

Russian Military Autonomy in Ukraine: Four Months In

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Four months into the war in Ukraine, the Russian military has failed to achieve its original objectives of quickly taking Kyiv, the capital of the country, and installing a pro-Russian regime. Ukraine's organized and effective resistance has pushed Russian forces out of the Kyiv and Kharkiv regions. Despite heavy casualties, the Russian military has launched a second major offensive to consolidate and expand control of the areas it holds in Donbas, in order to control all of the Donetsk and Luhansk Oblasts.¹

Throughout this conflict, unmanned aerial vehicles (UAVs) and drones have played an important part in each army's tactics. This paper highlights what we have seen to date regarding the use of unmanned and autonomous vehicles. It follows an earlier CNA paper outlining the possible Russian military systems we expected to see in this war.²

Military and commercial UAV use: commercial drones emerge as a key combat multiplier

Currently, both Russian and Ukrainian forces are using military drones to strike targets on the ground, along with numerous surveillance models—both civilian and military—that provide situational awareness of the battlespace. A key evolution of today's commercial drone technology as relatively cheap and easy to use resulted in its widespread use in numerous conflicts around the world, including the ongoing war in Ukraine.³ The use of commercial, off-the-shelf technologies is not new: civilian drones have been used in combat since 2011. The size and scale of commercial UAV usage in Ukraine speaks volumes about how easily this technology crosses into the military sphere.

By using multiple drone types and models, a defending force can complicate the attackers' plans by constantly exposing their location and movements, and then striking targets either from the ground (via artillery, multiple-launch rocket systems, or missile batteries) or from aircraft, helicopters, and heavy combat UAVs. The Chinese-made DJI Mavic drones have played a significant role in Ukraine because of their ease of use, likely flying in large numbers, evidenced by daily social media posts and videos of Ukrainian artillery striking Russian positions that were filmed by what looked like a commercial UAV.⁴ The actual number of such drones is difficult to estimate, but the Russian Ministry of Defense (MOD) daily war briefings include ever-rising numbers of Ukrainian drones downed by Russian forces (over 1400 as of early July

¹ Военные РФ заявили о планах обеспечить сухопутный коридор в Крым и выход к Приднестровью, Interfax.ru, Apr. 22, 2022, <https://www.interfax.ru/world/837353>.

² Jeffrey Edmonds and Samuel Bendett, *Russian Military Autonomy in a Ukraine Conflict*, Feb. 22, 2022, https://www.cna.org/CNA_files/PDF/Russian-Military-Autonomy-in-a-Ukraine-Conflict.pdf.

³ Hays Kesteloo, RUSSIAN MILITARY USES DJI DRONES AS WELL NEW VIDEOS SHOW, DroneXL.co, Apr. 15, 2022, <https://dronexl.co/2022/04/15/russian-military-dji-drones/>.

⁴ Kesteloo, RUSSIAN MILITARY USES DJI DRONES AS WELL NEW VIDEOS SHOW, and <https://twitter.com/RALee85/status/1543186943843893250>

2022), indicating that Ukraine is likely operating a large number of small military and commercial drones.⁵ Although the claim may be inflated as part of the Russian disinformation campaign, numerous social media posts showing the Ukrainian military observing and striking Russian positions probably support at least part of the MOD's claim about this large number of "eyes in the skies" over Ukraine.



Source: "DJI Mavic drone sent to the Russian forces from China",
<https://twitter.com/RALee85/status/1515617472241614851/photo/1>.

The downside of commercial drone use is that these UAVs are not military grade, although that does not appear to keep them from being integrated into current forces, given the low cost of acquiring and replacing the DJI Mavic models. The key vulnerability of this technology is the possible identification of the operator's location and communication link with the drone itself, leading both Russian and Ukrainian forces to develop quick drone-flying tactics instructions that spell out how to fly such technology in combat. These instructions are now available in easy-to-understand pamphlets, such as forms published by Russia-allied Donetsk militia.⁶

Prior to the war, the Russian military discussed integrating commercially available quadcopters into its operations,⁷ but so far there is no evidence that it has been flying them en-masse when compared to the ubiquitous DJI presence. This leads to a question of whether the MOD planned to purchase DJI drones and integrate them into Russia's forces as part of its quadcopters force, or whether the current DJI acquisition and usage is a result of ad hoc adaptation to fill gaps in time of war.

