

Defense TECH MONTHLY

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IN THIS EDITION

Training the Algorithms: Ukraine Opens Battlefield AI Model to Global Industry

Windows of Control: Russia Builds Its Own Battlefield Satellite Layer

Reactive Gerans: Russia Pushes Shahed-Derived Drones Into the Jet Age

A New Ballistic Threat:
Russia Adds North Korea's KN-30

SPECIAL FEATURES

The Interceptor Gap: Russia's Ballistic Surge Meets the West's Missile Shortage

Feeding the War: Russia's Manpower Crisis



AUGUST 2026

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THE GROWING ROLE OF UNMANNED SYSTEMS IN RUSSIAN PERSONNEL LOSSES

While **the Unmanned Systems Forces** account for only about 2.5% of Ukraine's armed forces, their share of all drone-inflicted **Russian personnel losses rose from 31.7% in January to 38.4% in July**.

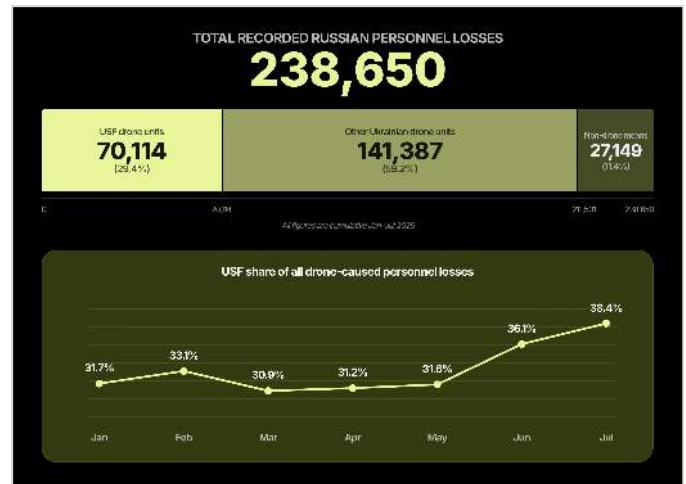
Ukraine's Ministry of Defence says unmanned systems now account for more than 90% of verified strikes on enemy targets, with over 800,000 drone strikes recorded by late June 2026 and **approximately 167,000 Russian personnel killed or seriously wounded**.

Our January versus July comparison highlights two simultaneous trends: the USF is becoming increasingly effective at generating personnel losses, but the majority of drone-inflicted losses still come from UAV units embedded across the wider Armed Forces.

The USF is not dedicated solely to attacking infantry: its units also strike artillery, air-defense systems, logistics, command posts, electronic warfare assets, vehicles and enemy UAVs. Despite this broader target set, its contribution to personnel attrition continues to rise.

That makes the USF a particularly manpower-efficient component of Ukraine's force structure and helps explain why its command plans to expand the branch from roughly **2.5% to 5% of the Armed Forces**.

In a war where Ukraine cannot match Russia soldier-for-soldier, the trend suggests that further **scaling of unmanned systems can increase battlefield output without requiring proportional growth in human forces**.



The Growing Role of Unmanned Systems in Russian Personnel Losses, January–July 2026. Serpens Center calculations based on Ukrainian official reporting.

Sources: General Staff of the Armed Forces of Ukraine, Ministry of Defence of Ukraine, Unmanned Systems Forces of Ukraine

FEEDING THE WAR: RUSSIA'S MANPOWER CRISIS

The Russian army has gradually shifted to a system built around a constant flow of contract soldiers. Its key experiment was the "Wagnerization" of warfare, a model first developed by Wagner and later partially absorbed by the regular army.

At the beginning of the war, Russia relied on a professional contract army and DNR/LNR formations. After the defeats at Kharkiv and Kherson and the September 2022 mobilization, Moscow began experimenting with new ways to sustain the war and replenish its forces.

By the summer of 2023, two different Russian armies coexisted. **The Russian Armed Forces were more or less sparing in personnel, but struggled to achieve results.** Wagner was ruthless but more effective.

After Prigozhin's mutiny, Wagner was dismantled, but many of the mechanisms it had tested survived. The model is simple:

- rapid recruitment
- minimal training
- mass assault
- high losses
- rapid replacement.

Now, however, this system is beginning to show signs of strain. **Russian losses are rising faster than recruitment, the price of a Russian recruit keeps rising and territorial gains are minimal.**

Russia's military recruitment is stagnating. According to **Janis Kluge**, a research fellow at the German Institute for International and Security Affairs (SWP), 800–1,000 people were signing contracts every day in the first quarter of this year, 20% fewer than during the same period last year. **Russia is losing roughly 1,000–1,300 personnel per day.**

To maintain the current pace of the war, the Kremlin is being forced to raise financial incentives while simultaneously increasing administrative pressure on potential recruits.

According to the **Financial Times**, Russian authorities are already conducting raids at workplaces and on the streets, forcibly taking men to recruitment offices, and pressuring debtors, people under investigation, and others into signing contracts.

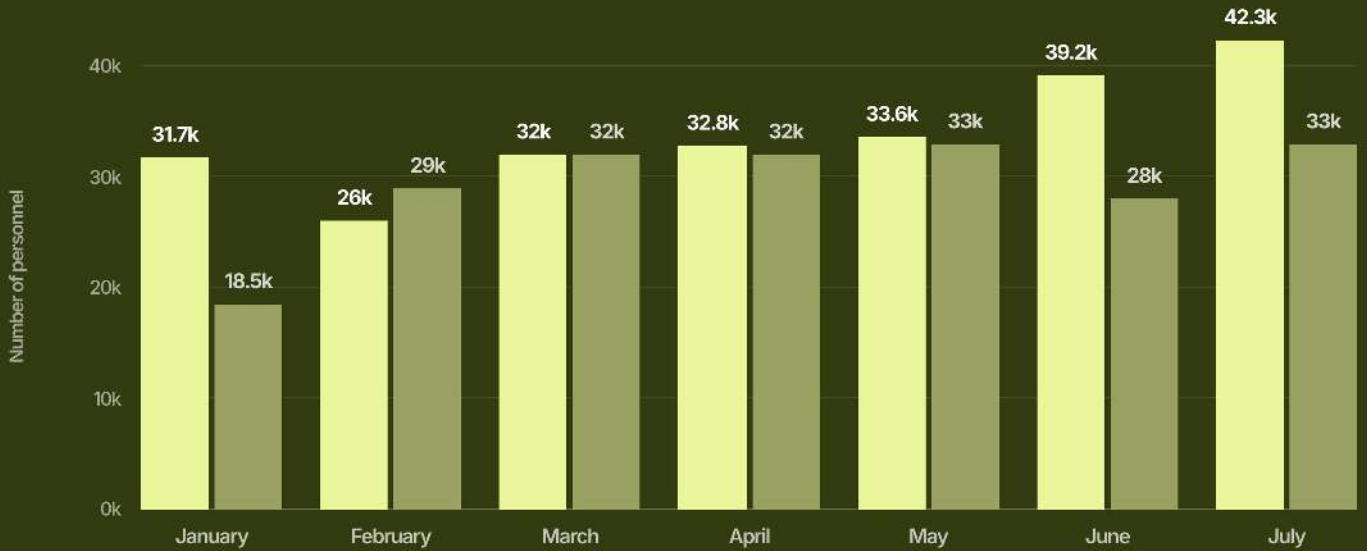
The consequences are already visible on the front, where **Russian advances have remained minimal** since the beginning of spring, despite the fact that summer vegetation has traditionally favored their infiltration tactics.

At the same time, the Kremlin is unlikely to resort to a formal nationwide mobilization. A more probable scenario for now is increased pressure on regional authorities, which have effectively been tasked with meeting recruitment targets set from Moscow.

This could further expand the "de facto mobilization" through centrally imposed recruitment quotas.

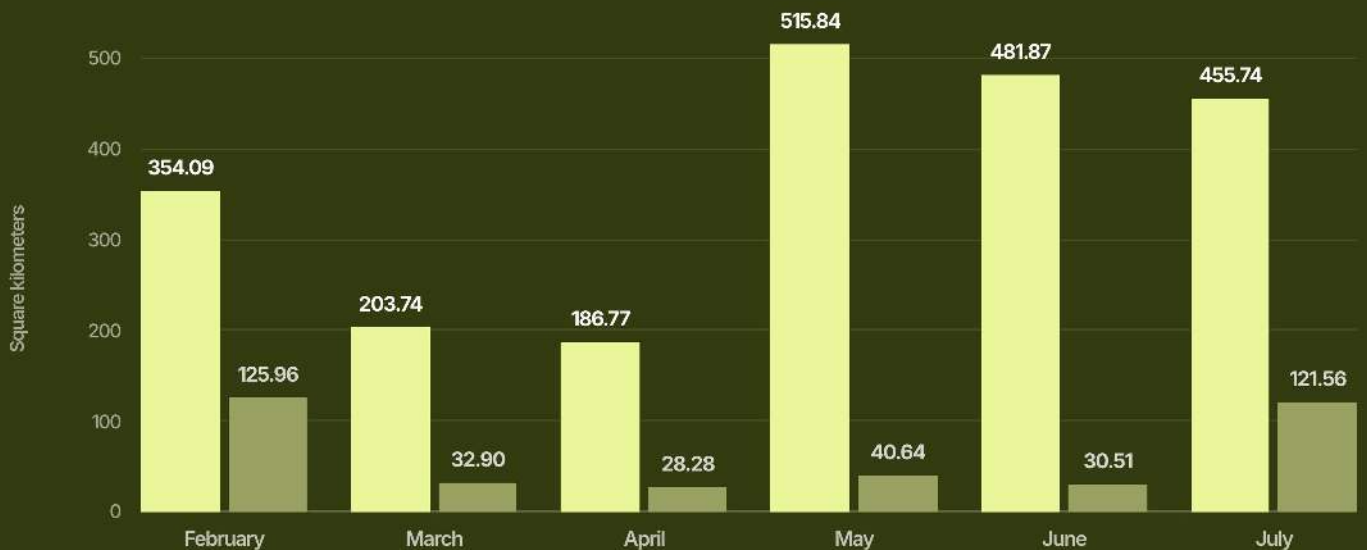
Reported Russian casualties and estimated recruitment, January–July 2026

