) is a key factor that is considered from the very beginning of development. Innovations that are deemed too costly are weeded out early, the design must not only be combat effective, but also feasible in terms of cost. To develop new technologies and control costs, Russia appears to pursue the incremental "evolutionary" approach, as opposed to "revolutionary" approach to development and design. Many of the design elements of the T-95 tank prototype are found in the T-14, to include the gun (2A82 125-mm smoothbore gun/ ATGM launcher), active defense system (*Afganit*), engine (Chelyabinsk A-85-3A X-diesel engine), and several other systems.²⁵ Russia can apparently overcome any proprietary issues and may use "plug-n-play" options and features from different manufacturers as desired. Although Russia will experiment with new innovations (such as double-barreled howitzers), they will usually build these innovations on the backs of known and trusted components. For instance, the 2S35 *Koalitsiya-SV* howitzer has a completely automated turret (new innovation) with plans to reduce the crew to two or three personnel, but this turret is on the same chassis that has reliably served *Msta-S* for many years. (There are plans that *Koalitsiya-SV* will eventually be on an *Armata* chassis). This system assures that Russian weapons manufacturers never really "start-from-scratch" and allows for the economic feasibility of smaller production runs.

Russia is also pursuing this evolutionary strategy in terms of robotization. Instead of attempting to develop robotic combat vehicles from scratch, Russia is incrementally adding robotic capabilities (autoloaders, unmanned turrets, computerized steering, and so on) to existing systems and reducing crew sizes, with the desired end state of eventually eliminating the entire crew for some combat vehicles, including the T-14. One advantage that likely allows a quicker run to serial production is Russia's use of only a few manufacturers. Russia's primary manufactures of combat vehicles are *UralVagonZavod* (T-72, T-90, *Armata*) and *KurganMachineZavod* (BMP-1, BMP-2, BMP-3). These production lines may be kept "warm" through the steady production of new combat vehicles and the refurbishment of old combat vehicles. *UralVagonZavod* is currently conducting "frame-off" upgrades of Russia's entire T-72 fleet, converting them into T-72B3s. Russian manufacturers have also touted the capabilities of new computer software that more quickly facilitates production than traditional paper plans and have recently introduced 3D printing technology that has also sped development.²⁶

The Russian Federation has made great efforts to enforce the principles of interoperability and modularity throughout her Armed Forces. One example can be seen in naval air defense systems. Russian naval air defenders 'borrow' systems from their Ground Forces and Aerospace Forces brethren. Russian naval vessels are being equipped with naval variants of the S-400 and *Pantsir-S* (Aerospace Forces air defense systems) and the *Buk* (a Ground Forces air defense system). Aside from the obvious benefit of reducing development costs, the economy of scale issues involved with producing existing systems also provide additional financial benefits for state coffers.

Another example is the Russian Navy's development of modular launch systems that are capable of firing different types of missiles. The Russian Federation is already fielding the 3S-14 universal vertical launcher. The 3S-14 is capable of firing several different missiles including the: 3M55 *Onyx* (SS-N-26 Strobile) anti-ship missile, the 3M-54 *Kalibr* (SS-N-27 Sizzler) anti-ship missile, the 3M-14 *Kalibr-NK* (SS-N-30A) land-attack cruise missile, and Russia's new 3M22 *Tsirkon* (SS-N-33) supersonic

²⁴ A. Oleynikov and I. Chusov, "The Problem of Interoperability in the Russian Federation Armed Forces," *Vestnik Akademii Voenykh Nauk* Online, 31 December 2017, No. 1 (61), 2017. pp. 61-68. <http://cplire.ru:8080/4318/>.

²⁵ Yaroslav Vyatkin, "Next Is the T-14: Newest Russian Tank Demonstrated to a Very Small Circle," *Vzglyad* Online, 26 September 2013, <http://www.vz.ru/society/2013/9/26/652197.html>.

²⁶ "Technological Breakthrough: Russia to Debut 3D Printed Armata Tank," 2 February 2016, *Sputnik* Online, <http://sputniknews.com/military/20160206/1034346115/russia-3d-printed-armata.html>.

