AMERICAN FOREIGN POLICY COUNCIL

Red Robots Rising: Behind The Rapid Development Of Russian Unmanned Military Systems

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Over the last five years, the Russian Federation has made great strides in designing, testing, evaluating, and fielding a variety of unmanned military systems, including land, air, and sea-based models. Russian media is full of announcements and analyses of the use and specification of what I call red robots, while Russia's foray into Eastern Ukraine and Syria afforded Moscow a rare opportunity to field and operate such machines in combat. The Western response to Russia's entrance into the club of nations capable of building and using unmanned systems has varied from surprise to alarm to stoic objectivity. Much of this reaction stems from the realization that the United States and its allies are no longer unchallenged in the ways and means of using unmanned systems on the battlefield. With Russia rapidly gaining expertise in building and using unmanned air and land vehicles, many in the American policy, defense, and manufacturing establishment are concerned with the impending fight for elbow room with competitors who, only recently, were far behind the West in battlefield robotics. This essay will look at the major trends in Russia's unmanned military systems to shed light on how they may influence Moscow's military conduct and impact its potential adversaries in the next several decades.

MOVING TOWARDS MANAGED AND STREAMLINED DEVELOPMENT
Up until a few years ago, Russia had no official and coordinated policy on how to marshal military robotics from their concepts and development through testing, evaluation, and eventual acquisition by the country's armed forces. Multiple companies and organizations within Russia's military-industrial complex were engaged in uncoordinated design of various platforms. This has now changed and this development constitutes the most important aspect of the future of unmanned military systems in Russia.

In 2014, Russian Ministry of Defense developed and approved a comprehensive target program called "Creation of Prospective Military Robotics through 2025." The Ministry also formed a commission for the development of robotics, headed by the Defense Minister Sergey Shoigu. To formulate battlefield needs for the next 10-20 years and to justify developments of military robotics, Russia launched an annual conference in 2016 called "Robotization of the Armed Forces of the Russian Federation." The goal of this annual event was the development of "unified interdepartmental approaches for the creation and development of military and special-purpose robotic complexes (RTCs)." Russia also launched its own version of the Defense Advanced Research Projects Agency (DARPA) called Foundation for Advanced Studies, tasked with working on various unmanned and robotics projects for the military.

UNMANNED SYSTEMS IN USE AND DEVELOPMENT
Over the past several years, there have been multiple statements by Russian President Vladimir Putin and his defense officials calling for greater robotization of the Russian Armed Forces and for increased investment in military robotics. These systems should make up a significant share of the Russian military strength in the coming decades. The Russian unmanned aerial vehicle industry has been hit hard by the collapse of the Soviet Union in 1991. As a result, the Russian defense industry is currently behind world leaders in unmanned aerial developments - countries like the US, Israel, and even China - though that gap is starting to close. Today, supported by the government and Ministry of Defense, the Russian defense-industrial sector is ushering in a revival of Russian unmanned aerial systems development. There are numerous programs currently in existence, at various stages of development and completion: mid to long-range designs, quadcopters, multi-rotor and tilt-rotor craft, helicopter-type, micro-UAVs and heavy, 10-ton models, among many others.

Typical representatives of this fleet include Soviet legacy Pchela (Shmel), as well as post-1991 Granat, Zala, Eleron-3, and Zasatava models used for intelligence, surveillance, reconnaissance and target acquisition duties. With a short range, they form a rising number of unmanned systems operated by an increasing number of Russian military formations. Russia also operates two mid-range unmanned aerial systems. Orlan-10, which has a range of up to 120 km, has been used widely in Russia's conflicts and forms the majority that are employed. Forpost, an intelligence, surveillance, and reconnaissance platform, remains Russia's largest unmanned aerial system with the longest range, up to 250 miles.

Of particular importance are current projects to develop domestic MALE/HALE (medium altitude-long endurance/high altitude-long endurance) unmanned systems. Perhaps the most significant announcement to date was the unveiling of Orion unmanned system at the MAKS-2017 air space exhibition. Russia will initially field this concept, with a range of up to 250 kilometers, as an intelligence collection model, and will later follow with an armed version for export markets.

Another important Russian unmanned aerial developments is the fielding of RB-341B Leer-3 electronic warfare system that delivers cell tower jammers via two or three Orlan-10. This system represents a qualitative and asymmetric advantage vis-a-vis existing Western concepts of operations, forcing the U.S. military to replicate Russian concepts for placing electronic warfare technology on unmanned aerial vehicles, something the Americans have not done before. Leer-3 was reportedly used in Eastern Ukraine and Syria, and numerous Russian detachments are training with Leer-3 and are fielding it across its military districts.

With Moscow's involvement in the Syrian civil war, the Russian military has publicly acknowledged the use of unmanned platforms, adding that they have resulted in increased effectiveness of their forces. In fact, Moscow used unmanned more often than piloted aircraft, and is now talking about exporting its systems that have undergone trial by fire. In Eastern Ukraine, Russian-made unmanned systems acted in target acquisition roles, often to make artillery strikes against Ukrainian military forces more precise. In both conflicts, Russia operated small and cheap unmanned aerial systems, showing their mission could be accomplished without expensive and sophisticated systems currently in service with Western forces.

