

The New Salvo War

Russia's Evolving Punishment Campaign

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THE ISSUE

- Russia has normalized massive, mixed drone-missile salvos: The average wave size has risen from about 100 munitions in 2022 to nearly 300 in 2025, while intervals between major strikes have compressed from roughly a month to as few as two days.
- The salvo campaign now leans heavily on Shahed swarms to saturate Ukraine's air defenses in line with the increasing Russian low-cost drone manufacturing capability. These salvos reflect an attritional punishment strategy—victory through volume, persistence, and psychological strain
- Ukraine must counter with layered, cost-efficient defenses: rapidly field high-energy lasers and HPMs, expand cross-domain early-warning networks, diversify low-cost interceptors and rapid-fire guns, and fuse civil-military tracking to decode salvo patterns in real time.

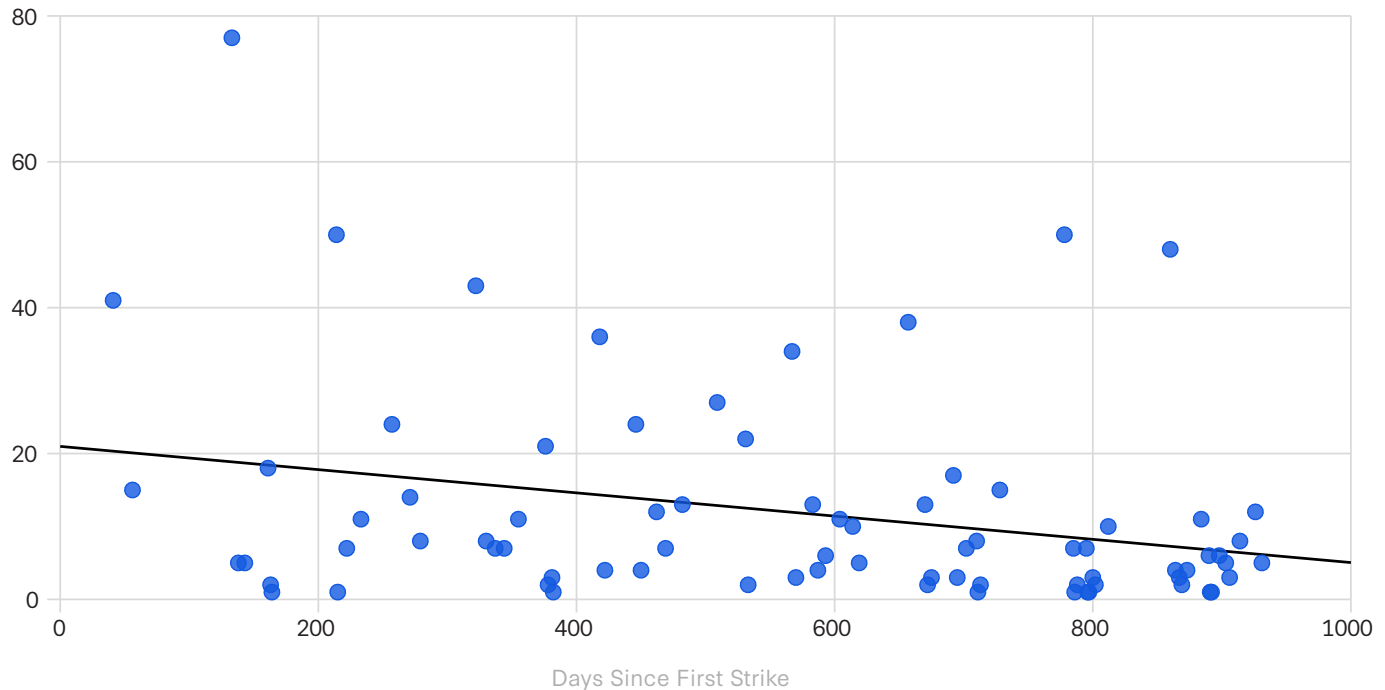
INTRODUCTION

On the night of July 9, 2025, Russia launched the **largest combined drone and missile attack of the Russia-Ukraine war**, saturating Ukraine's defenses with 728 kamikaze drones and 13 missiles, most aimed at Kyiv. The scale was staggering. And it was not an isolated incident. In the days that followed, two more salvos hit Ukraine—416 weapons in one wave, 625 in another—each exceeding the daily averages seen in prior months. These attacks were more than mere upticks in Russian activity. They demarcate a deeper, deliberate shift in operational tempo and a signal to Ukraine and its backers: Russia is prepared to escalate, overwhelm, and exhaust Ukraine. Massed salvo attacks are part of Russia's evolving coercive **punishment campaign**.