Initially in this conflict, it looked as though the widespread use of commercial drones could impact operational security and discipline, with commercial unsecured technology used alongside regular units, weapons and systems at the tactical level. However, four months into this war, it appears that the Russian military is willing to take this risk with its allied forces in Donbas that use commercial technology to conduct intelligence and reconnaissance, along with directing fires, according to pro-government news reports and

⁵ Examples are <https://tass.com/defense/1440941>; <https://tass.com/defense/1440229>; <https://tass.com/defense/1438831> and <https://tass.ru/armiya-i-opk/15105443>

⁶ <https://t.me/DroneCenterDNR/58?single>

⁷ Anton Lavrov, Roman Kretsup, "С дроном в разведку: стартует массовое оснащение армии квадрокоптерами," Iz.ru, Jan. 15, 2021, <https://iz.ru/1111609/anton-lavrov-roman-kretcul/s-dronom-vrazvedku-startuet-massovoe-osnashchenie-armii-kvadrokofterami>.

DNR telegram channels.⁸ In fact, DNR even advertised its own “drone school”, where it trains UAV operators over a course of several days to fly mostly commercial drones in combat.⁹

Another new factor in this war is the commercial drone manufacturer’s ability to get involved in the conflict. For example, the Ukrainian government has accused DJI of leaking data on Ukrainian positions to the Russian forces.¹⁰ Likely unrelated to this, DJI use was so widespread that the Chinese company pulled the plug on its official operations in both Russia and Ukraine, probably worried about the commercial impact of its products being viewed as easily modified for war.¹¹ Despite this decision, DJI Mavics remain on the front lines in what is certainly a continued heavy drone presence over Ukraine. At least for now, it is unlikely that the flow of crowd-sourced DJIs is going to stop any time soon, with Russian forces and their allies continuously advertising their DJI acquisition from the donors.¹² In fact, one of the most active pro-Russian Telegram channels recently put out a guide for volunteers that specified exactly which DJI models were and were not needed at the front lines, even asking those willing to go an extra mile to bypass the DJI ban in Russia by scouting for these drones in Europe and former Soviet states.¹³

Military UAV use

The Russian military is using an entire lineup of military-grade UAVs in this war to conduct intelligence, surveillance, and reconnaissance (ISR) and combat missions over Ukraine. Systems that have seen duty in Ukraine include the Orlan-10, Orlan-30, Eleron-3, Takhion, Zastava, and Zala ISR drones, along with additional helicopter models. Numerous examples of these drones shot down over Ukraine indicate that they are flown in large numbers—especially Orlan-10, which is reportedly the most numerous drone in Russian military service.¹⁴ For long-range ISR and combat missions, the Russian military is reportedly flying Forpost-R and Orion combat UAVs; the MOD has released at least several official videos and combat narratives about these missions.¹⁵ The efficacy of these missions is still open to debate, given a relatively pinpointed approach to striking certain targets, and considering the limited numbers of these drones in the Russian military. For example, at the start of 2021, the Russian MOD claimed it had around 20 Orion

⁸ “Izvestia showed how drones work against the Armed Forces of Ukraine in the Donbass” («Известия» показали работу беспилотников по позициям ВСУ в Донбассе), Iz.ru, May 9, 2022, <https://iz.ru/1332058/2022-05-09/izvestiia-pokazali-rabotu-bespiletnikov-po-pozitciyam-vsu-v-donbasse>.

⁹ https://t.me/PRO_respubliku/9508, May 13, 2022

¹⁰ Eduardo Baptista, “China’s DJI rejects claims of data leaks to Russia on Ukrainian military positions,” Reuters.com, Mar. 30, 2022, <https://www.reuters.com/world/china/chinas-dji-rejects-claim-that-russian-military-uses-its-drones-ukraine-2022-03-28/>.

¹¹ “DJI condemns use of its drones in the Russia-Ukraine war,” DroneDJ.com, Apr. 22, 2022, <https://dronedj.com/2022/04/22/dji-drones-ukraine-russia-war/>; M. Moon, “DJI suspends sales in Russia and Ukraine to prevent its drones from being used in combat,” Engadget.com, Apr. 27, 2022, <https://www.engadget.com/dji-suspends-sales-russia-ukraine-051617291.html>.