Yuriy Belousov, "Only an Armata is More Awesome than an Armata," 3 July 2015, *Krasnaya Zvezda* Online, in Russian 03 July 2015, <http://redstar.ru/index.php/newspaper/item/24718-kruche-armaty-tolko-armata>.

anti-ship missile. Russia is now developing its next generation of universal missile launchers. The UKSK-M will be capable of not only firing the same missiles as the 3S-14, but will also be capable of firing air defense and antisubmarine missiles. Due to the varying lengths and diameters of these different missiles, these launchers are likely to waste a significant amount of space for most applications, but in exchange Russia would gain a universal launcher capable of being installed on most Russian submarines, cruisers, destroyers, frigates, and even corvettes.²⁷

Growing Importance of Robotics

The Russian military, as many other militaries, is now seriously considering the role of robotics and artificial intelligence on the modern battlefield. Despite references to the Terminator film franchise, Russia does not appear to see a future, in the near term, where combat is conducted solely by autonomous robots. Instead remote-controlled and semi-autonomous robotics will be integrated into conventional units, serving in the most dangerous roles as fire fighters, mine clearers, EOD technicians, armed sentries, and as cannon fodder for the initial assaults on fortified positions.²⁸ In keeping with these functions, and unlike many of the robots in the Terminator films, Russian robots have a distinctively “mechanized” appearance, with most systems being found on tracked chassis. In fact, just as much discussion of robotics deals with automating existing platforms (such as the *Armata*, *Kurganets*, and even T-72 chassis) as with creating new systems. Russia’s newest generation of light track chassis, the *Kurganets*, reportedly utilizes a PlayStation-like controller for steering. Apparently, designers think that Russian soldiers of the future will be much more comfortable with this type of controls than with steering levers and a manual transmission. These sorts of novel designs will also more easily facilitate the installation of automated control systems.²⁹

The Russian Federation has adopted an evolutionary, as opposed to revolutionary, approach to robotization. In practice, this means that instead of trying to develop completely new systems, a majority of Russian efforts in this area have focused on grafting robotic capabilities on to existing platforms. These efforts include experimenting with remote-controlled and semiautonomous heavy tracked platforms (such as the *Armata*, *Kurganets*, T-90, and even T-72 chassis). This meshes well with Russia’s considerable experience fielding auto-loading tanks and self-propelled artillery systems, a necessity for fielding any robotized weapons platform. Unmanned turrets (such as on the T-14 *Armata* and new BTRs and BMPs) are the future of Russian combat vehicles. Russian analysts have speculated that there may eventually be no lethality difference between wheeled Armored Personnel Carriers (BTRs) and tracked Infantry Fighting Vehicles (BMPs), as the only firepower difference between them will be the type of turret with which they are equipped, a turret that may be (relatively) easily replaced.³⁰

The Russian Armed Forces are also developing small, automated, unmanned turrets for placement on manned armored personnel carriers, armored cars, support vehicles, and even used as secondary weapons on large weapon systems such as self-propelled artillery pieces. Unmanned turrets are considered beneficial for crew protection as well as for Intelligence, Surveillance, and Reconnaissance (ISR) support. These Remote Controlled Turret Modules (DUBM) are equipped with a variety of sensors which far exceed the capabilities of the human eyes and ears in a manned turret. Reports about these systems have touted their ability to engage low flying and low speed aircraft.

²⁷ Aleksandr Kruglov, Aleksey Ramm, and Nikolay Surkov: “The ‘Admirals’ Will Be Armed With ‘Cell Missiles’,” *Izvestiya Online*, 3 January 2018, <https://iz.ru/682833/aleksandr-kruglov-aleksei-ramm-nikolai-surkov/admiralov-vooruzhat-sotovymi-raketami>.

