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The Ukraine Drone Effect on European Militaries

The war in Ukraine is the first large-scale, high-intensity military conflict in which both sides deploy different types of drones extensively and to different military effects. European countries should take note to adopt a holistic approach on drones and anti-drone defenses.

By Dominika Kunertova

Drones alone do not have decisive war-winning capability. However, the war in Ukraine shows that they have become a significant factor in conventional warfare. Ranging from persistent eyes in the sky and flying missile launchers to small stealthy drone scouts, the qualitative and quantitative scale of their use in war is unprecedented. At the same time, the effect of drones on the changing character of warfare should not be overestimated. Machines are still far from replacing human fighting. Drones, however, can transform the way humans go about warfare. In addition to their use as weapons, drones have brought about an important evolutionary change in their less spectacular supporting roles, especially in providing battlespace awareness for small teams and even individual soldiers.

Large drones are too easy to defend against to make an independent difference in air operations, especially in an active shooting war in which no side has control of the airspace. In contrast, smaller drones operated by land forces are transforming the dynamics in lower airspace. They empower infantry soldiers to spot enemy units and navigate artillery fires, which helps to improve precision and keeps troops out of harm's way. These

are the same tasks that drones performed in the last century – yet thanks to their affordability and user friendliness, humans just got better at using them.

The main take-away for the European countries from drone warfare in Ukraine is drone diversity. Different categories of drones have different military effects. For the past two decades, European countries have been procuring drones designed for the wars of the past. Due to US drone-intensive counterterrorism operations executed by

Key Points

- The war in Ukraine is shaping how the military is thinking about drones and normalizing the use of armed drones, as the context changes from counterterrorism to conventional warfare.
- European countries should adjust their drone acquisition strategies to include a full spectrum of drones, but also better integrate small drones serving land forces.
- European countries should invest in their under-developed air defenses and, given the changing operational dynamics in the lower airspace, acquire effective countermeasures against small drones.



A police officer inspects parts of an unmanned aerial vehicle (UAV), at a site of a Russian strike on fuel storage facilities, in Kharkiv, Ukraine October 6, 2022. *Vyacheslav Madiyevskyy / Reuters*

Predator and Reaper drones, large armed/surveillance drones became infamous for their targeted killing beyond official battlefields.

The European dronescape needs to reflect how drone utility – especially tactical armed drones and drone scouts – has been evolving in Ukraine now. Future drone acquisition plans of European armed forces could better embrace the added value of drone diversity in accomplishing military missions. In addition, given the increasing popularity of loitering munitions and cheap, commercial, grenade-carrying alternatives to military drones, European countries need to adopt a holistic approach to drones that includes cost-efficient anti-drone defense systems.

Drones in Ukraine

The war in Ukraine shows that drones achieve different effects depending on the type of the platform and its payload. While large drones carrying missiles can be destructive under conditions of air superiority, small and mini drones are proving crucial for situational awareness of infantry, maneuvering units, and artillery targeting. In addition, loitering munitions represent yet another hard-to-defend-against way to deliver explosives.

The large military drone TB2 Bayraktar, manufactured by the Turkish company Baykar Defense and now operated by Ukrainian forces, was stealing headlines and acquiring almost mythological significance for Ukrainian resistance with songs composed to honor it. Ukraine bought up to two dozen of them prior to the war to conduct reconnaissance, artillery targeting, and strikes. These drones, which are the size of a small airplane, provide a less costly means than crewed jets to deliver firepower over longer ranges. Yet, in a war in which no side controls the sky, these large drones are vulnerable to the adversary's air defenses, which disqualifies them from more extensive use. They are

also expensive to replace. For instance, one TB2 costs about 2 million USD, in contrast to some loitering munitions for 20,000 USD per unit. Large and tactical surveillance drones can be still useful to gather information over extended periods. Russia deploys its Orlan-10 to conduct reconnaissance and targeting, yet its ability to provide high-quality reconnaissance has been lacking.

Both sides have discovered the utility of small commercial drones to generate military capability on the cheap. These drones have made the most significant difference in their enabling functions. First, they have shortened firing cycles of artillery from about half an hour to just three to five minutes with drones. Second, drone scouts give unprecedented battlespace awareness down to the level of infantry soldiers, allowing them to

spot enemy positions and monitor the movements of troops without risking lives of human special forces. These AliExpress/Amazon drones repurposed for spying on the enemy's troops and dropping hand grenades on targets have become abundant thanks to their low cost and user-friendliness. Chinese DJI drones represent a key tactical reconnaissance and artillery targeting capability.