Reported Russian casualties (ISW, per Ukrainian General Staff) Estimated Russian recruitment (Kluge)



Russian territorial gains in Ukraine, February–July 2025 vs. February–July 2026

Year 2025 2026



Monthly territorial gains (including infiltrations) by Russian forces in Ukraine, comparing the same period in 2025 and 2026

FROM THE FRONT TO NATO: UKRAINE SHARES UGV COMBAT LESSONS

Ukraine's growing battlefield use of unmanned ground vehicles is beginning to shape NATO training directly. At Camp Jomsborg in southeastern Poland, Ukrainian troops participating in the Norway-led Operation Legio are not only receiving Western instruction but also passing combat lessons back to Allied forces.

Ukrainian soldiers arriving at the camp range from combat veterans to support personnel, creating a training environment where experience flows in both directions.

Brigadier Atle Molde, the Norwegian commander overseeing Task Force Legio, told [Business Insider](#) that “the Ukrainians are teaching us” when it comes to UGV employment. The lesson, however, is not simply that NATO should copy Ukrainian systems. Ukrainian experience also highlights the limitations of ground robots: restricted situational awareness, cameras obstructed by vegetation, mobility problems on difficult terrain, communications vulnerabilities, and short battlefield lifespans.

Molde noted that some Ukrainian solutions reflect necessity rather than an ideal force design, and that practices developed for Ukraine's terrain cannot automatically be transferred to places such as Norway, where snow and different ground conditions would impose very different requirements. NATO's challenge is therefore to separate universally useful lessons from adaptations specific to Ukraine's battlefield.

Camp Jomsborg already provides a mechanism for doing that. **NATO's own material describes** training ranging from infantry maneuver and trench clearing to combat engineering and specialist instruction, with Ukrainian battlefield feedback continuously informing the program.

The result is less a traditional one-directional assistance mission than a live lessons-learned loop: **NATO provides structured training and doctrine, while Ukraine contributes current experience from drone-dense, electronically contested, high-intensity warfare.**

The broader significance is that Ukraine is increasingly exporting operational knowledge, not only defense technology. Western militaries have experimented with UGVs for years, but Ukraine is supplying something testing grounds cannot replicate: thousands of missions conducted under electronic warfare, artillery fire, persistent surveillance, damaged terrain, and real casualty risk.

For NATO, the value lies less in selecting a particular Ukrainian robot and more in understanding where unmanned systems reduce human exposure, where they fail, and how they should be integrated with conventional ground forces before the next high-intensity war.



Training with UGVs
Source: [Business Insider](#)

ARMED UGVs MOVE CLOSER TO ASSAULT ROLES

On August 21, soldiers of Ukraine's 44th Separate Mechanized Brigade used a DevDroid Droid TW-12.7 armed unmanned ground vehicle to attack a Russian-held building without sending Ukrainian infantry into direct-fire range.

According to DevDroid, operators remotely drove the UGV toward the position and engaged it with a 12.7 mm M2 Browning heavy machine gun mounted on a remotely controlled combat module.

The company claimed that the position was neutralized and around 20 Russian troops were killed. That casualty figure has not been independently verified.

The TW-12.7 took over the most exposed phase of the assault: closing the distance to a defended position and delivering direct machine-gun fire. Operators remained outside the immediate engagement area while receiving video and battlefield data from the platform.

The system combines onboard cameras, a ballistic computer, and AI-assisted functions intended to help detect, track, and engage targets remotely.

This was not an isolated demonstration.

In July, **Ukraine's 33rd Separate Assault Regiment** used two Droid TW-12.7 platforms together with reconnaissance and strike UAVs to attack another Russian position.

Drones first reconnoitered the route and identified enemy positions before the two UGVs advanced and opened fire.

That operation shows the emerging model more clearly: **armed ground robots are not operating alone, but as part of a combined unmanned package** in which aerial drones provide reconnaissance and route awareness while ground robots deliver direct fire.

DevDroid had already reported another combat milestone in April, when a Droid TW-12.7 operated by Ukraine's 5th Separate Assault Brigade struck a Russian MT-LB armored vehicle.

Taken together, the April, July, and August cases suggest that the platform is moving beyond experimentation toward repeated combat use against both personnel and vehicles. The manufacturer's claims still require independent verification.

These missions do not mean robots can replace assault troops entirely: they still depend on operators, communications, reconnaissance, maintenance, and protection from enemy FPVs and electronic warfare. But they can shift the most dangerous part of a mission away from soldiers.

The emerging value proposition is therefore less "robot infantry" and more human crews controlling expendable or recoverable firepower from outside the immediate kill zone.



DevDroid Droid TW-12.7 strike unmanned ground vehicle.
Source: [United 24](#)



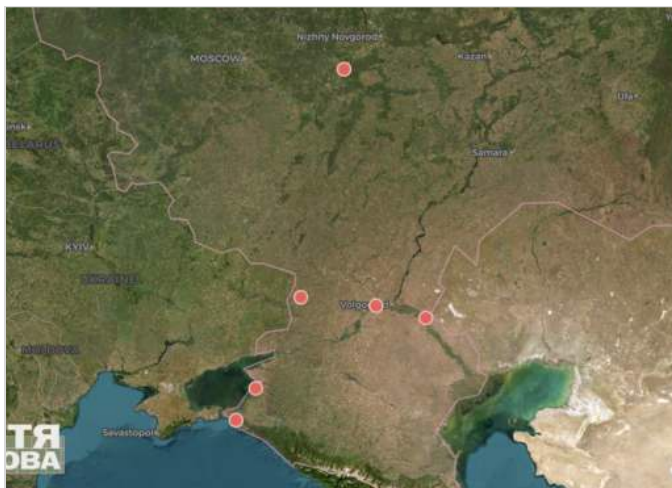
Screenshot from the video of the UGV's work.
Source: [DevDroid](#)

RUNWAY PRESSURE: UKRAINE TURNS RUSSIAN AIRFIELDS INTO A REPEATED TARGET SET

Between August 15 and 24, Ukrainian forces attacked at least six Russian military airfields: Savasleyka, Primorsko-Akhtarsk, Akhtubinsk, Marinovka, Vityazevo, and Millerovo.

Ukrainian reporting and subsequent **open-source assessments indicate** that the campaign damaged or destroyed at least one Su-34, one Su-33, two MiG-29s, and an Orion strike-reconnaissance UAV, while also hitting 18 UAV storage facilities at Primorsko-Akhtarsk. The concentration of confirmed results between August 20 and 24 suggests that the attacks were not isolated raids but part of a sustained effort to pressure Russia's aviation and drone infrastructure.

The August 20–21 strikes already showed the breadth of this approach. Ukrainian forces hit Akhtubinsk airfield, where a Su-34 was reported damaged, and simultaneously attacked Primorsko-Akhtarsk, one of Russia's major launch and storage hubs for long-range attack drones. The latter strike reportedly damaged 18 buildings used for UAV storage, while Ukrainian forces also struck Marinovka airfield in Volgograd Oblast. President Volodymyr Zelensky later **confirmed results** at Akhtubinsk and Primorsko-Akhtarsk, linking them directly to Ukraine's expanding deep-strike campaign.



Russian military airfields targeted by Ukrainian strikes between August 15 and 24, 2026. Source: [Telegram](#)

The campaign intensified again on August 23. Unmanned Systems Forces commander Robert “Madyar” Brovdi reported strikes on a Su-33, MiG-29, and Orion UAV at Vityazevo, alongside eight Russian radar stations, an S-400 position, and Tor and Pantsir air-defense systems across Krasnodar Krai, Rostov Oblast, and occupied Crimea.

ISW assessed these attacks as part of a broader Ukrainian effort to conduct suppression and destruction of enemy air defenses, or SEAD/DEAD, in order to make Russia's rear areas increasingly vulnerable to follow-on strikes.

The following night, Ukraine extended the sequence to Millerovo airfield, where the Unmanned Systems Forces reported hitting another MiG-29.

On August 24, Brovdi stated that Ukrainian drone units had struck 66 targets in Russia and occupied territories overnight, including the fighter jet and four radar complexes. The Millerovo strike is particularly relevant because the airfield also serves as one of the launch directions for Russia's long-range UAV attacks against Ukraine, illustrating the reciprocal nature of the campaign: facilities supporting Russian aerial strikes are themselves increasingly exposed to Ukrainian drones.

Ukraine appears to be treating aircraft, UAV bases, radar networks, and surface-to-air defenses as one interconnected target system. Hitting radar and SAM assets can increase the probability that subsequent drones penetrate deeper; striking storage and launch infrastructure can reduce the operational tempo of Russian UAV units; and **destroying aircraft on the ground removes expensive platforms without having to defeat them in the air**. The practical effect is cumulative: Russia must disperse aircraft, build shelters, redistribute air-defense systems, and protect an expanding number of bases simultaneously.