Aleksey Ramm, Nikolay Surkov, Yevgeniy Dmitriyev, “Multipurpose System Will Enable Use of Any Missile in Any Weather,” *Izvestiya Online*, 17 November 2017, <https://iz.ru/654343/aleksei-ramm-nikolai-surkov-evgenii-dmitriev/rossiiskii-flot-poluchit-superraketnitsu>.

²⁸ Grau and Bartles, *The Russian Way of War*, pp. 378-379.

²⁹ Leonid Orlenko, “Breakthrough Robots,” *Voyenno-Promyshlennyy Kuryer Online*, 23 September 2015, <http://www.vpk-news.ru/articles/27159>.

³⁰ Aleksey Ramm, “Strike, Another Strike: Three types of robotic combat machine are being built on a common platform,” *Voyenno-Promyshlennyy Kuryer Online*, 23 December 2015, <http://www.vpk-news.ru/articles/28600>.

This capability may be a result of the Russian belief that the battlefield of the future will increasingly involve more UAVs controlled by both state and nonstate actors. A built-in air defense capability, such as these Remote Controlled Turret Modules, would be a great benefit in such an environment. Most DUBM configurations involve the use of a 12.7-mm 6P49 “Kord” machine gun, a rough equivalent to the U.S. Browning .50 caliber machine gun. If Remote Controlled Turret Modules become common place in the Russian military, even Russian armored cars and support vehicles would be equipped with about the same firepower as most standard U.S. Army Strykers. In general, most Russian robotics developments, and other “incremental” technology advancements are useful not only for developing future robotic platforms, but also for current systems, by supporting Russia’s line of effort to do more with less personnel.

Focus on Munitions, Instead of Platform Development

The Russian defense circles are notionally split into two camps, with one camp advocating state funding for new “platforms” such as tanks, field guns, aircraft, and helicopters. The other camp advocates funding precision weapons such as guided munitions and cruise, aeroballistic, and hypersonic missiles. The crux of this debate is whether the finite amount of defense rubles are better spent on expensive platforms (aircraft, ships, etc.) or more modestly priced platforms with better munitions. President Putin’s recent comments at a meeting of the Defense Ministry Board, appears to make it clear that Russia will favor the latter. “A special emphasis must be made on equipping troops with high-precision air, land and sea weapons, unmanned airstrike complexes, and individual equipment for servicemen, as well as advanced reconnaissance, communication and electronic warfare systems. This development is not surprising since Russia has had great success in Syria using technologically advanced munitions with older and/or less technologically advanced platforms, at the same time as state coffers are being stressed due to low oil prices and sanctions. (An air launched cruise missile (ALCM) launched from an old, relatively inexpensive Tu-95 is just as effective as an ALCM launched from the forthcoming PAK-DA bomber.) Although it is adopting this “lower cost” strategy, Russia will not stop the development and fielding of technologically advanced platforms, but will instead slow their development and field fewer systems.³¹

Conclusion

Russia is in the process of implementing major reforms to further military modernization. These reforms have been easier to implement regarding ground combat vehicles (BTRs, BMPs, tanks, howitzers, and so on), versus more technologically advanced systems such as aircraft and ships. Modernization alone is no panacea: Russia faces significant challenges regarding economic sanctions, import restrictions and defense industry corruption, competition and inefficiencies; all of which are important problems. But the Russian leadership has had some success at fielding a modernized military, especially considering the Russian military that fought in the 2008 Russo-Georgian War versus the one seen in Crimea, Eastern Ukraine, and Syria. Whether Russia is able to field a fully modernized military remains to be seen, but it appears that at the very least a framework for modernization has been laid, and is being implemented.

³¹ Aleksey Ramm, Sergey Valchenko, Dmitriy Strugovets, “Banking on Precision and High Efficiency,” *Izvestiya Online*, 25 December 2017, <https://iz.ru/687444/aleksei-ramm-sergei-valchenko-dmitrii-strugovetc/stavka-na-vysokotochnoe-i-vysokoeffektivnoe>. “Expanded meeting of the Defence Ministry Board,” Kremlin Website Press Release, 22 December 2017, <http://en.special.kremlin.ru/events/president/news/56472>.