¹² See <https://twitter.com/RALee85/status/1534069615491522560>, and Emma Helfrich, “Estonian-Russian Citizen Tried To Smuggle Commercial Drones To The Russian Army,” TheDrive.com, May 31, 2022, <https://www.thedrive.com/the-war-zone/estonian-russian-citizen-tried-to-smuggle-commercial-drones-to-the-russian-army>.

¹³ See <https://twitter.com/SamBendett/status/1536410879184486404>.

¹⁴ Examples are <https://twitter.com/UAWeapons/status/1505275977785659394>; https://t.me/RKadyrov_95/1561; and <https://twitter.com/UAWeapons/status/1509992155200241674>.

¹⁵ See <https://tass.com/defense/1424617>; <https://www.youtube.com/watch?v=GBQ8shcaK5U&t=1s>; and https://t.me/mod_russia_en/202.

unmanned combat aerial vehicles (UCAVs) in service.¹⁶ Even though additional Orion drones may have been built in 2021, Russia is still not flying them in significant quantities, possibly out of concern of losing its key aerial unmanned assets to Ukrainian countermeasures. Perhaps as a direct consequence of this war, the company that manufactures Orion drones recently announced that once its new, large-scale production facility opens, it will operate in three shifts to keep up with the demand for combat UAVs from the Russian military.¹⁷



Source: “Russian Forpost drone”, Russian MOD, <https://www.youtube.com/watch?v=GBQ8shcaK5U&t=1s>.

Russian use of different drones includes evidence of KUB and Lancet loitering munitions conducting a limited number of strikes, although some evidence indicates that KUB may not have performed as intended and failed to strike its targets.¹⁸ In particular, KUB usage earlier in the war sparked an intense international debate on the potential use of artificial intelligence (AI) in this aerial vehicle, given the manufacturer’s claims that AI is part of its civilian and military UAV operating systems.¹⁹ It was not clear whether such a claim was applicable in this case, possibly because of a lack of technological evidence.²⁰ The repeat appearance of the KUB drone—at least judging from several that may have crashed without detonating—speaks to the Russian military’s desire to field a successful loitering munition, a tactic used widely by the Azerbaijan military against the Armenian forces in Nagorno-Karabakh, and identified as a key tactic for the Russian military to replicate going forward.²¹ In June 2022, the Russian military admitted that it is also using Lancet in Ukraine, possibly adding more fuel to the debate about the use of AI in this war, considering that

¹⁶ Aleksei Ramm, “Куда летит беспилотная авиация” (Where unmanned aircraft are flying), IZ.ru, 21 Jan. 2021, https://nvo.ng.ru/armament/2021-01-21/1_1125_aviation.html.

¹⁷ The production plant that will manufacture reconnaissance and strike drones will work in three shifts (Завод по производству разведывательно-ударных дронов заработает в три смены), RIA.ru, June 30, 2022, <https://ria.ru/20220630/drony-1799258410.html>

¹⁸ See <https://twitter.com/UAWeapons/status/1506587380232425478>; and <https://twitter.com/jesusfroman/status/1505532382908239883>.

¹⁹ “ZALA AERO introduced a new technology based on artificial intelligence” (ZALA AERO представила новую технологию на основе искусственного интеллекта), Kalashnikov.media, Aug. 27, 2019, <https://kalashnikov.media/article/technology/zala-aero-predstavila-novuyu-tekhnologiyu-na-osnove-iskusstvennogo-intellekta>.

²⁰ Will Knight, “Russia’s Killer Drone in Ukraine Raises Fears About AI in Warfare,” Wired.com, Mar. 17, 2022, <https://www.wired.com/story/ai-drones-russia-ukraine/>.

²¹ Ruslaan Pukhov, “Буря на Кавказе,” *BMPD Ij blog*, Sept. 27, 2021, <https://bmpd.livejournal.com/4403721.html>.

this particular munition was advertised as “highly autonomous” for target identification and destruction.²² As with KUB, there has been little technological evidence to confirm such a claim, although as the war drags on and the Russian military utilizes more Lancets and KUBs against Ukrainian forces, more facts may come to light about the Russian claim.



Source: “Two KUB loitering munitions in Ukraine”, <https://twitter.com/jesusfroman/status/1505532382908239883>;
<https://twitter.com/FeWoessner/status/1502559795781513219>.