Moment a Ukrainian drone strikes a Russian MiG-29 at a military airfield. Source: [Telegram](#)

This matters because depth has historically been one of Russia's principal defensive advantages. The August strike sequence shows Ukraine increasingly contesting that depth from southern Russia to much deeper aviation facilities. Even where strikes do not permanently disable an airfield, repeated attacks impose repair costs, force changes in basing and operating procedures, and stretch Russia's already heavily tasked air-defense network.

The emerging objective appears less about shutting down a single runway and more about making the entire Russian aviation support network more expensive, dispersed, and difficult to operate securely.

HEAVIER BALLISTICS: NORTH KOREA ADDS KN-30 TO RUSSIA'S MISSILE ARSENAL



Launch of a Hwasong-11C (KN-30) ballistic missile in March 2021.
Source: [Militarnyi](#)

Ukraine's Defense Intelligence reported in August that Russia's arsenal now includes North Korean KN-30 ballistic missiles, alongside the KN-23 and KN-24 systems already supplied by Pyongyang.

As of July 2026, **Ukrainian intelligence estimated** that Russia possessed roughly 50 North Korean ballistic missiles in total across the KN-23, KN-24, and KN-30 families. The appearance of the KN-30 is significant as it represents a heavier variant of North Korea's Hwasong-11 family and gives Russia another source of short-range ballistic weapons at a time when Moscow is increasing the ballistic component of its strike campaign.

KN-30 is the Western designation commonly associated with the Hwasong-11C/Hwasong-11Da, an enlarged derivative of the KN-23 family. It is solid-fueled and launched from a mobile transporter-erector-launcher. North Korea has claimed that the missile can carry a warhead weighing up to 2.5 tonnes, although this figure has not been independently verified. **Its first known test in March 2021 demonstrated a range of at least 600 km.**

The combination of a large payload and ballistic flight profile makes the system potentially more destructive than many conventional short-range missiles, even if its accuracy remains uncertain.

The immediate concern is not only the new missile itself, but **how it can be integrated** into Russia's existing strike architecture.

ISW reported that Russia has begun deploying six launchers for North Korean missiles in Voronezh Oblast, from where systems in this family could threaten Sumy, Kharkiv, Chernihiv, Poltava, Kyiv, Dnipropetrovsk, and Zaporizhzhia oblasts.

ISW also assessed that additional North Korean missiles could allow Russia to enlarge ballistic salvos or sustain them for longer without drawing as heavily on its domestic Iskander, Zircon, or modified S-400 missile stocks.

The KN-30 therefore arrives at a particularly unfavorable moment for Ukrainian air defense. Russia has been increasing ballistic-missile use in 2026 because these weapons are substantially harder to intercept than Shahed-type UAVs or most cruise missiles and require a limited pool of advanced interceptors, primarily Patriot-class systems.

North Korean supplies effectively give Moscow an additional external production base for this pressure campaign. Russia already demonstrated renewed use of North Korean missiles **in July, when Ukrainian authorities assessed** that a KN-23 or KN-24 was used in a deadly strike near Kryvyi Rih.

However, the KN-30 should not yet be treated as a proven new battlefield capability. There is currently no publicly confirmed evidence that Russia has used the KN-30 itself against Ukraine, and the Ukrainian intelligence figure of roughly 50 North Korean missiles combines several missile types rather than identifying the number of KN-30s specifically. **The more important strategic development is therefore the continued integration of North Korea into Russia's missile supply chain.** Pyongyang is no longer merely replacing expended artillery ammunition; it is helping Moscow diversify and replenish the ballistic weapons that place the greatest pressure on Ukraine's most scarce air-defense resources.

RUSSIA SHIFTS TO A NEW GENERATION OF REACTIVE GERAN DRONES

Russia has stopped production of the Geran-3 reactive strike drone and is shifting production toward the newer Geran-4, according to information provided by [Ukraine's Main Directorate of Intelligence \(HUR\)](#).

Geran-3 appears to have served primarily as an intermediate design rather than a platform intended for long-term mass production.

Geran-3 retained much of the airframe and electronics architecture of the Geran-2 but replaced its engine with a Telefly JT80 turbojet. This increased its speed to approximately 300–370 km/h and gave it a reported operational **range of up to 1,000 km**. The drone also incorporated the Kometa-M12 satellite-navigation system with a 12-element CRPA antenna, providing increased resistance to electronic warfare. Geran-4 represents a more significant step. Unlike Geran-3, whose airframe was largely inherited from Geran-2, **the new drone was designed around the larger Telefly LX-WP-160 jet engine**.

This allows Russia to move from simply adding a jet engine to an existing Shahed-derived platform toward a purpose-built family of high-speed strike UAVs. With a redesigned airframe, more powerful propulsion and speeds of up to approximately **500 km/h**, it combines high speed with improved maneuverability.

For Ukraine, the transition creates a more serious air-defense problem. **Faster reactive drones reduce the time available for detection, identification and engagement compared with conventional Shahed-type UAVs.**

Their use in smaller groups can also complement massed Geran attacks by forcing Ukrainian air defenses to deal simultaneously with slow, numerous targets and faster aircraft.

Recent Russian attacks indicate that reactive Geran variants are increasingly being incorporated into this approach. The key question for Ukraine will be whether existing counter-UAV systems can be adapted quickly enough to prevent the new platforms from exploiting the speed advantage at scale.

GERAN-3 VS. GERAN-4		
KEY DIFFERENCES AT A GLANCE		
	GERAN-3	GERAN-4
TOP SPEED	~370 km/h	~500 km/h
ENGINE	Telefly TJ80 turbojet	Telefly LX-WP-160 turbojet (larger)
AIRFRAME	Adapted Geran-2 airframe	Reinforced, purpose-built airframe
DESIGN FOCUS	Incremental upgrade of existing platform	Built to outrun / outmaneuver interceptor drones
Comparison based on provided reference material.		

Key differences between Geran-3 and Geran-4.
Source: [OKO-GORA/Ukrainska pravda](#)

FROM ONE DRONE TO A STRIKE CELL: HYDRA CENTRALIZES FIBER-OPTIC FPV OPERATIONS

Ukrainian manufacturer **3DTech has introduced the HYDRA Khyzhak REBOFF** system to coordinate several fiber-optic FPVs from one control node. The station can connect up to five strike drones and support several pilots working in parallel, allowing a unit to launch and manage multiple aircraft during a short engagement window rather than treating each FPV as a separate sortie.

The practical value is in concentrating strike tempo. HYDRA is designed for coordinated ambushes, synchronized attacks, and rapid successive launches.

Because the Khyzhak REBOFF drones use fiber-optic control links, they remain less vulnerable to conventional radio-frequency jamming, making the system especially relevant in EW-heavy sectors.

The five-model Khyzhak REBOFF family was **codified in 2025** and is already supplied to combat brigades, giving HYDRA a foundation in platforms that frontline units already use.

3D Tech says its products are developed through field testing and direct feedback from military units, but public sources do not yet identify a specific brigade that has used the full five-drone HYDRA configuration in combat.

The available evidence therefore supports combat use of the REBOFF drones themselves, while HYDRA should still be viewed as a new command-and-control layer whose battlefield effectiveness remains to be demonstrated at scale.

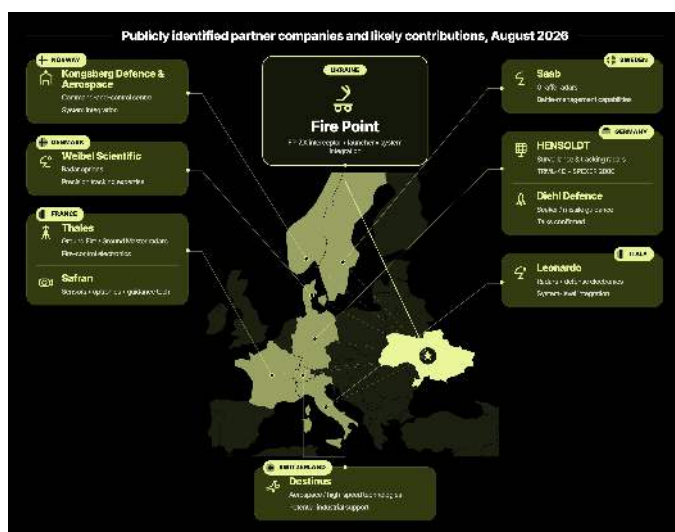
FIRE POINT'S FP-7 BALLISTIC MISSILE NEARS COMBAT READINESS

Fire Point's FP-7 ballistic missile is currently **on track** for combat use as early fall 2026. The strike variant of the FP-7 has completed 15 test launches, and is now undergoing certification by the Defense Ministry of Ukraine.

The **missile** can deliver a payload of up to 150 kg, and engage targets at up to 200 km in range. It is explicitly designed for scalability into larger-scale air and missile defense systems (AD/MD).

The FP-7 comes in an interceptor variant, in addition to the strike variant currently undergoing testing. The interceptor variant, the FP7X, is being developed as the interceptor for Ukraine's proposed **FREYJA** pan-European anti-ballistic missile defense initiative.

President Zelenskyy has expressed confidence in Fire Point's expected timeline, but emphasized that widespread deployment will depend on significant international cooperation. As SCIS has written in the past, including through its major report **Building the Arsenal**, there are supply chain components that must be sourced from European partners in order to successfully scale production. FREYJA is structured under an open-source architecture, meaning that different components can be swapped in-and-out from different suppliers.