What was once the exception has become routine. Large-scale salvo attacks now make up roughly 10 percent of all Russian aerial operations (see Appendix Table A-1). Since September 2022, the CSIS Futures Lab has tracked 157 of these coordinated waves—combinations of missiles, drones, and ballistic projectiles—deliberately sequenced to test and stress Ukrainian defenses. Early in the conflict, salvos averaged around 100 weapons per wave. By 2025, that number has tripled to nearly 300, reflecting not only expanded production but an increasingly aggressive aerial campaign. The pace has accelerated as well. In 2022, Russia launched a major strike roughly once a month. By mid-2025, the gap between salvos has shrunk to just eight days (see Figure 1). What were once peak events are now baseline activity in a campaign defined by sustained pressure and operational tempo.

Figure 1: Interval Between Salvos Over the Course of the War

Days Since Last Salvo



Note: The scatterplot shows the number of days between missile salvos (y-axis) plotted against the number of days since the first strike (x-axis). Each point represents a single inter-salvo interval. The blue line is a simple linear trend, which helps visualize whether salvos are becoming more or less frequent over time.

Source: Futures Lab analysis using data from Air Force Command of Ukraine and General Staff of the Armed Forces of Ukraine.

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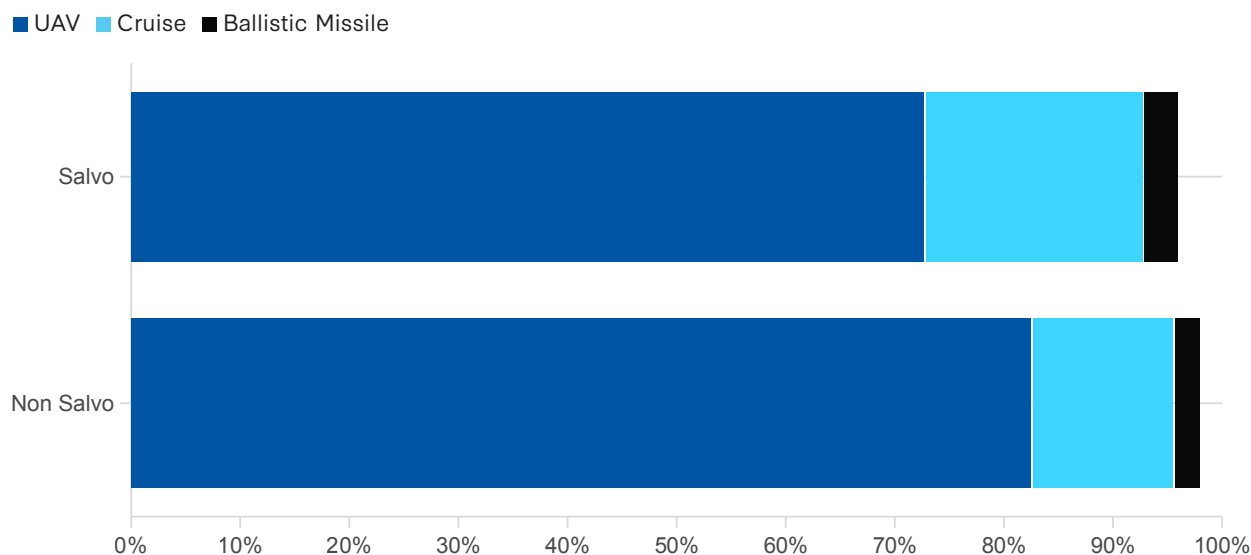
The tempo keeps climbing. In the past two months, the shortest interval between major salvos has dropped to just two days. What were once outlier events—occasional spikes in intensity—have become standing features of Russia’s aerial campaign. Each wave piles pressure on Ukraine’s air defenses, saturating systems already strained by months of attritional combat and forcing difficult choices about what to protect. This pattern reveals more than tactical adaptation—it reflects a shift in operational logic, a move from sporadic devastation to sustained saturation. It is a strategy designed to erode, overwhelm, and exhaust, and is a central feature of the current phase of the war.