Kamikaze or suicide drones differ from armed drones, which carry munitions that are released over targets, as they achieve kinetic effects through self-destruction. They behave like disposable munition and offer an offensive capability that can loiter in the target zone before activating. Therefore, they are known as loitering munitions. They made noticeable appearances in Libya (the Turkish Kargu drone) and in Nagorno-Karabakh (Israeli Harop). In Ukraine, both sides were familiar before the war with loitering munitions of varying size, control, and engagement modes. While Ukraine already operated RAM II, Russia deployed the Lancet and the KUB-BLA system. Thanks to the weapon deliveries from the United States, Ukrainian troops can target Russian forces with munitions like Switchblade 300 that fit in a backpack.

What Russia now possesses, and Ukraine is still missing in the winter of 2022, is a long-range loitering munition. Russia is making intense use of Iranian-supplied Shahed-136 (russified as Geranium-2) kamikaze drones that carry 50 kg of explosives over several hundred kilometers – in contrast to Switchblade's limited range of 10 km. They provide Russia with the ability to strike targets deep in Ukrainian territory and on the cheap. At around 10,000 to 20,000 USD per unit – in contrast to a single standard cruise missile costing 1 million USD – Russia can afford to launch Shaheds in large numbers. Yet their relatively slow speed of 185 km/h and the use of a commercial and thus less precise guidance system allowed Ukrainians to report-

edly destroy – with anti-aircraft missiles, rifles, machine guns, and electromagnetic jamming – more than 80 per cent of incoming drones.

Drones are also employed for non-kinetic effects such as propaganda and psychological warfare missions. This can include harassing the adversary's soldiers, recording videos of ambushes and posting them on social media, as well as footage documenting post-battle damage and destroyed civilian property. Similarly, the salvos of loitering munitions launched at cities and civilian infrastructure in Ukraine inflicted psychological pressure with the intention to break down Ukrainian resistance.

The Ukraine effect on drones

The innovations in the use of drones during the war in Ukraine have further implications on the image of armed drones and the increased difficulty of controlling their proliferation. The predominantly commercial origins of dual-use components in drone systems and the involvement of the private sector are two major contributing factors.

Volunteers and crowdfunding campaigns have strengthened the civilian involvement in the war efforts. Both Russian and Ukrainian forces have acquired parts of their drone capability through “dronations” of small hobbyist drones from the local population. Charities raising money for the purchase of combat drones, such as the Ukrainian Prytula Foundation and Come Back Alive, are allowed to engage directly with the arms industry. This

support of the private sector contributes to normalizing the use of drones delivering explosives.

In addition, the Ukrainian government regularly sponsors drone hackathons to build on the innovation in the commercial sector. Its fundraising platform UNIT-ED24 runs a full drone life cycle procurement program, including repair and operator training. Another example of civil-military tech combination is the use of Starlink technology. The commercial internet provider via a satellite constellation has enabled communications, as well as drone use for reconnaissance and even the battlefield use.

Lastly, the war in Ukraine has also provided a playground for foreign drone powers, accelerating drone proliferation. Iran and Turkey use drone diplomacy to project power through their weapons sales and engagement in fight. While China has been the world's largest exporter of armed drones, Chinese military drones have not featured in the conflict yet. However, the Chinese commercial drones or the commercial components needed for building bomb-dropping quadcopters, remote-controlled munition, and Iranian military drones have made their way into the war.

The Ukraine drone effect on European militaries

For the past two decades, Europeans have been procuring armed drones for the conflicts of yesterday: to conduct counterterrorism operations overseas in asymmetric conflict, reducing the risk to humans at the front line and flying over mines and improvised explosive devices. In addition, European efforts to decrease the dependence on foreign drone technology through multimillion-euro capability development projects (CSS Policy Perspectives Vol. 9/5, April 2021) led nowhere.

The use of drones in the war in Ukraine is beginning to affect the European thinking about drones. Some contemplate procuring armed tactical drones (Slovakia), others hasten to either acquire a long-range drone surveillance capability (Poland is leasing the American MQ-9A Reaper until Warsaw gets its own system) or equip their drones with missiles. The case of Germany sticks out the most as it was able to overcome the years-long opposition to arming the Heron drones that it bought from Israel.

In the meantime, large armed drones are being superseded by a widening spectrum of lethal drone threats, which includes also armed quadcopters as flying air mines, loitering munitions, and small reconnaissance drones. The changing public perception makes armed drones more politically acceptable. Once decried as flying assassination robots conducting strikes and ethically disputable executions

Further Reading

James M. Page, “**Drones in Ukraine: Claims, Concerns and Implications,**” *RUSI*, 10.06.2022.