At this point in the conflict, the Orlan-10 seems to be the most numerous military drone used by the Russian military in Ukraine, given the evidence that it is also the Russian UAV that is shot down most often in this war, with many social media posts showing these drones falling into Ukrainian hands. Another defining feature is the presence of commercial technology in the Orlan-10 airframe; for example, a Japanese engine and Canon commercial camera parts have been among the items uncovered by the Ukrainian defenders and put on display on social media.²³ This is not revelatory, as the Orlan-10 UAV was already “autopsied” earlier, during low-level conflict in eastern Ukraine between 2014 and 2020.²⁴ What may be significant is the Russian manufacturer’s continued reliance on imported technology to mass produce this UAV, given the growing difficulty for Russia in getting technology from abroad.

At the same time, the Russian military is starting to utilize these drones in combat missions by attaching four high-explosive fragmentation shells to the wings to target Ukrainian vehicles, equipment, and

²² “Kamikaze drones successfully used in Russia’s special operation in Ukraine — defense firm,” Tass.com, June 8, 2022, https://tass.com/defense/1462311?utm_source=t.co&utm_medium=referral&utm_campaign=t.co&utm_referrer=t.co.

²³ Ashish Dangwal, “Ukrainian Soldier Find A ‘Cannon’ Inside A Russian Orlan-10 Drone; Calls It Moscow’s ‘Cosmic Technology,’” *Eurasian Times*, Apr. 13, 2022, <https://eurasianimes.com/ukrainian-soldier-find-a-cannon-inside-a-russian-orlan-10-drone-calls-it-moscows-cosmic-technology-watch/>.

²⁴ “Russian drone Orlan-10 consists of parts produced in the USA and other countries—photo evidence,” *InformNapalm*, June 2, 2018, <https://informnapalm.org/en/russian-drone-orlan-10-consists-of-parts-produced-in-the-usa-and-other-countries-photo-evidence/>.

soldiers.²⁵ The MOD tested this concept earlier during the Zapad-2021 military exercise, with modified Orlan-10 and Forpost-R drones delivering strikes against ground targets. Of the 2,000 or so UAVs in the Russian military service, the Orlan-10 UAV is probably the most numerous and refitting this workhorse into a combat version can raise the number of aerial strikes that the Russian military can conduct. At this point, there is little public evidence of its use for strike, although the MOD may control how it reveals this capability as it continues to refine this combat Orlan-10 tactic. Another key use for this drone is electronic warfare (EW), with a modified Orlan-10 flying as a Leer-3 EW platform. There is some evidence of downed Leer-3 drones in Ukraine, indicating that this UAV is now utilized in new missions to identify and target Ukrainian command, control, and communications nodes and equipment.²⁶ Regardless of how many Orlans the Russian military may be lost over Ukraine in this war, this relatively cheap and easy to operate drone has proven to be an effective ISR platform for the Russian military, which continues to advertise its combat use as part of the reconnaissance-strike complex as an aerial guide for long-range artillery and rocket systems.²⁷

Ukrainian forces are using the Turkish-made Bayraktar TB2 combat drone to target and counter Russian military advances. This is coupled with the much smaller Bayraktar MINI IHA drone for ISR.²⁸ The Ukrainian military initially operated between 20 and 50 TB2 drones,²⁹ but most may have been destroyed by Russian air defenses. The first several weeks of this war were dominated by news and evidence of TB2s striking Russian forces, in stark contrast to the Russian military's earlier claim that they would be able to neutralize such a threat early on.³⁰ TB2 has a remarkably resilient shelf life in this war: sorties were carried out well past the two-month mark, with strikes against not just Russian ground forces but maritime targets as well.³¹

²⁵ Makism Nizkodubov, Alisa Krause, "The enemy is afraid of us': how Russian Pantsirs and Orlans instill fear in the Ukrainian armed forces during a special operation" («Противник нас боится»: как российские «Панцири» и «Орланы» наводят страх на ВСУ в ходе спецоперации), RedStar.ru, May 13, 2022, <https://tvzvezda.ru/news/202251339-gTytu.html>.

²⁶ Official Facebook page of the Ukrainian Assault Forces' Command, accessed May 13, 2022, <https://www.facebook.com/www.dshv.mil.gov.ua/posts/369933015180693>.