Publicly identified partner companies and likely contributions
Source: [KyivPost](#)

The broader trend is important: Ukraine is moving from improving individual FPVs toward improving the system around them. Fiber optics solve part of the EW problem; HYDRA addresses the next bottleneck—how to mass several EW-resistant drones quickly, reduce crew burden, and connect FPV strikes with wider battlefield tools such as DELTA and Vezha. Its real test will be whether centralized multi-drone control increases successful engagements per crew without creating a vulnerable single point of failure.

Currently, Fire Point has **secured agreements** with 13 European defense companies to supply radars, guidance, and other necessary systems for FREYJA. As of now, it has been confirmed that Kongsberg is developing the command-and-control center that will integrate other components of the FREYJA system.

The aim is for each interceptor to cost around 1 million euros, or 1.2 million USD, allowing FREYJA to serve as a lower-cost alternative to the United States's Patriot interceptor systems. Each Patriot interceptor currently costs around **\$4 million USD**.

The **global shortage of interceptor missiles** caused by the U.S.-Iran war has necessitated Ukrainian defense technologies companies work to quickly develop and scale domestically-produced alternatives. Fire Point is also preparing a larger variant, the FP-9 ballistic missile by late fall. The FP-9 will be **capable** of carrying an 800 kg warhead to a range of up to 855 kilometers. The first successful interception of Russian missiles utilizing the FREYJA system is aimed for mid-2027.



Source: [WSJ](#)

FIRE POINT FP-5 MISSILES ALLEGEDLY USING NEW, BRITISH-MADE ENGINES

Russian sources have claimed that Ukrainian Fire Point FP-5 Flamingo cruise missiles are now appearing with a different, British-made engine sourced from an unidentified supplier. Earlier versions of the FP-5 **used** the Soviet-designed AI-25TL turbojet.

Switching to an internationally sourced turbojet could remove one of the FP-5 program's main production bottlenecks: the limited availability of AI-25TL engines, while also potentially extending the weapon's range. Current FP-5 Flamingos are designed to carry one-ton warheads more than 3,000 kilometers, or 1,860 miles. Delivering a warhead over such a large distance requires a full-sized turbojet to carry the missile.

Previous versions of the FP-5 used an AI-25TL engine with 16.9 kilonewtons of thrust, and a weight of 350 kgs.

Fire Point engineers designed the FP-5 with existent production bottlenecks in mind, choosing to mount the engine above the fuselage, in order to make it possible to more easily install powerplants from other suppliers. While the exact British engine now being used has yet to be identified, the U.S.-produced Honeywell TFE731 engines can serve as a comparable model. A similar engine as this could add approximately 450 kilometers to the current FP-5 model's range.

FROM MISSILE SUPPLY TO MISSILE SOVEREIGNTY: UK OPENS STORM SHADOW TECHNOLOGY TO UKRAINE

On August 24, the United Kingdom approved the release of classified technical information on British components of the Storm Shadow/SCALP cruise missile to Ukraine.

Prime Minister Andy Burnham said the decision followed a Ukrainian request for access to the technology needed to develop an independent long-range strike capability.

The British government confirmed that MBDA, the Anglo-French missile manufacturer, will be permitted to share the relevant information as Ukraine and France work toward establishing local SCALP assembly lines in Ukraine.

The decision is important because it moves the relationship beyond simply supplying finished missiles. Storm Shadow, **known as SCALP in France**, is an air-launched cruise missile designed for precision strikes against fixed and hardened targets at ranges exceeding 250 km. Britain began supplying the weapon to Ukraine in 2023, but stocks have remained constrained by European production capacity.

Transferring technical information creates a pathway toward Ukrainian assembly, maintenance expertise, component integration, and potentially deeper localization over time. It does not, however, mean that Ukraine can immediately manufacture a complete Storm Shadow independently; the current announcement concerns technology release and the establishment of assembly capacity with British and French industrial participation.

The agreement also fits a broader shift in **European defense cooperation with Ukraine**. Western firms are increasingly moving from direct deliveries toward licensed production, joint manufacturing, and technology transfer inside Ukraine. **BAE Systems has followed** a similar model with the L119 light gun, while MBDA's decision would bring one of Europe's most sophisticated long-range weapons into the same industrial logic.

The strategic benefit is resilience: local assembly can shorten portions of the supply chain and build Ukrainian expertise, although output will still depend on imported components, funding, tooling, testing, and the ability of European industry to expand production.

Burnham also linked the visit to Ukraine's more urgent ballistic-missile defense problem. **He said Britain would call** on its defense industry to support FREYJA, the Ukrainian-European program intended to develop an integrated air- and missile-defense capability with a particular focus on ballistic threats.

Taken together, the two announcements point toward the same strategic trend: Ukraine is trying to reduce dependence on finite stocks of imported high-end missiles on both sides of the air war. Storm Shadow technology transfer addresses the offensive side by creating a pathway toward sovereign long-range strike production; FREYJA addresses the defensive side by attempting to develop a European answer to the shortage of ballistic interceptors. Neither offers an immediate solution—new production and missile-defense systems will take time to industrialize—but **both represent a shift from emergency wartime deliveries toward building capabilities Ukraine can sustain domestically with European industry**.



Storm Shadow/SCALP EG air-launched cruise missile.
Source: [Wikipedia](#)

UKRAINE ADDS JET-POWERED INTERCEPTOR TO COUNTER NEW-GENERATION SHAHEDS

Ukraine has added Alexa Spatium, its first domestically developed jet-powered unmanned interceptor, to the arsenal of the Defence Forces. The system was developed primarily to counter Russia's increasingly fast Shahed/ Geran family, including Geran-4 and Geran-5.

Unlike conventional quadcopter-based interceptors, Alexa Spatium uses a turbojet engine, allowing it to combine high speed with a high operational ceiling and significant maneuverability.



Source: [Drone Warfare](#)

The system supports both pre-programmed missions and direct guidance and is equipped with TV and infrared targeting systems.

The interceptor measures approximately 1.5 × 1.7 m, is launched from a mobile catapult within minutes, and the complete system can fit into a pickup truck. Its modular design and minimal position-preparation requirements are intended to allow distributed deployment across Ukraine's air-defence network.

A notable feature is reusability: if the interceptor fails to engage its target, it can return to the launch area for another mission. The system also supports several warhead types, including fragmentation, shaped-charge and thermobaric options.

Why it matters: Russia's transition from piston-powered Shaheds toward faster jet-powered variants is increasing the performance requirements for Ukraine's low-cost counter-UAV layer.

Alexa Spatium represents an attempt to answer this shift with a dedicated high-speed interceptor rather than a conventional short-range drone.

S8000 BANDEROL: RUSSIA'S NEW LOW-COST MISSILE SPAM

Russia is scaling up production of the **S8000 Banderol**, a small jet-powered strike weapon developed by Kronshtadt JSC. Initially identified in Ukraine in 2025, the weapon has now entered serial production and is increasingly used in Russian strikes.

The Banderol occupies an unusual niche between a cruise missile and a one-way attack drone. It is primarily launched from Orion UAVs, although Russian forces have also integrated it with Mi-28 helicopters. This allows Russia to launch the weapon without relying on strategic bombers or other conventional cruise-missile carriers.

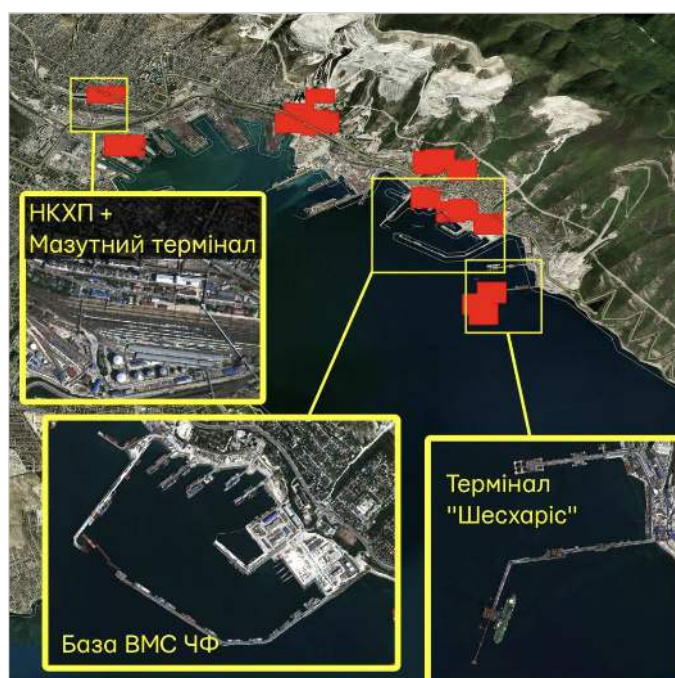
The combination is important: **Banderol** is substantially cheaper than a conventional cruise missile while remaining fast enough to require sophisticated air-defence systems. Russia can therefore use the weapon to increase the number of targets presented to Ukrainian air defence without consuming its more expensive strategic missile inventory. At a reported production capacity of 80 missiles per month, **Banderol could add almost 1,000 additional long-range strike weapons annually if production is sustained.**

Russia is building a new layer of relatively cheap, jet-powered weapons designed to bridge the gap between Shahed-type UAVs and expensive cruise missiles — creating a larger and more difficult-to-defeat target set for Ukraine's air-defence network.