This brief first examines the evolving logic of Russia’s missile and drone salvos, showing how shifts in composition and frequency are designed to strain Ukraine’s air defense architecture. It then outlines the operational and psychological consequences of this strategy, particularly the rise of Shahed drone swarms as a primary tool of attritional warfare. Finally, it identifies a set of policy responses for Ukraine and its partners. These include (1) accelerating the deployment of directed-energy weapons such as lasers and high-powered microwaves, (2) expanding early-warning sensor networks across domains, (3) diversifying the interceptor mix to include low-cost, rapid-response systems, and (4) integrating civil and military tracking capabilities to decode Russian salvo patterns in real time. Together, these steps can help Ukraine blunt the effectiveness of Russia’s evolving aerial campaign and restore strategic balance to the skies.

RUSSIA’S SALVOS HAVE DIFFERENT LOGIC

Analysis of the composition of these salvos reveals a clear operational logic. It is not just about volume. It is about the

Figure 2: Average Launch Composition by Day Type



Note: Each bar shows the average proportion of each missile or UAV category on salvo and non-salvo days. Categories are grouped by type, and shares are normalized across all attacks for each day type. The remaining missile types, including guided bombs and surface-to-air missiles, are dropped from the analysis, accounting for the distance between the end of the bars and the 100% mark

Source: Futures Lab analysis using data from Air Force Command of Ukraine and General Staff of the Armed Forces of Ukraine.

mix. By integrating a greater mix of high-end cruise missiles alongside drones and ballistic threats, Russia amplifies the strain on Ukraine’s layered defenses. Rather than sending weapons in discrete categories—drones in one wave, cruise missiles in another—Moscow blends them together. Mixed salvos stretch Ukraine’s defenses, forcing commanders to divide limited interceptors across multiple types of threats at once. The result is saturation. The more simultaneous angles of attack, the greater the chance something gets through.

Moreover, Russia’s large-scale strikes increasingly lean on long-range cruise missiles—specifically the Kh-101 and Kh-555—as well as ballistic missiles including the **Iskander**. These systems feature prominently in high-intensity salvos, while lower-intensity days are more reliant on unmanned combat aerial vehicles. The choice is not random. Cruise missiles offer range, low observability, and the psychological punch of a deep strike. Russian planners appear to be selecting these weapons deliberately to penetrate Ukraine’s increasingly sophisticated air defenses and to create uncertainty about where the next blow will land.