Analyzes how drones in their less sensational roles brought a considerable evolution in how warfare is conducted.

Maximilian K. Bremer / Kelly A. Grieco, “**The Air Littoral: Another Look,**” *Parameters* 51: 4 (Winter 2021–22), 67–80.

Examines the air littoral and the consequences of domain convergence for the concept of control in the land and air operations.

Hanna Shelest, “**Defend. Resist. Repeat: Ukraine’s Lessons for European Defence,**” European Council on Foreign Relations, *Policy Brief*, November 2022.

Outlines the lessons the EU and its member states can learn from Ukraine’s response to Russian aggression.

James Rogers / Dominika Kunertova, “**The Vulnerabilities of the Drone Age Established Threats and Emerging Issues out to 2035,**” NATO Science for Peace and Security, 2022.

Analyzes the global proliferation of drones to hostile state and non-state actors and explores the contours of the future drone age out to 2035.

in the 2000s and 2010s, they have become a regular part of conventional warfare. European militaries will need to adapt their doctrines to better integrate small drones with traditional weapon systems and especially accommodate the increasing scope of human-machine interactions.

This proliferation of small drone use comes with additional operational challenges. One of these challenges concerns airspace management, since drones operate in congested spaces next to, with and against a wide range of aerial vehicles. Whether deployed in a concentrated (to saturate air defenses) or dispersed (to provide persistent surveillance over larger areas) manner, small drones contribute to the thickening of air traffic. To support ground troops, the lower airspace with altitudes below three kilometers is becoming crucial as a result.

Defense against drones

The war in Ukraine confirms that drones are becoming stealthier, speedier, smaller, more lethal, more easily operable, and arrive in the hands of more actors. Decades of concentrating on fighting insurgents and less potent regional powers did not lead European militaries to prioritize air defense, which creates a significant problem today.

Drone countermeasures need to reflect the increased drone diversity. Countering large drones can be done with little extra effort via existing air defenses. In contrast, small, low, and fast-flying drones are difficult to spot, let alone intercept. Even drones of lesser quality can destroy things and kill people – and these low-tech cheap attack drones cannot be efficiently stopped by much more expensive air and missile defense systems, such as Patriot. The war in Ukraine shows that drone warfare gives preference to quantity, rather than quality. This means that the cost of a defense system must be lower than the cheap low-tech drones it is supposed to stop. European countries need to develop anti-drone defenses that balance effectiveness with operating costs in order to make stopping cheap Shaheds more feasible.

Additionally, lowered cost makes multi-drone deployment more affordable, allowing even for a rudimentary drone swarming tactic. These are different from Artificial Intelligence (AI)-enabled swarms, which rely on greater levels of autonomy and are thus immune to jamming. In addition, drone jammers have a rather small effective radius (some reaching 10 km, on the upper end). Jammers would have to be spread out across the entire theater to mount an

effective drone defense, which could also present a logistical nightmare. Hence, jamming equipment alone will not reliably counter the threat of low-cost, potentially autonomous loitering munitions and small drones. European militaries are yet to develop effective defenses against existing drones.

Finally, the Ukrainian maritime drone attacks against the Russian fleet in the bay of Sevastopol in October heralded the spillover from the air to naval domain of operations. In combining drone boats with aerial drones to saturate Russian defenses, this innovative use of uncrewed platforms across various domains of operation is one step closer to full-spectrum drone warfare.

Beyond Ukraine

The thinking in European governments and militaries about drones should reflect the lessons learned from the war in Ukraine. Observing the innovative approach to the use of drones in a high-intensity war, European drone acquisition strategies should incorporate 1) the military potential of small and mini drones; 2) the compound effect of low-tech commercial drones; 3) employing drones all the way down to the squad level; 4) loitering munitions with longer ranges deployed *en masse*; and 5) more cost-effective defenses against drones.

The war shows that European countries need to develop reliable drones for a battle, not a showroom. While drones have not become a decisive capability in the war, their use can create limited but significant tactical effects. Future European drone arsenals should include not only long-range persistent eyes in the sky and missile platforms, but also small drone scouts. In contrast to some analysts who dismissed any prospects for major increase in drone procurement for lower military echelons – since the experience taught that large combat drones did not change the offensive air campaigns – small drones are already empowering individual soldiers. The reverberations of the war in Ukraine on European drones will be mostly felt in balancing expensive weapon platforms procurement with buying cheaper expendable munition.

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