SNAKE ISLAND INSTITUTE

Defense Tech Monthly:

Ukraine-Russia Battlefield

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August 2025

Section I:

Frontline Update

Northeast (Sumy–Kup'yansk–Lyman):

- Enemy activity in the Sumy region has decreased, with units redeployed to other fronts. Around Kup'yansk, the situation remains difficult as Russian forces have reached the outskirts, seeking to consolidate positions and push deeper. Fighting also continues in the Lyman sector: the Seredbryanske forest has been largely seized, while battles persist in Zarichne, where Ukrainian troops repeatedly clear and expel infiltrating units.

East (Pokrovsk Axis):

- The heaviest fighting is concentrated near Pokrovsk. Russia has committed reserves, including naval infantry, conducting combined assaults with armor and infantry toward Myrnohrad. Simultaneously, continuous pressure is applied along the Donetsk–Dnipropetrovsk administrative border, with enemy attempts to advance near Filiya. Ukrainian forces are holding, clearing forested areas where the enemy seeks to entrench.

South (Zaporizhzhia Front):

- The southern front has seen little change, though tension is rising. Russian forces conduct regular assaults toward Stepnohirsk via Plavni and Prymorske. Preliminary intelligence suggests additional reinforcements are being redeployed into the sector, but their direct involvement has yet to be confirmed.

*Changes on the frontline within the past month are reflected based on the analysis, provided by the **DeepState** team.*

The Snake Island Institute is Ukraine-U.S. initiative dedicated to strengthening strategic cooperation in defense through:

- **Analytics:** Advancing understanding of modern warfare and doctrine
- **International partnerships:** Aligning Ukrainian, U.S., and international decision-makers
- **Defense Tech:** Enabling integration of critical technologies into combat operations

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UGV Warfare Expands: Drone Launchers, Mobile Air Defense & Kamikaze 'Mothers'

Insight

August 2025 marked a sharp **acceleration in the development of uncrewed ground vehicles (UGVs)** on both sides of the front, encompassing concepts, battlefield deployment, tactical adaptation, and institutional integration. The K-2 Regiment has formally launched as the **world's first UGV-only battalion**. Moving beyond logistics and evacuation, the 3rd Assault Brigade established the **first-ever company dedicated solely to striking UGVs**. To support this, the Snake Island Institute co-organized the **Strike UGV Forum** on August 29 in Lviv, bringing together over 100 participants from frontline units and defense tech companies to identify shared operational problems, compare use cases, and set realistic expectations for strike UGV development.

Speakers from **the 3rd Assault Brigade, 93rd Mechanized Brigade, K2 Regiment, and 5th Assault Brigade** all emphasized the same bottom line: the need for modular, reliable, affordable systems built for real combat.

Among the most grounded priorities voiced were:

- **Anti-drone turrets** integrated directly into UGV platforms
- **Simpler fire control systems** for remote gun turrets, which currently require high operator skill due to jams, misalignment, and poor calibration
- **Minimal autonomy** for routine resupply or casualty extraction tasks
- **More kamikaze UGVs** and heavier payloads (e.g., thermobaric and anti-tank warheads) Rather than pursuing full AI-driven autonomy, units focus on practical functionality, ease of maintenance, and survivability in complex battlefield environments.

Ukraine's Tactical Innovations

The NC13 UGV unit of the **3rd Assault Brigade** has confirmed frontline use of the UGV Kamikadze Mothership. These are larger robots that **deliver multiple operator-controlled kamikaze UGVs forward for synchronized multi-angle attacks** — essentially a ground-based analog of FPV drone swarms. This model blends shock tactics with scalable deployment.

Ukrainian "mothership" UGV in August 2025 operation. Source: NC13, 3rd Assault Brigade

Another innovative use case emerged in August when a **UGV mounted with MANPADS reportedly downed a Russian helicopter**. The configuration allows expendable, close-range air defense without exposing infantry crews, forming part of a layered approach to defending against low-flying threats.

Other developments — not yet observed in combat — include **UGVs configured as FPV drone launch platforms**, allowing operators to bring drone swarms closer to the front and launch them from cover. This could reduce signal loss and jamming, shorten flight times, and create a hybrid system where ground mobility supports aerial saturation.

