



Russia Is Poised To Surprise The US In Battlefield Robotics

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No one would call Russia's government and budgetary bureaucracy particularly nimble, nor its defense industry particularly advanced. Certainly, it trails Western economies in such key areas as communication equipment, microelectronics, high-tech control systems, and other key technologies. But in certain aspects of the field of unmanned military systems, Russia may be inching ahead of its competition in designing and testing a wide variety of systems and conceptualizing their future use.

In recent years, an unusually close alignment of its executive leadership and the Ministry of Defense on the importance of unmanned systems has vastly streamlined their funding, development, and deployment. (The defense minister has a direct line to the president, and final military decisions are often made by a very small circle of individuals - a far cry from the American budgetary process. As well, the Russian defense budget will remain largely unchanged over the next few years, give or take a few percent, even as other government ministries fight for budget share.)

Russia's swift progress in unmanned systems suggest that the United States and its allies should prepare for battle against foes who can put U.S. forces at a disadvantage by inhibiting their operational capabilities.

AIR, LAND, AND SEA

The vast military force that Russia inherited from the Soviet Union was generally older and less technologically advanced than the U.S. arsenal, but it did include a relatively good ISR UAV: the Pchela/Shmel, which has been used in every major conflict from the Chechen wars in the 1990s to today's Syrian campaign. In the 2000s, Russia compensated for its lack of domestic UAV manufacturing capability by importing Forpost and Zastava UAVs from Israel. Today, the Eleron, Orlan, and Forpost trio of UAVs are in widespread use by Russian forces, including in domestic and overseas combat operations, together with a growing list of other models and platforms.

Russia's UAVs are generally smaller, simpler, and cheaper than their American counterparts, which frees the military to use them without worrying much about loss. As well, Russia has leveraged its capabilities in electronic warfare; for example, an Orlan UAV was incorporated into a Leer-3 EW platform and surprised American and Western observers with its effectiveness at manipulating cellular communications in a contested environment.

Now Russia is working to catch up to Western militaries in other areas. In August 2017, the wraps came off the country's first domestically produced medium-altitude, long-endurance UAV, the Orion, which will be offered in a combat version in the coming years. Meanwhile, two storied Russian aircraft firms have announced UAVs with combat characteristics to start entering service around 2020: the MiG Corporation claims an entire lineup of heavy combat drones, while the Sukhoi Design Bureau is working on Ohotnik (Hunter), a large combat UAV that may resemble Northrop Grumman's X-47. As well, the Defense Ministry has begun talking with Russian firms about producing swarming UAVs with artificial intelligence, with an eye on similar efforts by the U.S. and China.

On the ground, the Russian military currently has unmanned systems clearing mines in Syria, starting with the Uran-6 and later adding smaller Scarab and Sphere situational awareness systems. But its vision for the future includes mid-to-heavy UGVs armed with a variety of weapons. This flows from Russia's status as a major land power that still plans to fight with tank and armored vehicle formations backed by long-range artillery and air force assets. For now, a range of UGVs have been built as technology testbeds, including the tank-sized Uran-9 and Vihr, along with the mid-range and smaller Soratnik, Nerehta, Platforma-M, Argo, and other models. The Nerehta, built to help develop AI concepts, is to be acquired by the Russian military in the near future, while Soratnik is undergoing testing and evaluation.

The emphasis on armed robots underscores the difference between U.S. concepts of operations, in which unmanned ground systems largely support ISR and augment warfighters' capabilities, while the Russian military contemplates small to large UGVs doing the actual fighting in the near future alongside or ahead of the human fighting force. Russian defense firms are debating the proper role of AI in such systems, and the current consensus is emerging that a human will be present in the decision-making firing loop, at least in the near future.

American defense and policy planners may want to begin their own push for larger unmanned vehicles that can fight as well as perform a variety of functions - along with the need for the development of relevant concepts of operations. As the American manufacturers contemplate the role of a human operator, certain new battlefield tactics may emerge in an environment where man and machine have to make quick and irreversible decisions.

At sea, Russia's defense industry is fielding a variety of smaller unmanned and tethered submersibles and deep-water autonomous gliders and mini-submarines, while a variety of deep-sea platforms capable of long-term autonomous operations are being designed and tested. The military envisions using such UUVs and USVs to guard Arctic maritime approaches, perhaps in swarms and ideally for long periods of time. While Russian unmanned naval systems still trail those of the United States and its allies, the prospect of Russian autonomous, potentially-AI-driven swarms should prompt the U.S. Navy to re-evaluate its ability to control the world's waterways.