²⁷ The Ministry of Defense showed MLRS Uragan combat footage" (Минобороны показало кадры боевой работы расчетов РСЗО "Ураган"), RIA.ru, July 1, 2022, <https://ria.ru/20220701/uragan-1799453945.html>

²⁸ William McGee, "VIDEO: Ukrainian Forces Take Out Russian Equipment With Turkish Drones," *Newsweek*, Mar. 25, 2022, <https://www.newsweek.com/video-ukrainian-forces-take-out-russian-equipment-turkish-drones-1691952>; and Mia Jankowicz, "Ukraine posts videos it says show Bayraktar drones blowing up Russian armor, further cementing their heroic status," *Business Insider*, Mar. 14, 2022, <https://www.businessinsider.com/videos-purport-to-show-ukraine-bayraktar-strikes-on-russia-vehicles-2022-3>.

²⁹ Derek Gatopoulos and Suzan Fraser, "Cheap but lethal Turkish drones bolster Ukraine's defenses," AP News, Mar. 17, 2022, <https://apnews.com/article/russia-ukraine-middle-east-africa-libya-europe-ecb9e820ea4bddb4464d7e8cb40e82fc>.

³⁰ "Kronstadt CEO: the Turkish Bayraktar would not have passed state tests in Russia" (Глава компании "Кронштадт": турецкий Bayraktar не прошел бы госиспытания в России), Interfax.ru, Aug. 24, 2021, <https://www.interfax.ru/interview/786015>.

³¹ Tayfun Özberk, "Ukrainian TB2 attacks on Russian vessels may mark a first in naval warfare," Shephardmedia.com, May 6, 2022, <https://www.shephardmedia.com/news/naval-warfare/ukrainian-tb2-attacks-on-russian-vessels-may-mark-a-first-in-naval-warfare/>.



Source: "Downed Russian Orlan-10 drone in Ukraine",
<https://twitter.com/UAWeapons/status/1509992155200241674>;
<https://twitter.com/Osinttechnical/status/1512107049156591621>.

The Ukrainian military is also using Fury, Spectator, Leleka, Punisher, and PD-1 drones for surveillance and reconnaissance, and Polish-made Warmate loitering munitions.³² In particular, Leleka ISR UAVs may have recently penetrated Russian airspace to gather photographic evidence of Russian military combat losses, such as many pieces of damaged military hardware stored in a field near the border.³³ Ukraine also utilized much older Tupolev-143 military drones from the Soviet days early on in the war.³⁴ The Ukrainian military and volunteers are also flying numerous commercial drone models made in China and the US, acquired either via official delivery channels or from the volunteers.³⁵ In fact, commercial drone use by Ukrainian forces may not be limited DJI-like small models – there is evidence that a much larger commercial UAV may have been modified to carry out an attack on the Russian oil refinery located at least 100 km from the Russian-Ukrainian border.³⁶ To augment Ukrainian capabilities in the face of a renewed Russian military offensive in Donbas, the United States is lending Switchblade loitering munitions to the Ukrainian

³² Gerrit De Vynck, Pranshu Verma, and Jonathan Baran, "Exploding 'kamikaze' drones are ushering in a new era of warfare in Ukraine," *Washington Post*, Mar. 24, 2022, <https://www.washingtonpost.com/technology/2022/03/24/loitering-drone-ukraine/>.

³³ Jerome Starkey, "PUTIN'S TANK GRAVEYARD Ukrainian spy drones find massive 'tank graveyard' ten miles inside Russia underlining shocking scale of Putin's losses," *The Sun (UK)*, Apr. 21, 2022, https://www.thesun.co.uk/news/18334790/ukraine-drones-putin-tanks-graveyard-russian/?utm_source=sharebar_app&utm_medium=sharebar_app&utm_campaign=sharebar_app_article.

³⁴ Ukrainian Tu-143 UAV downed by Russian air defense systems — Russian defense ministry, Tass.com, April 15, 2022, https://tass.com/defense/1438489?utm_source=google.com&utm_medium=organic&utm_campaign=google.com&utm_referrer=google.com.