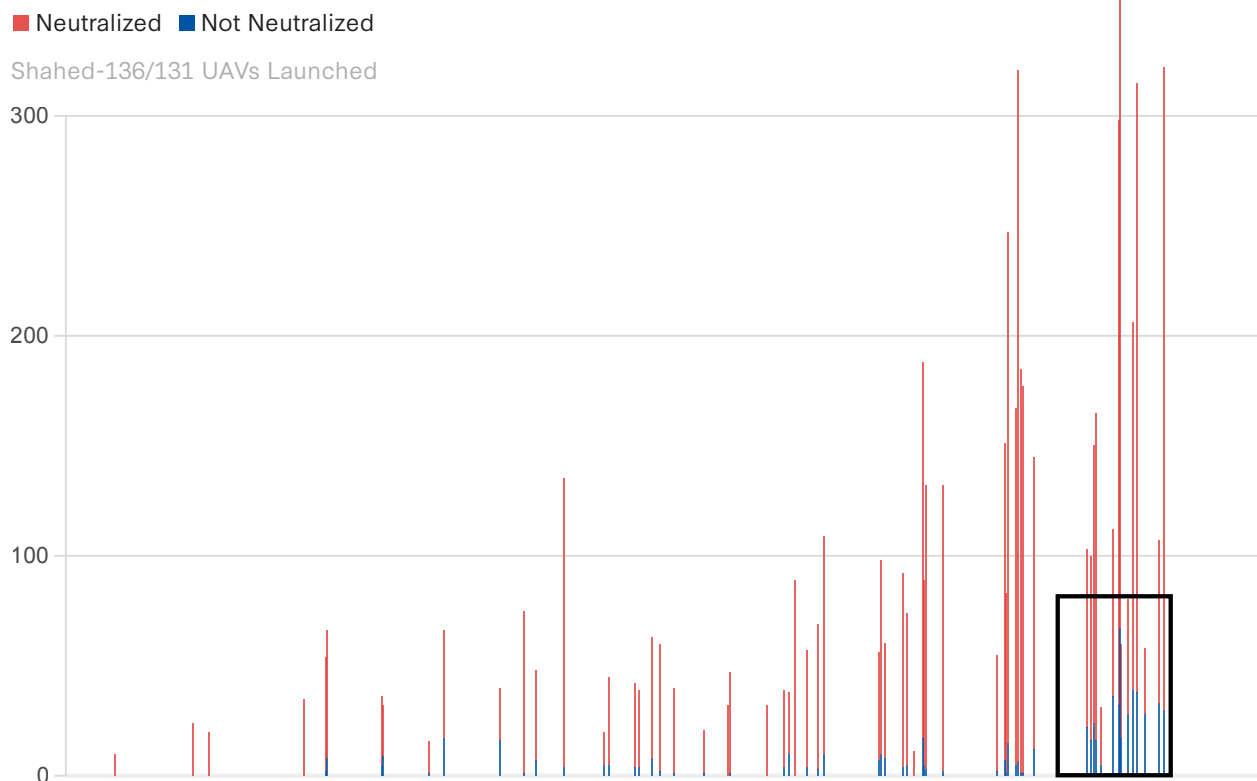
Over time, that constant pressure does not just burn through munitions—it eats away at morale. This is the core of Russia’s salvo strategy: not overwhelming strength at a single point, but cumulative pressure across many, designed to wear down defenses through volume, vari-

ety, and repetition. In sum, the distinctive logic of Russia’s salvo launches lies in their calibrated blend of quality and quantity—an approach designed to erode air defenses through multi-vector pressure (see Figure 2).

HOW RUSSIA LEANS ON KAMIKAZE DRONES

Since September 2024, Russia’s aerial campaign has entered a new phase—one defined not by cruise missiles or ballistic strikes, but by swarms of Geran-2 (Shahed) kamikaze drones. Where earlier salvos blended missiles and unmanned systems, the new pattern is almost entirely drone-centric. **Monthly Shahed launches** now routinely exceed 5,000 of these drones, with weekly averages pushing past 1,000. On the night of July 2, 2025, Russia launched 750 drones in a single wave. This is a shift in logic as well as a shift in payload. Drones are cheap, abundant, and effective at forcing Ukraine to defend in multiple locations and risk burning through its limited supply of expensive interceptors. Compared to the mixed salvos that defined earlier stages of the war, today’s drone-dominant strikes blur the line between routine and massed. Even low-intensity days now resemble full-scale assaults. One-way attack drone warfare has become the backbone of Russia’s pressure strategy: relentless, low-cost, and part of a broader **punishment campaign**.