When it comes to unmanned ground vehicles, Russia used non-combat models to augment ground forces' effectiveness. For example, the Uran-6 is a Russian version of the Croatian MV-4 Dok-Ing mine-clearing robot and has been assisting Russian sappers in Syria to clear recaptured areas of mines, improvised explosive devices, and other unexploded ordnance. The Russian demining team in Syria is now operating the Scarab and Sphere, two small unmanned ground systems, among other small models. The Scarab is a robotic system based on a light tracked platform, with built-in high-resolution and thermal camera, microphone, and audiovisual transmitter. The Sphere is a wireless exploration device (360 degrees) equipped with visual and infrared cameras, microphones, position sensors, signal processing, and data recording. A smaller and lighter Platforma-M, designed for intelligence gathering and reconnaissance roles, is another unmanned ground vehicle being integrated into the Russian armed forces in various drills and exercises.

There has already been some speculation that Moscow-allied Syrian forces actually used armed Russian unmanned ground systems in recent operations. A closer international investigation revealed this probably did not take place, though numerous Russian unmanned designs point to their potential use in a variety of combat scenarios. The Uran-6's larger sibling, the armed Uran-9, is designed for future combat - weighing in at 10 tons, it is armed with a cannon, machine gun, and anti-tank rockets. Its intimidating-looking prototype has been actively featured in Russian and Western media as the sign of things to come in Russian unmanned forces.

In 2015, Russia unveiled Udar, a heavily armed system built on the chassis of the BMP-3 armored vehicle. It carries heavy armaments such as 30mm cannon and its own small multi-copter unmanned aerial vehicle for greater intelligence, surveillance, and reconnaissance, along with a small complement of unmanned ground systems to assist it in various combat duties. Today, it has been renamed Vihr (Hurricane), and its evaluation continues by the Ministry of Defense. Other prospective developments include unmanned ground vehicle for demining, amphibious operations, biomorphic testing, and logistics support.

A few years ago, Russian designers created another unmanned ground system - Nerehta. Armed with a variety of weapons including a 7.62mm machine gun, this mid-sized vehicle is envisioned to operate in three variants - combat, intelligence gathering, and transportation & logistics support. It was noted that Nerehta and other combat robots "managed to prove themselves well at the Alabino testing ground, during which it was found out that in a number of parameters these ground robots exceed the existing manned combat vehicles." So, according to Ministry of Defense officials, the Russian military will start acquiring Nerehta. Nerehta has also been chosen as a research and development platform for a variety of new and emerging technologies, including artificial intelligence and cooperation with unmanned aerial vehicles. Another system, the Soratnik, was unveiled in September 2016 by the the Kalashnikov Design Bureau, and will be used as a test platform for further unmanned ground vehicle development. Another notable military robot under development is a humanoid FEDOR, recently featured in Russian promotional videos. Dubbed the Russian Terminator, it's designed mainly for civilian use, such as for work aboard space stations; however, it made for great public relations as a menacing-looking metal skeleton holding large guns in each hand.

When it comes to Russian unmanned underwater and surface vehicles, the vast majority of these models are still in the development, testing and evaluation stages, and have not seen combat. Russian domestic manufacturers are set to deliver several models to the nation's naval forces. The Marlin-350 remote controlled unmanned submersible is set to substitute for the British-made Tiger remote-controlled vehicles currently used by the Russian Navy. In addition, a Concept-M autonomous search and research submersible capable of diving to depths of 1,000 meters has been developed and is about to go into mass production to replace the Icelandic Gavia submersibles currently used for deep-water surveying.

The Russian Navy will also soon be equipped with underwater Glider 2.0 robots, which will be able to perform search operations for 6-9 months without interruption, and conduct deep-sea reconnaissance without support vessels. Another glider, the Sea Shadow, is designed with an eye towards Russian Navy's need for oceanographic research and can be used as a universal tool for collecting and processing large amounts of information.

A Russian submarine design bureau is also working on a drone that imitates submarines. The drone, tentatively named Surrogat, will have a deployable trailing antenna, allowing it to mimic submarines. Last year, Russia reportedly conducted a test of a revolutionary drone with the capacity to carry a nuclear payload and pose a major strategic threat to U.S. ports and harbors. According to the Pentagon, U.S. intelligence agencies detected the test of the unmanned underwater vehicle, code-named Kanyon, during its launch from a Sarov-class submarine. Russia is also using imported unmanned surface vessels such as the Inspector MK2 multipurpose platforms, which can operate in autonomous mode, in protection missions and mine warfare activities. Other sea-based developments include numerous deep-water designs by the Rubin Central Design Bureau of Marine Technology, the manufacturer of Russia's nuclear submarines.