S8000 Banderol. Serpens Center infographics.
Sources: [Militarynyj](#), [Serhii Flash](#)

NOVOROSIYSK UNDER ATTACK: UKRAINE STRIKES RUSSIA'S LAST MAJOR BLACK SEA BASE



Consequences of the strikes on the port of Novorossiysk
Source: [Exillenova+](#)

On August 12, Ukraine conducted a coordinated strike against the Russian naval base and port of Novorossiysk. Ukraine employed a broad range of its deep-strike capabilities.

For the first time, Paliyntsia, Peklo, Bars, and the Long Neptune worked together in a coordinated operation, alongside MICH, Fire Point, Ramzai, Sichen, Trust, Khariok, Beaver, Liutyi, Dovbush, as well as the Sargan and Mamai naval drones. The operation targeted both naval assets and supporting port infrastructure, demonstrating Ukraine's ability to combine different strike systems against a heavily defended maritime facility.

The most significant reported result was damage to two Russian Project 11356 frigates, **Admiral Makarov** and **Admiral Essen**. The Russian Black Sea Fleet had relocated a substantial part of its valuable assets to Novorossiysk after repeated Ukrainian attacks made Sevastopol increasingly vulnerable.

The disruption is significant because Novorossiysk is one of Russia's principal gateways for **agricultural exports**. Russia is the world's largest wheat exporter, making the port an important node not only for the Russian economy but also for global grain markets.

The full extent of the damage remains subject to further assessment. However, the reported damage to two Kalibr-capable frigates at Russia's principal eastern Black Sea naval base represents a significant operational setback and demonstrates that geographic displacement alone is no longer sufficient protection for the Russian fleet.

A more detailed overview of how Ukraine's maritime campaign gradually pushed the Russian fleet away from Crimea and reshaped the balance in the Black Sea is available in our report, **The Black Sea's Asymmetric Blueprint**.

SEA DENIAL MEETS STRATEGIC LIMITS: UKRAINE'S DRONE CAMPAIGN CUTS BLACK SEA TANKER LOADINGS



Ukrainian drone strikes tanker
Source: [Ukraine Unmanned Systems Forces](#)

Ukraine's maritime drone campaign in the Black Sea and Sea of Azov produced a measurable impact on Russian-linked tanker traffic in late July.

According to Seatrade Maritime, dirty tanker loadings from Russian Black Sea and Sea of Azov ports fell by 62% in the final two weeks of July compared with the average of the previous four weeks, dropping from 2.59 million barrels per day to 0.98 million barrels per day.

Ukraine said it had carried out 206 strikes on vessels under its MoLoCHKa campaign by August 1, while Russia responded by suspending navigation through the Kerch Strait and Don-Azov channel and establishing an operational headquarters to reroute cargo and coordinate alternative transport.

The impact, however, extended beyond Russian exports. **BIMCO reported** that tanker loadings from the Caspian Pipeline Consortium terminal at Novorossiysk also fell by 62% over the same period.

This created a strategic complication for Kyiv because the **CPC mainly handles Kazakh crude, with around three-quarters of its exports this year going to the EU.**

Black Sea drone attacks disrupted as much as one-fifth of CPC loadings in July, while Kazakhstan's oil production fell 14% month-on-month; major Western companies including Chevron and ExxonMobil operate in the consortium.

That spillover triggered a political constraint on Ukraine's maritime strike campaign. On August 12, **Reuters reported**, citing the U.S. officials, that Ukraine had paused drone strikes on tankers using Novorossiysk after a request from U.S. Vice President JD Vance. **Washington warned Kyiv against targeting non-Russian vessels and CPC infrastructure**, arguing that the route provides an alternative to Russian energy supplies and that attacks were beginning to affect global oil markets and U.S. commercial interests.

Ukraine reportedly reaffirmed that it would refrain from striking CPC infrastructure and non-sanctioned vessels bound for the terminal. Reuters noted that it could not independently verify the Financial Times report in full.

The episode illustrates both the effectiveness and the limits of maritime drone warfare. Ukraine demonstrated that sustained attacks on vessels, ports, and shipping corridors can reduce tanker activity at operational scale and force Russia to alter transport routes. But once those effects began spilling over onto third-country energy flows and Western companies, the central constraint shifted from technical reach to target selection.

The challenge is now to preserve pressure on Russian maritime logistics while distinguishing more precisely between Russian military or sanctions-evasion traffic and infrastructure whose disruption could impose political costs on Ukraine itself.

FROM CARRIER TO AIR-DEFENSE HUNTER: MAGURA TARGETS CRIMEA'S SAM NETWORK

Ukraine is moving beyond simply demonstrating that naval drones can carry FPVs.

In late July and early August, **Ukraine's Defence Intelligence Group 13 used new MAGURA** naval platforms as FPV-drone carriers to attack Russian ground-based air-defense and radar assets in occupied Crimea.

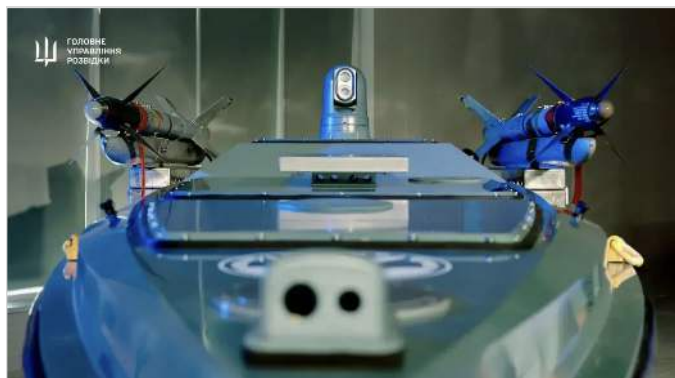
In the first disclosed operation, the platforms carried FPVs close enough to strike a Podlyot radar command vehicle and a Parol-4 identification-friend-or-foe interrogator.

This is an important evolution from what we reported in the July edition of **Defense Tech Monthly**.

Last month, Ukraine's 40th Marine Brigade demonstrated the carrier concept with Barracuda unmanned boats, using them to transport FPVs toward Russian positions near Zaliznyi Port.

The significance then was the launch method itself: an unmanned boat could extend the practical reach of short-range FPVs by carrying them closer to the target.

The August MAGURA operations show what comes next — using that architecture repeatedly against a specific, high-value target set rather than simply proving that the concept works.

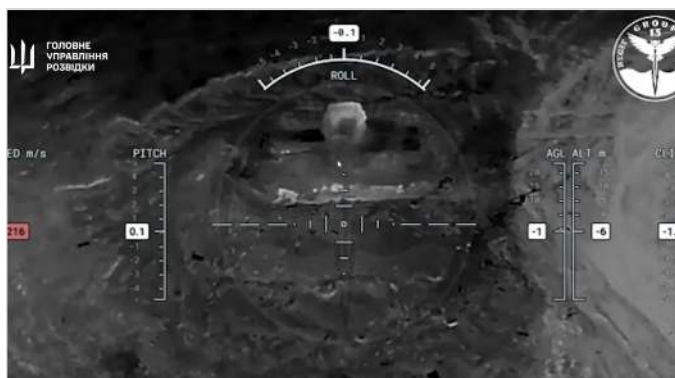


Magura V7 presented on May 2025
Source: [HUR](#)

On August 6, Group 13 reported destroying a Pantsir-S1 air-defense system, valued by Ukrainian intelligence at approximately \$15 million, as well as a military crane in occupied Crimea.

Russian forces had reportedly attempted to conceal the Pantsir under camouflage, but FPVs launched from MAGURA platforms still reached the position.

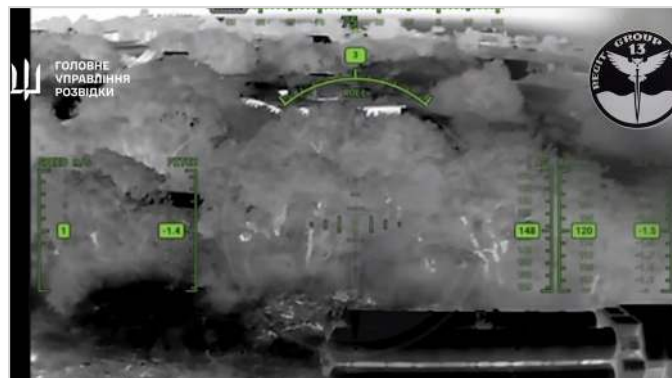
The repeated operations suggest that the late-July strike was not a one-off demonstration but the beginning of a more systematic use of maritime platforms to deliver aerial strike systems against coastal and near-coastal targets.



Russian Pantsir-S1 air defense system covered with camouflage nets in occupied Crimea, seen through drone targeting crosshairs moments before a strike by HUR's Group 13 in early August 2026.
Source: [HUR](#)

The campaign began with lower-level elements of Russia's defensive network. In an operation conducted in late July and disclosed on August 3, Group 13 reported striking the command vehicle of a Podlyot radar system and a Parol-4 identification-friend-or-foe interrogator.

Days later, **the unit reported destroying a Pantsir-S1 short-range air-defense system and a military crane.** The subsequent attack on two S-400 launchers therefore marked an escalation from surveillance and point-defense assets toward one of the most valuable components of Russia's long-range air-defense architecture in Crimea.