³⁵ David Hambling, "Every single drone fighting in the skies above Ukraine," *Popular Mechanics*, June/July 2022 issue,

³⁶ Andrew Roth, "Drone crashes into Russian oil refinery in possible attack," *TheGuardian.com*, June 22, 2022, <https://www.theguardian.com/world/2022/jun/22/russian-novoshakhtinsk-oil-refinery-struck-drone-possible-attack-inside-borders>; <https://mobile.twitter.com/DAlperovitch/status/1539510827593699328> and Thomas Newdick, "Kamikaze' Drones Strike Russian Oil Refinery, Looks Like Model Sold On Alibaba", *TheDrive.com*, June 22, 2022, <https://www.thedrive.com/the-war-zone/kamikaze-drones-strike-russian-oil-refinery-looks-like-model-sold-on-alibaba>

defenders, along with the newly developed Phoenix Ghost combat drone and light Puma UAVs for ISR.³⁷ These loitering drones may be able to effectively target Russian armored vehicles and hardened locations, and may even target Russian command-and-control posts. A possible acquisition of heavy long-range MQ-1C Gray Eagle UCAVs by the Ukrainian military is under discussion at the time that this paper is being written, potentially giving the Ukrainians a key capability to strike Russian high-value targets.³⁸

Like forces in other conflicts involving multiple drone types, Ukrainian operators have demonstrated that they can penetrate the attacking forces' air defenses and hover close to or directly above Russian positions undetected, allowing for follow-up strikes.³⁹ Russian forces are also using this tactic, a concept they refined in Syria as part of the reconnaissance-fire and reconnaissance-strike contours/complexes.⁴⁰ This key tactic appears to be a staple in the current conflict: numerous videos released by the Russian military show drone video feed of a Ukrainian target in sight before it is struck by missiles and artillery. For the first several months, the Ukrainian forces were using the same tactic against the Russian military with relative success, probably owing to spotty or nonexistent Russian counter-UAS or electronic warfare (EW) coverage in certain areas, although recent admissions point to a strengthened Russian EW use that complicates Ukrainian drone operations.⁴¹

UGV and maritime autonomy use

So far in social media, we have found only several instances of the Russian military using Uran-6 demining unmanned ground vehicles (UGVs) in the Donbas, in what appear to be carefully orchestrated videos.⁴² This is probably because such vehicles are remotely operated, with an operator nearby, making their use dangerous in a contested combat environment. Additional evidence of demining UGVs may become public as the conflict continues. The Uran-6 UGV was used by the Russian military in Syria to clear mines and unexploded ordnance and saw limited use in Nagorno-Karabakh by the Russian peacekeepers.⁴³

The Russian arsenal also includes other demining UGVs, such as the heavy Uran-14. There are also several smaller UGVs in use by Russian sappers, engineering battalions, and other forces for ISR. As the Russian forces continue their slow advance across the Ukrainian territory, the Russian MOD will likely show additional uses of Uran-6 and other UGVs in its promotional videos. At the same time, there is plenty of evidence that most demining is actually done by human sappers, who have to conduct "old school" on-foot

³⁷ Anthony Capaccio, "U.S. Drones for Ukraine Will Include Latest Tank Killers," Bloomberg.com, Apr. 4, 2022, <https://www.bloomberg.com/news/articles/2022-04-04/u-s-switchblade-drones-for-ukraine-will-include-tank-killers>; and Lee Hudson and Paul McCleary, "Mystery drone: How the Air Force fast-tracked a new weapon for Ukraine," Politico.com, Apr. 21, 2022, <https://www.politico.com/news/2022/04/21/mystery-drone-air-force-new-weapon-ukraine-00026970>.

³⁸ Mike Stone, "EXCLUSIVE U.S. plans to sell armed drones to Ukraine in coming days -sources," Reuters.com, June 1, 2022. <https://www.reuters.com/business/aerospace-defense/exclusive-us-plans-sell-armed-drones-ukraine-coming-days-sources-2022-06-01/>.

³⁹ See <https://twitter.com/Osinttechnical/status/1517489879634042882>.

⁴⁰ See <https://twitter.com/RALee85/status/1512321536262352896>; and <https://t.me/milinfofive/81220>.

⁴¹ Jake Thomas, "'They're Jamming Everything': Putin's Electronic Warfare Turns Tide of War," Newsweek.com, June 3, 2022, <https://www.newsweek.com/theyre-jamming-everything-putins-electronic-warfare-turns-tide-war-1712784>.

⁴² See <https://t.me/milinfofive/80873>.