WHERE THE U.S. ARMY IS GOING

Compared to Russia's push to develop and deploy armed unmanned ground systems, the U.S. exhibits a certain reluctance, particularly in how such weapons could be used. Even as the U.S. Army develops its own UGVs, the process of fielding such machines is expected to be "slow and cautious," according to American defense officials and military experts. The key policy that guides such developments is the Robotic and Autonomous Systems Strategy, or RAS, released in February 2017 by the Army's Training and Doctrine Command. This public document details how the Army will incorporate emerging technologies into its force structure, along with the benefits these advancements provide. This effort by the Army aims at "embracing technological advancements and harnessing the nature of modern warfare that traverses domains of war, described in Army parlance as multi-domain battle. With near-term priorities ranging from increasing situational awareness for dismounted forces at lower echelons, protecting forces with explosive ordnance disposal robots and lightening physical loads for dismounted forces, the Army hopes to get at far-term priorities 20 years in the future." Such priorities will include "increased situational awareness with persistent reconnaissance from swarming systems, improving sustainment with autonomous aerial cargo delivery, the need to roboticize combat vehicles performing dangerous tasks and facilitating maneuver with advancements to unmanned combat vehicles." Curiously, there was only a cursory mention of developing armored and combat UGVs to assist or augment the warfighter's capabilities in battle, although the Army's robotics strategy proposes that such unmanned systems should be developed in the future. In contrast, Russians are working on such platforms today and are putting them through rigorous trials.

U.S. Army officials are also pursuing the next-generation combat vehicle, also known as the NGCV. According to the Army Maneuver Center of Excellence, "robotics and autonomous systems are... going to be a part of the concept. When you start thinking about future possibilities and the effect that robotics might play, it could be a game-changer." Still, caution prevails. The Maneuver Center hasn't decided whether the NGCV would ideally replace the Abrams tank, the Bradley Fighting Vehicle, both, or neither. According to the Army Capabilities Integration Center, "the Army needs to take baby steps to achieve some type of unmanned vehicle that can operate with... its mounted armored formations." American caution is understandable: there are concerns about UGVs' ability to function, survive, keep operating, and contribute in a complex battlefield environment - not to mention ethical concerns about arming machines to kill.

RUSSIA'S APPROACH TO LETHAL AUTONOMY

U.S. military leaders like to highlight that Russia doesn't have the same internal restrictions on lethal autonomy as does the United States. Recent Russian moves at the United Nations seem to support that view. But Russia's approach to autonomy and especially lethal AI is more nuanced than many in the West know.

Of special interest to U.S. civilian and military decision makers should be the range of Russian opinion on the use of AI for military purposes. For example, the discussions by military experts zero in on the notion that such systems may take unpredictable actions. One line of argument holds that "there would be no 100% guarantee that [an unmanned system] wouldn't suddenly chose to act independently of its human operators. Therefore, (at least at this stage of development) we cannot speak of AI introduction into military affairs." Moreover, the official Russian position with respect to recently held United Nations conference on banning lethal autonomous weapons highlights the "inadmissibility of loss of meaningful human control." In Russia, the AI debate seems to be inching toward a requirement to have a human in the loop of all lethal decisions, as witness a recent announcement by the director of the Russian manufacturing company that makes unmanned ground vehicles about preventing robots from "'rebell[ing] against operators due to programming errors." Russian military strategists and decision makers are also contemplating the role of AI in the nation's version of net-centric warfare. Still, President Putin has said that the country that "leads in AI will get to rule the world," while other Russian politicians say that the Russian military could soon use some form of AI to replace a human in battle. In reality, Russian President's statement may have served as a significant catalyst for the country's military-industrial complex to invest in and begin serious deliberation of AI in the military role.

At present, the Russians are hardly "ten feet tall" in their application of unmanned and autonomous systems. The U.S. still leads in many, if not all advanced technologies and systems. But Russia - and others - are catching up fast in important ways. American defense and policy establishment should re-evaluate how it measures threats and develops and acquires new and promising technologies, and add flexibility to conceptualizing and formulating how American forces may fight in the future. In particular, they should boost efforts to improve ISR, counter-UAS, artificial intelligence, and electronic warfare technologies - and rethink how these might be used in combination with cyber and kinetic weapons to secure battlefield superiority.

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