FPV drone launched from a MAGURA V7 begins an attack on a Russian S-400 air-defense system in occupied Crimea.
Source: [HUR](#)

WINDOWS OF CONTROL: RUSSIA'S RASSVET NETWORK IS NOT STARLINK—YET



Soyuz launch carrying Rassvet communications satellites into low Earth orbit. Source: [Janes](#)

The key point is that Rassvet does not yet provide continuous coverage. Ukrainian satellite-communications specialists assess that the current constellation instead creates temporary connectivity windows over Ukraine.

ISW, citing Ukrainian expert Volodymyr Stepanets and satellite-tracking data, reported that the deployed satellites can provide several passes per day, with stable communication during two or three of them for roughly one to one-and-a-half hours.

Once the second batch reaches operational altitude, Russia could gain additional daily windows.



Rassvet satellite coverage visualization. Source: [Bureau 1440](#)

That limited availability can still have military value. Russia does not need Starlink-level global coverage to benefit operationally; it can plan missions around predictable satellite passes. Temporary high-bandwidth links could support real-time control of long-range UAVs, maritime drones, reconnaissance platforms, or other remote systems, particularly in environments where conventional radio links are vulnerable to Ukrainian electronic warfare.

The important shift is therefore from autonomous or pre-programmed missions toward the possibility of retaining control over selected systems deeper into contested territory.

The program is also advancing faster than Ukraine initially expected. As we noted in the **July 2026 issue of Defense Tech Monthly**, Russia had already moved beyond experimental launches and begun building an operational Rassvet constellation, with plans to expand it into the hundreds of satellites over the coming years.

Ukrainian military intelligence said in August that Russia currently has 16 operational Rassvet satellites and aims to expand the constellation to 292 satellites by 2027 and 924 by 2035. Kyiv assesses that the system remains intermittent today, but could eventually become a genuine sovereign alternative to Starlink if Russia succeeds in scaling both satellites and ground terminals.

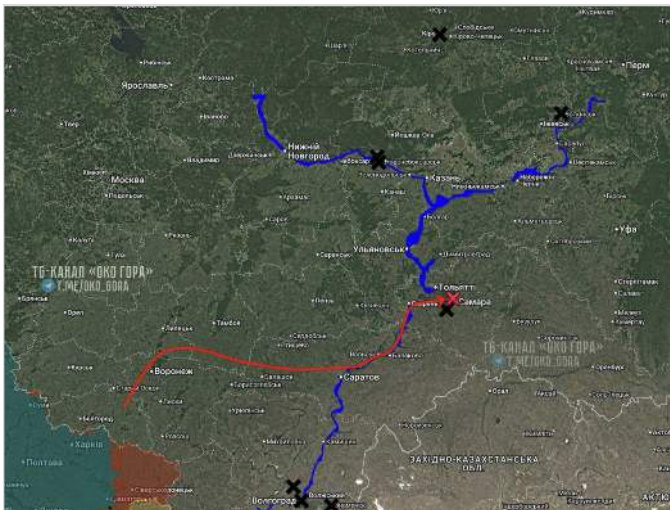
Rassvet should therefore be viewed neither as a “Russian Starlink” already capable of transforming the battlefield nor as an irrelevant technological experiment. Its significance lies in trajectory: Russia is building an independent space-based communications layer after losing reliable access to unauthorized Starlink terminals.

Even a partial constellation can create scheduled windows for command and control; a network numbering in the hundreds could eventually provide persistent connectivity to drones, ships, aircraft, and dispersed ground forces.

FLAMINGO STRIKES RUSSIA'S SPACE INFRASTRUCTURE



Consequences of Flamingo cruise missile strikes.
Source: [Exilenova+](#)



Flamingo cruise missile route
Source: [OKO-GORA](#)

On August 15, Ukrainian FP-5 Flamingo cruise missiles struck the Progress Rocket and Space Centre in Samara, approximately 900 kilometers from Ukraine. The facility is part of Roscosmos and produces Soyuz launch vehicles and spacecraft. The number of missiles used in the strike remains unknown.

The attack is particularly significant because Progress is involved in Russia's **Rassvet low-Earth-orbit communications program**. Soyuz-2.1b launch vehicles produced by the facility are used to place Rassvet satellites into orbit.

Ukrainian President **Volodymyr Zelenskyy confirmed the strike**, stating that the facility was involved, among other activities, in electronics production.

Russian authorities also confirmed that the region was attacked, while OSINT reporting indicated that the strike caused a fire at the Progress site and may have affected its main production building. The extent of the damage has not yet been independently established.

The attack also demonstrates the growing reach of Ukrainian long-range strike systems. **Flamingo has now been used against a target roughly 900 kilometers from the Ukrainian border**, extending the geography of the campaign deeper into Russia's defense-industrial and space infrastructure.

The operational effect on the Progress facility and the Rassvet program remains unclear. However, repeated attacks against specialized industrial nodes could complicate Russia's ability to sustain the rapid expansion of its sovereign satellite communications architecture.

ABOVE THE NOISE: HIGHLINE-T TURNS A TETHERED DRONE INTO A COMMUNICATIONS NODE



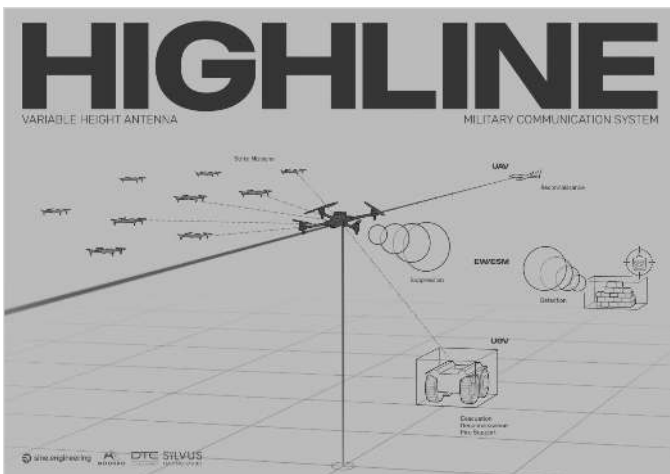
A Highline-T drone on the ground. Source: [Militarynyi](#)

In August, [Ukrainian company Hules](#) unveiled the **Highline-T**, a tether-powered relay drone designed to lift communications, electronic-warfare, and signals-intelligence equipment above terrain obstacles and ground-level interference.

The basic system includes the UAV, a control station, an automated winch, and an uninterrupted power unit. Its modular architecture allows military users to integrate their own radios, relay equipment, or EW payloads rather than relying on a fixed onboard suite.

The logic is straightforward: height improves line-of-sight communications. [Hules states](#) that Highline-T can operate as a relay for FPV and other UAVs, tactical radios, remotely controlled turrets, and unmanned ground vehicles.

The company claims that elevating the antenna can extend remote control of UGVs and turrets to up to 15 km, while the automated winch carries roughly 170 meters of cable for operations at about 150 meters altitude. Power, control, and data can all pass through the tether, reducing dependence on onboard battery endurance.



Highline-T battlefield communications and EW relay architecture. Source: [Hules](#)

The tether also creates several advantages in an EW-heavy environment. [Militarynyi reports](#) that the system can incorporate fiber-optic data transmission at up to 1 Gbps, while optical-odometry sensors help keep the aircraft precisely positioned for directional antennas. Highline-T also carries backup power and an emergency parachute.

[Hules describes](#) the system as resistant to electronic warfare because its core control and power links do not depend on a conventional vulnerable radio channel, although that claim remains manufacturer-supplied rather than independently demonstrated under combat conditions.

Highline-T is therefore better understood as airborne infrastructure rather than simply another drone. Hules describes a four-layer communications concept: ground systems form the first layer, tethered Highline-T antennas the second, long-endurance “pseudo-satellites” the third, and orbital satellites the fourth.

[The company argues](#) that Ukraine is effectively building a vertically distributed communications and EW architecture, where relay and sensing assets can be moved above terrain and interference instead of remaining fixed on the ground.

The platform is already in its sixth iteration, with the first version developed in 2022. [Hules is also working on](#) a mobile variant intended for integration with UGVs and unmanned surface vessels, potentially allowing relay nodes to move with robotic formations rather than remaining static. That could be particularly useful as Ukraine scales ground and maritime robotics, because increasingly autonomous and remotely controlled systems create a parallel requirement for resilient command links.

The broader trend is that Ukraine’s **EW challenge is shifting from simply jamming the enemy toward building a communications architecture that can continue functioning inside a heavily contested spectrum.**

Highline-T addresses that problem by moving antennas upward, using wired power and optional fiber links, and separating the communications node from operators and other ground equipment.

Its real battlefield value will depend on survivability, deployment speed, payload weight, and how well the tethered platform withstands artillery, FPV drones, and direct observation, but the concept points toward a future in which communications and EW infrastructure become increasingly mobile, elevated, and unmanned.

JUMPING THE JAMMER: FREQUENCY-HOPPING FPVS REACH THE FRONT

In August, Ukrainian forces recovered a Russian 10-inch FPV drone using frequency-hopping spread spectrum (FHSS) control, marking another step in Russia's effort to push radio-controlled drones through increasingly dense Ukrainian electronic warfare.

Drone-warfare expert and former Ukrainian servicemember **Dmytro Putiata reported** that the system could operate at depths of up to 40 km while maintaining control in contested spectrum.

ISW assessed that the technology significantly improves resistance to conventional jamming and could contribute to further expansion of the frontline "kill zone," currently extending roughly 15–25 km in many sectors.

