3 Main Points

Main Question: How are drones, particularly UAVs, redefining warfare in the Russia-Ukraine conflict? Argument: Affordable, small-scale drones (like FPVs) are now central to modern combat, offering low-cost, high-impact strategies that outmaneuver traditional defense systems. Conclusion: Operation Spiderweb showcased a revolutionary shift in warfare, proving drones are no longer support tools but central weapons capable of strategic, large-scale impact.

About the Authors

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Operation Spiderweb and the Drone Revolution

Major wars and conflicts have often catalyzed radical shifts in the way wars are conducted and weaponry employed. World War I introduced trench warfare and the use of chemical weapons; World War II led to a widespread mechanization of warfare through the rise of tanks as one of the most influential weapon systems and other significant military

technology advancements. Today's war in Ukraine marks a new relevant shift in the way war is conducted, by introducing new ways of employing unmanned aerial vehicles (UAVs). Although drone warfare is nothing new, it has never been used at this scale during a state-on-state conflict. One notable UAV operation was conducted on June 1st, 2025, by the Ukrainian armed forces under the codename "Operation Spiderweb", targeting the Russian strategic bomber fleet from within Russia. This brief will explore how drone technology has transformed the modern battlefield in the Russia-Ukraine war. It will first dive into the rise of the use of UAVs on the battlefield by both Russia and Ukraine, and later use "Operation Spiderweb" as a case study to illustrate the latest shifts in drone warfare.

The Rise of Small, Affordable Drones in the Russia-Ukraine War

The use of drones has been an integral part of modern warfare since the early 2000s. Back then, they were often associated with U.S. operations in the Middle East. Those operations typically employed drones, such as the MQ-9 Reaper, which costs around $30 million per unit. Their primary role lies in precision strikes and long-range surveillance. The drones that are used in the Russia-Ukraine war can be categorized as an entirely different class of UAVs. They are often small, inexpensive, and deployed in large numbers.

One of the most relevant transformative developments in this war has been the frequent deployment of so-called first-person view (FPV) drones. These small quadcopters are typically easy to produce and can cost between $200 and $500. They are operated by a person wearing FPV goggles and employed by both Ukrainian and Russian forces. The task of those drones can vary. While some are used for surveillance, others carry explosives that they can drop, or are armed with explosives to deliberately crash into enemy vehicles, personnel, or relevant infrastructure.

Ukraine has heavily invested in this new approach of drone warfare, with plans to acquire 4.5 million FPV drones for 2025 alone.

What Makes This War Different?

Unlike in past conflicts, the role of UAVs has drastically changed during the Russia-Ukraine war, from being supplementary or experimental tools to becoming center-stage weaponry. This transformation can be explained through a variety of factors. One of the driving factors is the low production cost. As previously noted, the production of the FPV drones often only costs a few hundred dollars. Even the production of larger drones, such as the Shahed drone frequently employed by Russia, is relatively cheap and estimated to cost around $35,000. In comparison, one of the cheapest Western military drones, the RQ-11 Raven, is estimated to cost around $35,000 per unit, but with the system together, the price rises to around $250,000. The low prices for many types of UAVs in the Russia-Ukraine war allow for their mass deployment, which can be used as a tactic to overwhelm traditional air defence systems. Small drones are harder to detect by air radars, since they often fly below traditional air defense thresholds. Another contributing factor is the ease of use of those drones and their portability. They can often be used by small units with minimal training, allowing for a quick deployment on the battlefield. Further, the use of UAVs helps to protect soldiers' lives as they are not directly exposed to enemy fire. At the same time, however, the use of drones can be lethal for the other party. In the Kherson region, for instance, 70% of civilian casualties nowadays are linked to short-range drone attacks. On the battlefield, drones are even believed to account for up to 80% of casualties.

All these aspects and new developments make the use of drones as a center-stage weapon very attractive, potentially marking the start of a new era of warfare. Particularly appealing is the cost-benefit ratio, with military equipment worth millions getting destroyed, by spending only a few hundred or thousands of dollars on drones. One example of how this works can be found when looking into the recent Ukrainian military operation, coded as “Operation Spiderweb”.

Operation “Spider Web”

After over a thousand days of war, Ukraine launched one of its most successful covert operations to date. On June 1st, in what was dubbed “Operation Spiderweb”, the Ukrainian military claimed to have wiped out nearly a third of Russia's strategic bomber fleet.

The operation has been widely praised by western analysts for its brilliance. All of the involved Ukrainian personnel were safely back in Ukraine by the time the attack was carried out. The operation reportedly involved the covert transfer of 117 FPV drones into Russia, hidden in shipping containers. Ukraine’s security service (SBU) placed those containers into standard truck parks near targeted areas and later contracted Russian truckers to transport them over to their launch points.

Once there, the drones were launched and linked remotely to operators within Ukraine. However, in case of a lost connection, they were equipped with the remarkable capability to reach their GPS coordinates and autonomously select their targets. While a considerable amount were intercepted and shot down during their mission, the remaining drones were still able to do irreparable damage to the Russian fleet.

Accurately assessing the full extent of the damage remains difficult, since claims vary depending on the source at hand. What is confirmed, however, is that the drones struck five major air bases, spread throughout Russia’s vast territory: Olenya Air Base (near Murmansk); Belaya Air Base (near Irkutsk); Ukrainka Air Base (in the Amur region); Ivanovo Air Base (near the city of Ivanovo); and Dyagilevo Air Base (near Ryazan).

According to Ukrainian officials, 41 aircraft were destroyed across these locations. Among these aircraft were several TU-95 Bear strategic bombers (capable of launching nuclear

cruise missiles), TU-22M3 Backfire bombers (supersonic, variable-sweep wing aircraft designed for anti-ship and anti land-attack missions), and two A-50 Mainstay AEW&C (airborne early warning and control) aircraft.

The destruction of the A-50s was significantly damaging, as they play a critical role in surveillance and command operations. Their destruction thus marked an irreplaceable loss to Russia's air operability and its ability for airspace control.

Crystallizing a new era of warfare

Ukraine's use of drones to remotely take out a significant part of Russia's strategic bomber fleet - without endangering a single Ukrainian soldier - marks a defining moment in modern warfare. Operation Spider Web exemplifies the emergence of a new era, increasingly dominated by unmanned systems.

Not only was the operation marked by its incredible operational security, but also by impressive impact and cost-effectiveness. According to Ukrainian officials, the mission had been planned for an 18 month period. The "cheap, first person view" FPV drones used were each worth a couple hundred of dollars. Keeping in mind the cost of logistics and transportation, the total cost for Ukraine could be estimated at around one million dollars, whereas experts cite Russia's loss in damage at around seven billion dollars.

In the wake of such a success, it is reasonable to assume the Russia-Ukraine war will involve an increasing amount of coordinated, multi-domain drone assaults - including aerial, maritime and submersible systems. As for now, Moscow is scrambling to find ways to defend its vast territory from future operations that are almost nearly impossible to detect in advance. As for the rest of the world, all eyes are on Ukraine, which has shown that

unsophisticated drones can take out high-value aircraft in a matter of minutes (assets that, like Russia, many countries still leave exposed on open airfields). With this, Ukraine has not just pulled off a tactical success, rather it has highlighted a deeper shift: drones are no longer supporting actors in warfare. They are becoming the protagonists.