One significant element of Russian unmanned underwater development is the current emphasis on Arctic exploration. To that end, various developments aim to advance Russian existing maritime capabilities deeper and farther from shore. For example, unmanned undersea swarms are in development. Other developments include underwater energy stations, and Russia's Rubin Design Bureau has also created a preliminary design for an underwater nuclear power plant that could potentially power other unmanned underwater systems. Unmanned underwater systems will also feature prominently in future submarine developments - current plans for a fifth-generation Russian nuclear submarine, codenamed Husky, will incorporate unmanned elements in its design and operations.

FUTURE DEVELOPMENTS

Following policy actions taken in 2013-2014 and described earlier, the standardization of research, development, testing, and evaluation of Russian unmanned systems is underway. The Foundation for Advanced Studies has even been involved in developing a specialized unmanned ground vehicle for Russian Special Forces. More government-to-private business and interagency discussions are taking place at Russia's major domestic and international military exhibitions.

No less important are official statements on the use of artificial intelligence in Russian unmanned systems. Viktor Bondarev, former commander of Russia's Aerospace Forces and current Chairman of the Federation Council's Defense and Security Committee, recently stated artificial intelligence will be able to "replace a soldier on the battlefield and a pilot in an aircraft cockpit," even though Russian defense establishment has yet to formulate official policy on its use on the battlefield. Furthermore, Russian President Putin recently stated the nation that masters artificial intelligence will get "to rule the world." Interestingly, Russia may not accede to the emerging international conversation on banning lethal autonomous weapons systems; to Moscow, it's a question of sovereignty and independence that concerns the use of its military force, although Russians remain in step with the international community on the importance of meaningful human control of systems driven by artificial intelligence. In fact, this debate seems to be ongoing amongst Russian unmanned systems manufacturers - the director of the company that makes Uran unmanned ground vehicles recently stated that humans will have final decision on when and how to fire weapons, thereby preventing "robots rebelling against operators due to programming errors."

IMPLICATIONS FOR THE INTERNATIONAL COMMUNITY

The future trajectory of Russian unmanned military robotics does not differ much from that debated in the West and elsewhere. It includes the development and use of domestic industrial, electronic, and high-tech components in unmanned systems, to replace those that were embargoed in the post-2014 sanctions; artificial intelligence will be a major research and development priority. Russia's development of medium and high altitude unmanned aerial systems with long endurance will accelerate, along with further manufacturing and testing of unmanned combat vehicles in every category (ground, undersea, and surface).

Russia knows its recent robotics successes are limited, and its defense industry is behind recent American and Chinese developments in aerial swarms and manned-unmanned teaming concepts. At this point, Russians are well aware that swarm technology, powered by artificial intelligence, is seen as a significant force multiplier. The Russian government and its military establishment are devoting considerable resources to marshal the country's intellectual, industrial, and technological potential to create a modern military capable of extending Moscow's foreign policy goals on the international stage, believing unmanned systems will become pivotal in this future force. With faster concept development, testing, evaluation, and acquisition cycles than in years past, Moscow may field its military robotics at a speedier pace than their Western or even Asian counterparts. However, this won't automatically translate into a better or even more capable force than the U.S. military. The Russian defense industry and its bureaucracy may in fact trip over themselves on the way to progress if such institutions would grow too large or too cumbersome. While the recent creation of Ministry and government offices tasked with development and procurement of military robotics was a success in establishing initial organizational order, multiple government outfits tasked with similar and overlapping duties may in fact be their own worst enemy - Russia has never been known for efficient government and bureaucracy in the first place. Russian defense procurement efforts and multiple technology wish lists by the country's armed forces will have to contend with nation's economic and budgetary realities, which have a way of limiting expectations. Still, Russian decision-making with respect to the needs and capabilities of their military systems can be faster and more flexible than that of their Western counterparts, since Russian Ministry of Defense does not have to contend with competing or inquisitive legislative bodies.

Going forward, the Western military establishment will have to come up with new concepts of operations, as well as technological solutions, to greater numbers of non-friendly unmanned systems on the larger battlefield space around the world. Already, the blueprints for such way forward exist as U.S. and Russian governments try to deconflict their Syrian operations via official channels and hot lines. In future conflicts by proxy, where the U.S. is providing support to front-line fighting units (as it doing in Syria, for example) new tactics, techniques, and procedures will be necessary to ensure that allied, friendly, or even American forces can properly counter the appearance of Russian unmanned systems without triggering a wider conflict. Most importantly, America's industrial and government potential should continue to push the envelope in the research and development of unmanned systems, since the entry of Russia into this race heralds the arrival of an actor with historically powerful intellectual, academic, and industrial credentials capable of rapid, breakthrough achievements.

Whatever the outcome, it is clear Russian development of military unmanned systems, in conjunction with ongoing modernization of its armed forces, will result in a qualitatively different and capable force. Should Russia's ongoing successes in Syria embolden it to act elsewhere in a similar fashion, then U.S. and Western planners may not be the only ones flying a constellation of unmanned systems or directing swarms of ground vehicles and high-tech weapons. This calls for a re-evaluation of the current defense posture and review of technology development and acquisition cycles, a process that has been ongoing in the United States for some time. Red robots are here to stay - and the U.S. reaction to their development will determine the future of conflict and peace in the decades to come.

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