FHSS works by rapidly shifting a control signal across different frequencies rather than remaining on one fixed channel. A jammer optimized against a known band can therefore become less effective if the drone continuously moves outside the interfered portion of the spectrum.

In practice, **this does not make an FPV immune to EW**, but it raises the burden on defenders: countermeasures must detect, track, and suppress a broader or rapidly changing set of frequencies instead of simply blanketing one predictable control channel.

Russian reporting on the recovered system also points to autonomous-navigation elements, suggesting that resilience may increasingly come from combining frequency agility with onboard guidance rather than relying on one counter-EW technique alone.

The development is part of a broader adaptation cycle between radio control, jamming, and alternative links. Russia previously expanded the use of fiber-optic FPVs, which bypass radio-frequency jamming altogether but impose weight, maneuverability, and cable-management constraints.

FHSS preserves the flexibility of a wireless FPV while making its link harder to disrupt. The approach is not uniquely Russian: Ukrainian manufacturers are also fielding encrypted frequency-hopping links. **NEJET**, for example, advertises ELRS + FHSS systems for EW-resistant FPV operations, while **RSI Europe's Shpak** can switch across several control bands or use multi-band FHSS.

For Ukraine, the challenge is therefore larger than identifying a new Russian drone model. The proliferation of FHSS means fixed-frequency "trench EW" becomes less reliable as a universal countermeasure.

Defenders increasingly need spectrum awareness, adaptive jammers, physical interception, and networked detection systems working together. This mirrors the broader direction of the drone war: neither side is finding a permanent solution to EW; each new layer of protection creates pressure for the other side to develop a new detection or interception method.

A Ukrainian military study published earlier in 2025 similarly identified FHSS as one of the technologies increasingly used to stabilize UAV control links under battlefield interference. The strategic implication is an expanding threat to rear-area movement.

If radio-controlled FPVs can reliably approach 40 km from the line of contact, logistics vehicles, artillery positions, headquarters, air-defense elements, and other assets previously located outside the densest FPV zone become more exposed.

Fiber optics, FHSS, autonomous guidance, and relay systems are therefore converging toward the same operational effect: extending the distance at which relatively inexpensive tactical drones can threaten targets while reducing the protection historically provided by electronic warfare.

UKRAINE OPENS AI TRAINING PLATFORM FOR DEFENSE COMPANIES

On August 10, Ukraine's Ministry of Defence announced that Ukrainian defense companies will be able to train their own artificial intelligence models using the Avengers Labs platform. The platform was developed by the Center for Innovation and Development of Defence Technologies, which created the DELTA combat system that collects the majority of data used by the lab.

Over five million frames have already been collected from battlefield sources, covering targets across all domains, and including both traditional and unmanned systems. While carrying out video analysis, the DELTA system's **AI detects up to 70 percent of all enemy targets in real-time.**

The initiative is intended to give developers access to computing infrastructure and tools needed to build and train AI systems for defense applications.

The platform is designed to address one of the main barriers to military AI development: access to sufficient computing resources. Instead of each company having to build its own infrastructure, developers can use a shared environment to train models for specific defense tasks.

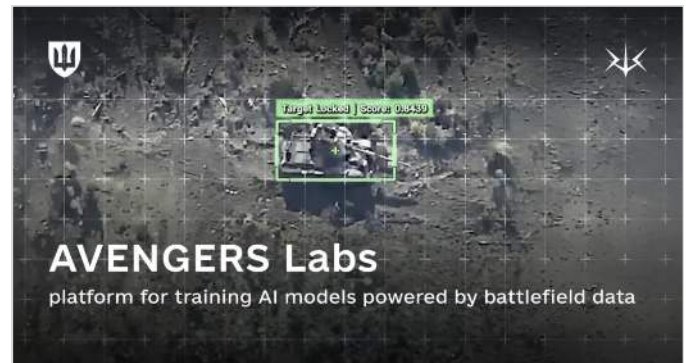
This could accelerate the development of AI-enabled systems while allowing companies to retain greater control over their own models and applications.

The initiative is particularly relevant to Ukraine's rapidly expanding unmanned-systems sector, **where AI is increasingly used** for target recognition and terminal guidance. In the future, this will also make UAVs more autonomous. The significance of Avengers Labs therefore extends beyond providing computing capacity.

By lowering the infrastructure barrier for private defense companies, Ukraine is attempting to move AI development from isolated projects toward a larger industrial ecosystem in which models can be trained, tested, adapted, and integrated into military systems more rapidly.

The effectiveness of the initiative will ultimately depend on the computing capacity available, the quality of training data, and the ability of developers to validate AI models under real battlefield conditions.

The Ministry has not publicly disclosed the scale of the platform's computing resources or the number of companies expected to use it.



Source: [Ministry of Defence of Ukraine](#)

RUSSIA'S BALLISTIC ESCALATION IS EXPOSING THE WEST'S MISSILE-DEFENSE SHORTAGE.

In July, **Russia launched a record 198 ballistic** and hypersonic missiles against Ukraine. More important than the record itself is what sits behind it: Moscow now has the production capacity, accumulated stockpiles and foreign supply needed to sustain high-intensity ballistic attacks precisely as Ukraine faces a shortage of the PAC-3 interceptors required to stop them.

The recent trend is particularly sharp. **Ukraine's Defense Intelligence recorded** 61 launches in April, 107 in May, 134 in June and 198 in July. Russia therefore more than tripled its monthly use of these weapons between April and July.

According to Vadym Skibitsky, deputy head of Ukraine's Defense Intelligence, the increase reflects preparations made in advance and, critically, the growing volume of weapons available to Russian forces.

The March–April decline likely reflected a combination of stockpiling, temporary pressure on Russian missile production, and a continued reliance on mass Shahed attacks.

Ukrainian strikes hit parts of the Iskander supply chain in February and March, while sanctions continued to constrain access to components; analysis of recovered missiles suggested that many were being produced shortly before use, indicating limited production slack.

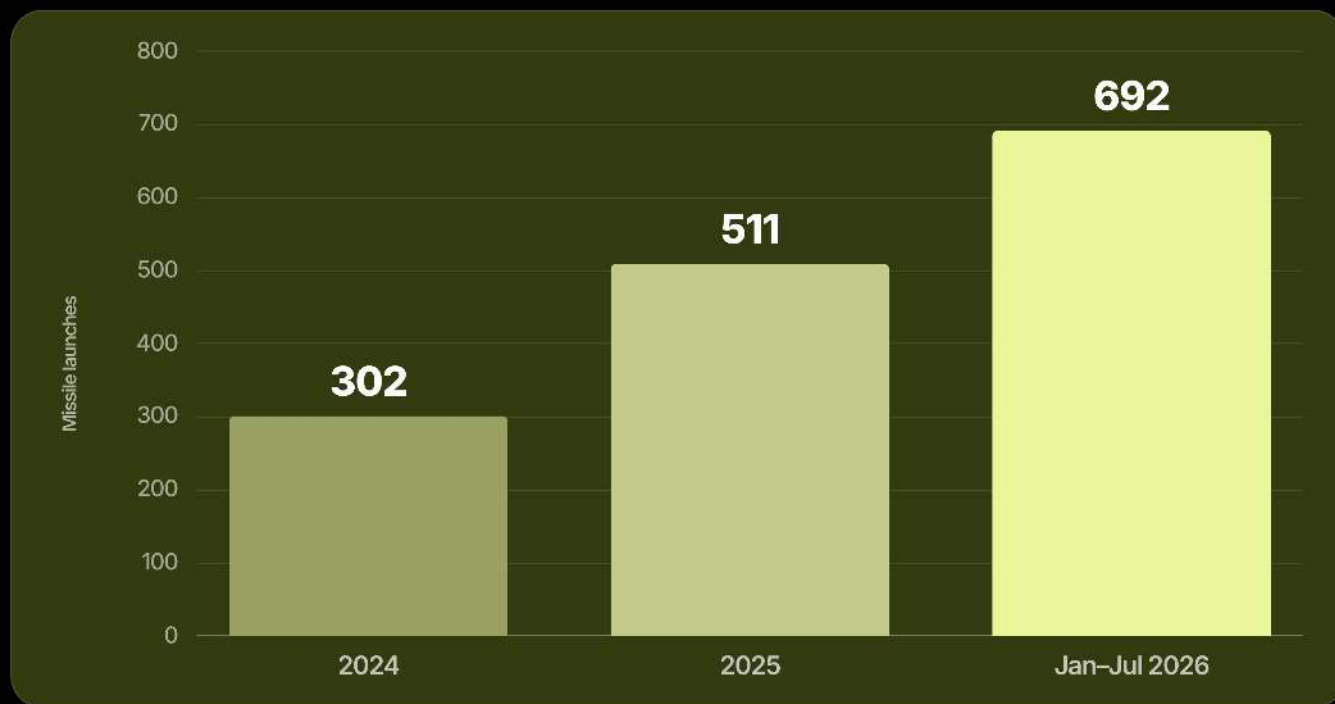
A separate **Ukrainian Air Force** dataset points to the same longer-term direction: ballistic missiles are taking a rapidly growing share of Russia's long-range strike campaign.

According to this series, **ballistic missile launches increased by approximately 69% from 2024 to 2025**, rising from 302 to 511 launches, and by approximately 35% from 2025 to the first seven months of 2026, reaching 692 launches.

