

The Czar of battle: Russian artillery use in Ukraine portends advances

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The Russian Army, which has long emphasised its artillery arm, is once again upgrading conventional tube artillery and adding new targeting techniques. *Samuel Cranny-Evans, Mark Czalet, and Christopher F Foss* report on the country's more flexible approach to fire missions

Since armed conflict began in Ukraine in 2014, the world has been given insight into Russia's land warfare playbook. Much of its current warfighting strategy relates to modernisation efforts that began in 2008, and these have had a profound affect on the strategies and equipment used in artillery formations. Russian developments have focused on dramatically increasing accuracy and rate of fire, but the country has also decreased the size of artillery formations.



*Russia's 2S19M2 152 mm SP artillery system in travelling position with its gun in travel lock.
(Christopher F Foss)*

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Russian artillery mixes modern practices with older, less precise tactics, according to Mikhail Zhirkhov, a military historian who has observed the conflict in Ukraine. He told *Jane's* "tactics used by Russian artillery during the war in the Donbas – in its active period in the summer of 2014 to the winter of 2015 – were very flexible and varied".

Zhirokhov said the 152 mm 2S19 (also referred to as the MSTA-S) tracked artillery, the MSTA-B towed artillery, and BM-21 Grad multiple rocket launch (MRL) systems were used during August 2014 to destroy Ukrainian forces on the border with Ukraine and Russia. In these instances, artillery fire was massed and aimed at entire areas, reportedly with devastating effects for Ukraine's 30th Mechanised Brigade.

However, as the campaign changed so did Russian tactics and the equipment used. According to Zhirokhov, the fire became more accurate as the intended targets became more mobile. "To destroy the army columns that went to the aid of the surrounded grouping in Ilovaysk in late August 2014, the MSTA-S and Nona-S missile systems were widely used, the fire of which was corrected by numerous army-type drones [unmanned aerial vehicles – UAVs]," he said.

The UAVs used are known to include the Orlan-10 and Forpost. The Orlan-10 is understood to be a catapult-launched small reconnaissance UAV with a range of 140 km from the control station, and an endurance of 16 hours. It has a top speed of 150 km/h and a maximum altitude of 16,404 ft. It is able to carry a 6 kg payload, and these have typically included a gyro-stabilised day TV camera and/or an infrared (IR) sensor.

Meanwhile, the Forpost UAV is a Russian derivative of the Israel Aerospace Industries Searcher Mk II UAV. It has a maximum range of 250 km from the ground control station, with a maximum endurance of 16 hours. Its top speed is 204 km/h, although its loiter airspeed is between 126 km/h and 148 km/h. Its maximum altitude is 20,669 ft and it is capable of carrying a 100 kg payload, and payload options include day TV camera, IR imager, and laser rangefinder.

The Orlan-10 and Forpost enabled Russian controlled artillery to destroy a column from Ukraine's 92nd Separate Mechanised Brigade in August 2014 near the village of Novozarievka, Zhirokhov said.

Russian armed forces are also known to have used various commercially available quadcopter and hexcopter UAVs. These have been documented in co-operation with more advanced UAVs, whereby an Orlan or a Forpost may locate a target, and then hand off to a commercial UAV to determine the target coordinates. Russian artillery will then aim for those coordinates and adjust fire based on initial strikes. One US Army account said, "Ukrainians report that once they identify a low-flying [under 1,000 ft] UAS [unmanned aircraft system], they have between 10 and 15 minutes before their position will be hit with accurate artillery fire."

SOF and EW

In July 2014 US intelligence sources reported that a single-fire mission by Russian artillery destroyed two Ukrainian mechanised battalions in a few minutes in what became known as the Battle of Zelenopillya. According to an account of the engagement, at about 0400 h local time a consolidated group of the 79th Airmobile Brigade appeared at a Ukrainian outpost, and 30 minutes later the outpost was struck by accurate fires from BM-21 Grad rocket systems, according to Zhirokhov.

Perhaps the most surprising aspect was that the attack was carried out with the BM-21 Grad, a 122 mm MRL and descendent of the Second World War-era Katyusha rocket launcher. The system mostly fires unguided high-explosive rockets with a maximum range of 37.5 km. Its use, and efficacy, shows that Russian forces are still able to employ older artillery systems to achieve a desired effect. It is possible that during Zelenophillya that scouts from Russian special forces were used to locate and target the 79th Airmobile Brigade before the engagement.

There are also reports that Russian electronic warfare (EW) assets, such as the RB-301B Borisoglebsk-2, were used to direct artillery fire. Borisoglebsk-2 is a multifaceted EW platform that can be used to jam radio signals or intercept mobile phone communications. Zhirokhov noted that Ukrainian forces often communicated via mobile phones to correct artillery fires at the outbreak of the conflict, prompting Russia to deploy EW systems that enabled them to listen in.

Russian forces soon began employing another EW system, the Leer-3, and this is understood to have been used to determine GPS coordinates of an active mobile phone. Using these EW complexes, Zhirokhov explained, Russian forces destroyed several of the Ukrainian Army's airborne units' 122 mm D-30 howitzer batteries in mid-2014.

To negate Russian artillery's EW advantages, Ukrainian formations introduced Harris digital radios that were provided by the US State Department. The Harris RF 7800V operates in the 30–108 MHz range at 25 kHz spacings and enables encrypted communications. The radios were delivered to Ukraine in 2015, according to the US Army, which trained Ukrainian soldiers on the systems.

The digital radios are understood to have helped, but there were also reports that signals emitted by the Harris radios were detected and used by Russian and separatist forces to direct artillery. This sort of targeting would likely have been assisted by an EW complex such as the Borisoglebsk-2.

Current Russian artillery practice, at least in Ukraine, integrates Russian forces into proxy artillery units. Russia's flexible approach to using trained personnel, EW, and UAVs has enabled the country to deploy its regular forces alongside proxies to improve their performance. A US Army handbook, issued in 2016 to raise awareness of Russian tactics, noted that Russian Spetsnaz snipers were integrated within proxy formations to identify and send the location of targets to artillery units. It is thought that Spetsnaz personnel have access to the Ratnik combat system, which includes location-finding computers worn on the person. Ratnik would enable them to instantaneously transmit location data to waiting artillery systems.

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