Figure 3: Shahed Drone Neutralization on Salvo Days



Note: Each bar shows the average proportion of each missile or UAV category on salvo and non-salvo days. Categories are grouped by type, and shares are normalized across all attacks for each day type. The remaining missile types, including guided bombs and surface-to-air missiles, are dropped from the analysis, accounting for the distance between the end of the bars and the 100% mark

Source: Futures Lab analysis using data from Air Force Command of Ukraine and General Staff of the Armed Forces of Ukraine.

Russia has begun flying upgraded Shahed variants at higher altitudes, exploiting radar gaps and pushing the limits of short-range air defense systems.

In fact, Shahed drone launches are getting more effective. Earlier in the war, hit rates hovered below 10 percent. Now, they have nearly doubled to 20 percent. This improvement does not reflect a collapse in Ukraine's air defenses, but rather Russian adaptation. Newer swarming tactics—overlapping flight paths and staggered timing—force defenders to divide their attention and burn through interceptors faster. At the same time, Russia has begun flying upgraded Shahed variants at higher altitudes, exploiting radar gaps and pushing the limits of short-range air defense systems. The result is compounding pressure. As the waves of drones increase in size and tempo, Ukraine's defenses saturate faster and stocks

of interceptors grow thinner. More drones slip through—not because Ukraine cannot defend itself, but because it is being asked to do so against an adversary learning in real time how to overwhelm the shield.

WHAT THIS MEANS FOR UKRAINE

The normalization of large-scale salvo launches, driven primarily by one-way attack drones, embodies a deeper strategic logic in Russia's wartime conduct. Oftentimes, Russia's **strategic advantage** lies in its capacity to absorb losses and keep the military momentum. Historically, Russia has waged conflicts that are protracted, unbounded by strict timetables, and resilient to attrition. In each instance, Moscow relied on the capacity to outlast adversaries through sustained production and relentless pressure. Today, by massing low-cost drones against Ukraine's air defenses, Russia seeks to impose not only physical attrition but also psychological strain on Ukrainian society, thereby increasing domestic pressure on Kyiv's government to concede. It is a logic of **punish-**

If integrated into Ukraine's air-defense architecture, lasers could complicate Russia's calculus.

ment and a different theory of victory than winning decisive battles along a static frontline.

To keep pace, Ukraine will have to match persistence with innovation. One path forward is the rapid deployment of low-cost, high-energy laser systems capable of intercepting drone swarms before they can overwhelm conventional defenses. Unlike missiles, directed-energy weapons do not rely on expendable munitions; they can engage multiple targets quickly and repeatedly. Early battlefield testing by **Ukraine** and the **United Kingdom** suggests these systems can disable drones at standoff ranges of several kilometers. If integrated into Ukraine's air-defense architecture, lasers could complicate Russia's calculus—forcing a shift toward more expensive munitions or prompting investment in counter-laser technologies. Either way, they help restore cost symmetry in a fight defined increasingly by asymmetric attrition.

This effort to incorporate laser systems can include using high-powered microwaves (HPMs). HPMs have the ability to target more broadly, including swarming drones. Both the **United Kingdom** and the **United States** have tested HPMs. The United States has tested these systems for both ground applications and at **sea**. The U.S. Army has integrated tests into its future concept for layered air defense in **major exercises in the Philippines**. These systems should be field tested in Ukraine.

Beyond lasers, Ukraine and its international supporters must pursue a multilayered defense architecture. First, cross-domain early-warning sensors—combining ground radars, manned and unmanned aerial platforms, and sat-

ellite data—are vital for detecting and distinguishing simultaneous threats, from cruise missiles to drone swarms. This network can include low-cost **ballons** to extend range. The United States, through **NATO Security Assistance and Training for Ukraine**, should find ways to fast track intelligence sharing and early-warning concepts to support Ukraine.