⁴³ "Russian peacekeepers use Uran-6 mine-clearing robot in Nagorno-Karabakh," Tass.com, Dec. 11, 2020, https://tass.com/defense/1233857?utm_source=google.com&utm_medium=organic&utm_campaign=google.com&utm_referrer=google.com.

identification and destruction of unexploded mines, munitions, and other ordnance.⁴⁴ For its part, Ukraine is acquiring a small Talon explosive disposal robot from the United States.⁴⁵ It is not clear at this point whether the Russian military will be fielding any of its combat UGVs against Ukrainian forces, although the Russian MOD claimed that it will start acquiring Uran-9 combat autonomous vehicles in 2022, after their redesign following the 2018 tests in Syria.⁴⁶ For their part, Ukrainian defense companies are eager to support their country and are discussing fielding GNOM small UGV platforms for combat and ISR missions, although the full effectiveness of such small UGVs may be questionable in actual combat.⁴⁷

There is also a lack of open-source evidence, from either the Russian MOD or the Ukrainian military, that the Russian military is using any maritime autonomy in this war. This may change now that the US has announced that it may donate unmanned coastal defense vehicles to Ukraine as part of its military package.⁴⁸ Earlier, there was speculation that such unmanned surface vessels (USVs) would include French-made Inspector models, a curious twist of fate for this USV that was actually rejected by the Russian Navy in favor of domestic models that have yet to appear in large numbers across the Russian fleets and forces.⁴⁹ Other potential Ukrainian candidates include Textron System's combat unmanned surface vessel (CUSV) or the Maritime Tactical Systems' Mantis T-12 USVs that were recently tested by the US Navy.⁵⁰ Their most likely mission will be conducting maritime ISR and assisting in mine-clearing operations, although some combat role may be possible.

⁴⁴ Nikita Pimenov, "Russian sappers have cleared more than 160 hectares of territory in Ukraine and the republics of Donbass" (Российские саперы разминировали более 160 га территории Украины и республик Донбасса)," M24.ru, June 6, 2022, <https://www.m24.ru/videos/bezopasnost/06062022/468796>.

⁴⁵ "Ukraine to receive TALON explosive disposal robots," Mil.In.Ua, June 11, 2022, <https://mil.in.ua/en/news/ukraine-to-receive-talon-explosive-disposal-robots/>.

⁴⁶ "Uran-9 combat robots will be delivered starting 2022" (Ударные роботы "Уран-9" поступят в войска с 2022 года), Ria.ru, Oct. 1, 2021, <https://ria.ru/20211001/robot-1752592989.html>.

⁴⁷ Max Hauptman, "Ukraine now has killer robots with machine guns," TaskandPurpose.com, June 15, 2022, <https://taskandpurpose.com/news/machine-gun-robot-ukraine-russia/>.

⁴⁸ "Fact Sheet on U.S. Security Assistance for Ukraine," US Department of Defense, Apr. 15, 2022, <https://www.defense.gov/News/Releases/Release/Article/3000166/fact-sheet-on-us-security-assistance-for-ukraine/>.

⁴⁹ A. Valagin, 'Беспилотный катер для ВМФ испытают в Черном море' (A USV will be tested in the Black Sea for the Russian Navy), Rg.ru, 27 Feb. 2019, <https://rg.ru/2019/02/27/reg-ufo/bespilotnyj-kater-dlia-vmf-ispitaiut-v-chernom-moreispytaniia.html>; and Dan Parsons, "Here's Exactly What's In The \$800 Million U.S. Military Aid Package To Ukraine," TheDrive.com, Apr. 13, 2022, <https://www.thedrive.com/the-war-zone/heres-exactly-whats-in-the-800-million-u-s-military-aid-package-to-ukraine>.

⁵⁰ Yuri Svitlyk, "What American unmanned coastal defence vessels can Ukraine get?," Root-nation.com, Apr. 19, 2022, <https://root-nation.com/en/articles-en/weapons-en/en-unmanned-coastal-defence-vessels/>.



Source: "Uran-6 demining vehicle in Ukraine", <https://twitter.com/FeWoessner/status/1513088355826814978>.

Conclusion

Both the Russian and Ukrainian militaries clearly understand and are demonstrating the value of UAVs in modern combat. Aerial drones can be capable assets: they can be used in place of manned aviation to conduct strikes on identified targets, and they can tie up adversary movements, forces, and air defenses by forcing ground-based assets to counter the persistent drone threat from above.