MISSILE LAUNCHES BY YEAR

692

January–July 2026 already exceeds all of 2025



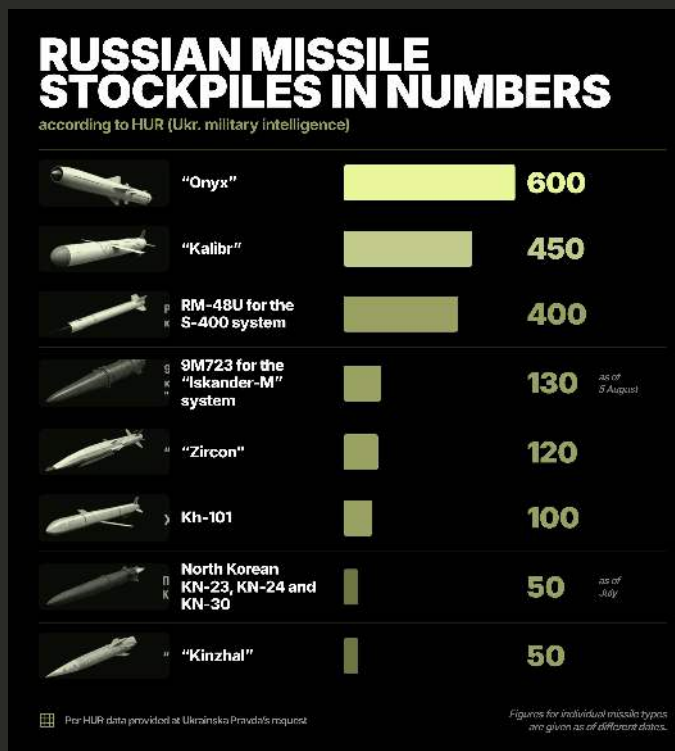
Russian ballistic missile launches against Ukraine in 2024, 2025, and January–July 2026.

Sources: [Massive Missile Attacks on Ukraine dataset](#)

The immediate problem for Ukraine is that Patriot remains its key defense against these threats, while PAC-3 interceptor stocks are limited.

As we warned in [Holding Back the Sky](#), interceptor availability increasingly determines which targets Ukraine can protect and which threats it can afford to engage. That vulnerability is now colliding with a Russian missile industry designed to keep the pressure high.

Russia's ability to launch substantially more missiles in a month than it produces is explained by its stocks. As of August 5, [Ukraine's Defense Intelligence estimated](#) that Russia had around 130 Iskander-M 9M723 missiles allocated to its forces and approximately 400 RM-48U S-300/S-400 missiles, alongside more than 120 Zircos and about 50 Kinzhals. Russia also held roughly 50 North Korean KN-23, KN-24 and KN-30 ballistic missiles as of July. These reserves allow Moscow to combine current production with accumulated inventories and periodically generate attack volumes well above monthly factory output.



Estimated Russian missile stockpiles as of August 2026.
Source: [Ukrainska Pravda](#)

At the same time, those inventories are being replenished quickly. [Russia's monthly production plan](#) for Iskander-M 9M723 missiles is 60, but its industry produced 65 in July. Production of the RM-48U, a surface-to-surface weapon launched from the S-400 and flying a ballistic trajectory, is running at approximately 50 per month; Moscow plans to manufacture more than 480 in 2026, more than twice its 2025 target.

Together, these two systems alone represent roughly 115 new ballistic-trajectory missiles per month at current rates. **Russia's overall capacity exceeds 200 cruise and ballistic missiles per month when Kh-101, Kalibr and other weapons are included.**



Current Russian missile production rates and production-plan fulfillment.
Source: [Ukrainska Pravda](#)

Russia **suspended production of Kinzhal** aeroballistic missiles in April and redirected fuel, components and funding toward other ballistic and cruise missile programs. Ukrainian intelligence says this shift has helped increase Iskander-M output. Production plans across major missile programs are also being exceeded in several cases: in July, Iskander-M production reached 65 against a plan of 60, while other Russian missile programs similarly surpassed targets.

According to Ukraine's Defense Intelligence, Russia has converted up to 17 S-400 launchers specifically for strikes against Ukraine with RM-48U guided missiles. These launchers have been grouped into five dedicated missile units deployed in Russia's Bryansk and Rostov regions. The system is increasingly being used not in its traditional air-defense role, but as an operational-tactical strike capability against ground targets.

The operational tempo is already rising. Russia used an average of around 15 RM-48U missiles per month between January and June 2026, but fired 46 in just the first 20 days of July.

One reason is cost: RM-48U missiles are reportedly significantly cheaper than the 9M723 Iskander-M.

North Korea provides Moscow with an additional buffer beyond domestic production. In August, **Reuters reported** that Pyongyang had delivered another 40 KN-23 and KN-24 missiles, after supplying roughly 150 since late 2023. A North Korean missile unit of around 90 personnel is also deploying to Russia's Voronezh region and could ultimately operate six launchers with as many as 120 missiles. There is no reliable public estimate of monthly North Korean KN-23/24 production, so these supplies should not be added to Russia's monthly production figure; they are better understood as an additional source of inventory available for future strike campaigns.

The resulting industrial imbalance is increasingly difficult to ignore. **Lockheed Martin delivered 620 PAC-3 MSE** interceptors in 2025, equivalent to roughly 52 missiles per month, and that production must support the United States and 16 other customer countries — not Ukraine alone. By comparison, Russia is currently producing roughly 65 Iskander-Ms and 50 RM-48Us each month.

The comparison is not perfectly one-to-one — different threats require different engagement decisions — but it illustrates the underlying problem: Russia can currently produce more than twice as many of these two ballistic-trajectory weapons each month as the United States produces PAC-3 interceptors.



Estimated missile-production gap between Russia and U.S. PAC-3 MSE interceptor output. Serpens Center analysis based on Ukrainian intelligence and industry data. Sources: [Ukrainska Pravda](#); [Reuters](#); [DW](#); [Bloomberg](#)

The shortage is already operational. **The Financial Times reported** that Patriot batteries defending Kyiv temporarily lacked sufficient interceptors during Russian attacks in August. Ukrainian officials estimate that Kyiv needs at least 300 additional PAC-3 missiles for the coming winter campaign.

Washington plans to raise PAC-3 production capacity from roughly 600 to 2,000 missiles per year, but reaching that scale will take years.

Ukraine is trying to develop alternatives. **Fire Point's Freyja/FP-7.X program** aims to conduct its first successful ballistic interception by mid-2027 and ultimately provide a cheaper European-Ukrainian anti-ballistic option. It has not yet demonstrated that capability, however, leaving Patriot and its limited interceptor inventory as Ukraine's principal near-term defense.

The answer therefore cannot rely on interception alone. **Ukraine also needs to reduce the number of missiles that ever reach the launch stage**—by targeting launchers, storage sites, production facilities and critical missile-industry supply chains.

Every missile or launcher destroyed on the ground reduces pressure on an interceptor inventory that is considerably harder for Ukraine and its partners to replenish.

Ukraine's experience is increasingly demonstrating a wider lesson for NATO: missile defense is also an industrial competition.

Russia is already organizing its defense industry and foreign partnerships around sustained ballistic warfare. The West has begun increasing interceptor production in response, but the gap between recognizing the threat and producing defenses at scale remains the vulnerability Moscow is now trying to exploit.

For more details on the air campaign and its evolution, **read our report [Holding Back the Sky](#).**

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Serpens Center for International Security

Serpens Center for International Security (SCIS) is an independent Ukrainian defense and security think tank.

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Working from across Ukraine, we produce the research, programs, and partnerships that turn Ukraine's hard-won defense experience into the shared, lasting security of the West.

Through both official memoranda and our informal relationships across Ukraine's military and defense forces, every paper and program we produce is built alongside our partners in uniform.

We are headquartered in Kyiv. Also in Los Angeles.

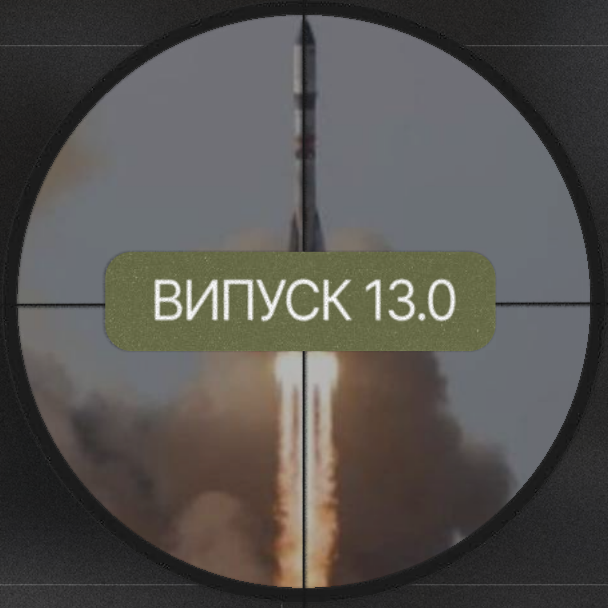
Our website





A circular graphic with a dark grey border. Inside the circle is a photograph of a rocket launching, with a large plume of orange and white smoke at the bottom. A horizontal olive-green bar with rounded ends is centered over the rocket. The text "AUGUST 2026" is written in white, serif, all-caps font on this bar. The background of the entire image is dark grey with a faint white grid.

AUGUST 2026

A circular frame with a black border contains a photograph of a rocket launch. The rocket is positioned vertically in the center, with a large plume of orange and white smoke and fire trailing behind it. The background within the circle is a clear blue sky. The entire circular frame is set against a dark gray background with a faint white grid pattern.

ВІПУСК 13.0



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