Second, a diversified interceptor portfolio should pair rapid-response, low-cost point-defense systems—such as radar-guided, rapid-fire guns and low-cost, short-range missiles—against drones with retained stocks of high-end surface-to-air missiles for cruise and ballistic threats. Ukraine has already begun deploying systems such as the **Sky Sentinel**, an AI-powered autonomous turret capable of detecting, locking onto, and neutralizing drones without human intervention. Funded in part through the **United24**, Sky Sentinel offers a scalable and cost-effective alternative to missile-based interception. In parallel, Ukrainian units are **expanding their dedicated air defense and drone-interception capabilities**, forming specialized UAS and FPV interceptor groups to counter the growing threat of Shahed-type drones. These domestic innovations are being bolstered by growing international partnerships. In 2025, Ukraine signed a **deal** with Swift Beat, a U.S. company led by former Google CEO Eric Schmidt, to coproduce hundreds of thousands of drones, including interceptors, marking a significant step in public-private defense collaboration. European industry is also engaging: Denmark's **Terma**, in partnership with Ukrainian drone manufacturer Odd Systems, is developing AI-powered drone interceptors, illustrating the potential of allied contributions to Ukraine's layered defense. Together, these initiatives underscore the importance of blending bottom-up domestic innovation with direct foreign investment in Ukrainian defense manufacturing and operational capability.

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Third, winning the fight in the air will take more than interceptors. It will require a fusion of technology, transparency, and analysis that draws on civil society, open-source intelligence, and classified assessments working in concert to track and decode Russia's evolving operational art in the new missile age. Transparent, real-time tracking and attribution platforms are critical. By logging each salvo—its size, composition, and timing—Ukraine can sharpen its operational planning and synchronize its requests for international aid, ensuring that interceptor shipments align with the actual threat mix. Just as important, this visibility helps shape strategic communications, pushing back against Russian disinformation and reinforcing public confidence in Ukraine's ability to defend itself.

Ultimately, defense is more than stopping drones or missiles. Equally crucial is contesting the narrative. By combining directed-energy systems, layered sensors, diverse interceptors, resilient infrastructure, and real-time tracking, Ukraine can turn Russia's salvo strategy from an overwhelming tide into a manageable, contested fight—and in doing so, regain the strategic initiative in the skies. ■

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APPENDIX

The Futures Lab defined salvos as follows:

- Rolling mean number of missiles launched created for each day.
- Rolling window: 30 days pre-salvo.
- Z-score for each day calculated based on rolling mean and standard deviation.
- Salvos defined as launches that exceeded the mean by at least 1.5 standard deviations, i.e., $Z \geq 1.5$.

Salvo compositions were weighted according to following:

- Day-weighted scheme:
 - Convert every launch day into a composition vector that sums to 100 percent, then average those vectors across days. This gives each calendar day equal influence (within category), no matter how many missiles were fired.

The day-weighted scheme allows Futures Lab to normalize the data, as these salvos are launched together.

Table A-1: Summary Statistics for Salvo Size and Frequency

Time Period	Total Launches	Salvos	Salvo Rate	Missiles Per Salvo	Mean Interval (Days)
All Years	775	80	0.103	116.0	12.20
2022	20	2	0.100	106.0	31.00
2023	227	22	0.097	58.9	17.20
2024	344	31	0.090	113.0	11.30
2025	184	25	0.136	287.0	8.12

Source: Futures Lab analysis using data from Air Force Command of Ukraine and General Staff of the Armed Forces of Ukraine.

Table A-2: T-Test Illustrating Statistical Significance of Composition Differences

Category	Mean Non-Salvo	Mean Salvo	Statistic	P Value	Conf. Low	Conf. High	Significance
UAV	0.825	0.727	2.455	0.016	0.019	0.177	*
Ballistic Missile	0.024	0.032	0.616	0.540	-0.036	0.019	
Cruise Missile	0.130	0.200	-2.068	0.042	-0.137	-0.003	*

Source: Futures Lab analysis.