The use of drones in this war is also evidence that relatively cheap unmanned platforms can be combat multipliers, especially when used in large numbers. At the same time, the Russian military still does not have enough UCAVs for persistent UAV strikes on the Ukrainian forces; we found only a few videos of either Forpost-R or Orion being used by Russian forces. Most of the drone work is still done by relatively light and cheap ISR UAVs. The Russian military also does not appear to be using any of the swarm technology it boasted of prior to the conflict as being a purported major area of the MOD's unmanned technology focus.⁵¹

As the conflict enters the fourth month, it is important to monitor the Ukrainian military's growing mass-scale use of US-supplied loitering munitions against Russian forces, in order to note the effect that such strikes can have on Russian military operations and logistics. For its part, the Russian military's growing use of its own KUB and Lancet loitering munition drones is a significant development worth watching.

As the war continues, both sides will use drones for ISR and combat missions: Ukraine will get US and NATO UAVs, while the Russian military will have to rely on its own diminishing stocks. The Russian media, which before the war were full of stories about Russia's apparently growing drone force, have been mute on domestic enterprises' efforts to fill the front-line losses with additional manufacturing. If the Russian drone force is diminishing in terms of actual numbers because of steady attrition from Ukrainian defenses, an additional area to observe is the Russian industry's attempts to replace lost UAVs with airframes that contain imported technology, all during unprecedented sanctions levied against the country this year.

Just as important is the evolution of counter-UAV defenses in the Ukrainian and Russian militaries as a key defense asset in a war with persistent commercial and military drone presence. As the Russian advance becomes more organized across Donbas, and as the Russian military grinds away at the Ukrainian defenses

⁵¹ "Swarm of drones used in Kavkaz-2020 exercise first time against enemy forces," Tass.com, Sept. 24, 2020, https://tass.com/defense/1204513?utm_source=mwi.usma.edu&utm_medium=referral&utm_campaign=mwi.usma.edu&utm_referrer=mwi.usma.edu.

and supplies, Ukraine may come to rely more on commercial drones due to lack of alternatives, especially as Russian electronic warfare is becoming more capable at targeting Ukrainian aerial assets.⁵²

As the Russian military continues its offensive operations in eastern Ukraine, it will be important to monitor the MOD's possible acquisition of Chinese military drones to make up for Russia's own drone losses, considering that it already operates a large number of civilian DJI models. The Russian military has been relatively mute on acquiring Chinese UCAVs that are already in wide use across the Middle East. Recently, there has been some evidence that the MOD may acquire specific military items from Beijing, and many have speculated that armed drones could be on that list.⁵³ The acquisition of such Chinese drones could provide Russia's forces with relatively cheap and expendable combat UAVs to use in the Ukraine war.

The extensive use of commercial UAVs by all sides is impacting military tactics and may force a change in operational planning and training both in Russia and in the West. The ability to have multiple persistent aerial assets in the skies is already producing a cascading effect on massing, maneuver, and force deployment, forcing the belligerents to adapt to the fact that their every move may be observed by a small drone, and eventually posted on social media. Large militaries such as that of the US are already deliberating the meaning of this UAV evolution in combat for their own forces and tactics, as the battlefield become more transparent and large formations can no longer hide their movements and presence.⁵⁴ At this point in the war, the drone usage by Russia and Ukraine shows no signs of abating; both the defending and attacking forces will continue to seek advantages from the multitude of capabilities that military and commercial drones offer on the battlefield.

⁵² Jeff Schogol, 'Assume you can be jammed' — What US troops are learning about electronic warfare in Ukraine," TaskandPurpose.com, June 7, 2022, <https://taskandpurpose.com/analysis/russia-ukraine-electronic-warfare-us-troops/>.

⁵³ Alberto Nardelli and Jennifer Jacobs, "U.S. Warns Europe That Russia Wants Armed Drones From China," Bloomberg.com, Mar. 14, 2022, <https://www.bloomberg.com/news/articles/2022-03-15/u-s-warns-europe-that-russia-wants-armed-drones-from-china>.

⁵⁴ Andrew Eversden, "US Army secretary: 5 lessons from the Ukraine conflict," BreakingDefense.com, June 1, 2022. <https://breakingdefense.com/2022/06/us-army-secretary-5-lessons-from-the-ukraine-conflict/>; Ivan Ingraham, "Off the shelf, above the fight: How cheap drones are completely changing warfare", TaskandPuirpose.com, July 1, 2022.,<https://taskandpurpose.com/opinion/drones-uas-warfare-ukraine-russia/>

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