A ground robot with a surface-to-air missile launcher. Source: Kostiantyn Liberov via 28th Mechanized Brigade

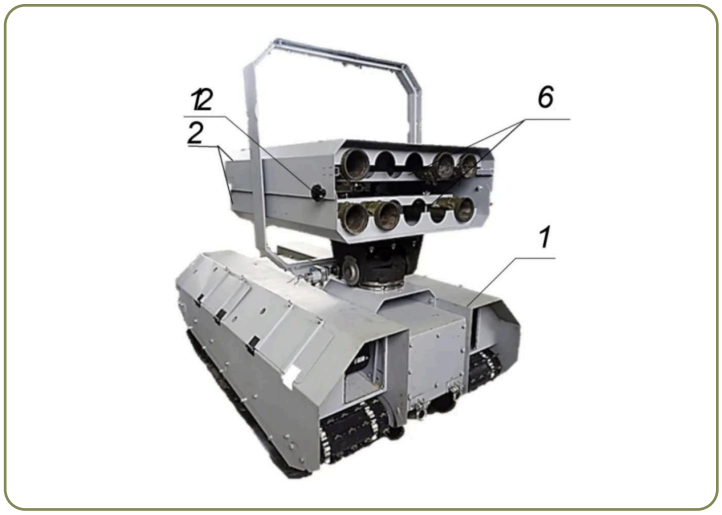
Russian Developments in Parallel

Russia, meanwhile, is also evolving its UGV capabilities.

Reports confirmed the deployment of "Mini-Solntsepyok" UGVs — **robotic platforms using RPO "Shmel" thermobaric launchers** for close-quarters trench and urban clearing. Designed for low-cost mass deployment, these modules are easy to reload in the field and represent a scalable solution for infantry support.

At the "Archipelago 2025" forum, Russian developers unveiled the Argus UGV, a **UGV equipped with multiple FPV drones** and managed via the Hermes 2.0 control system. Operators can pre-position Argus in ambush mode and activate drones remotely with loitering or group strike functionality. Despite claims of swarm AI and full autonomy, Russian systems, like those in Ukraine, **remain primarily operator-driven**. However, trends suggest a gradual shift toward distributed capabilities and edge decision-making.

Also revealed in August, Russia presented a miniaturized **unmanned version of its Buratino rocket flamethrower system**. Integrated into a UGV, it is designed to **deliver thermobaric or incendiary payloads via remote control**, tailored for high-risk environments where human crews are especially vulnerable to Ukrainian drone and artillery fire.



Source: BTVT.INFO

By moving such destructive systems to remote platforms, Moscow signals a growing recognition of crew vulnerability and the utility of expendable robotic assets. However, with its limited range and payload, the Mini-Buratino is unlikely to shift the overall balance of firepower. Instead, it reflects a tactical adaptation: **integrating unmanned strike tools to harass and complicate Ukrainian defenses** without significantly altering the strategic picture.

LAND

Rail Disruption as a Tech-Driven Tactical Lever

As Ukrainian and Russian forces target each other's rail infrastructure with increasing precision, the urgency to extend tech **protections from roads to railways is growing**. Current field-level innovations, such as netting systems and static anti-FPV grids, are heavily concentrated along major highways, logistics hubs, and vehicle routes. But trains, often carrying bulkier cargo, remain comparatively exposed. In less than a year, Ukrainian forces have successfully destroyed at least **four Russian military trains in the Zaporizhzhia direction, the latest one in mid-August**.

As both sides escalate strikes on trains, **protecting the railway network will require tech-enabled solutions**. The question is whether defenses will remain low-tech, similar to the netting used on highways against drones, or evolve toward more advanced systems based on radar, jamming, and layered detection, integrating acoustic and visual warning with active interceptors.

Burning Russian train after Ukrainian attack, August 2025. Source: TSN

AIR

Shaheds Evolve Into Minelayers: Russia Deploys PTM-3 Dropping Drones

Russia has begun **arming Shahed drones with PTM-3 anti-tank mines**, marking a new evolution in how disposable UAVs are used in the war. Shaheds are no longer limited to kamikaze strikes, and modified drones are now serving as low-cost, remote minelaying systems. This adaptation allows Russian forces **to deny mobility and threaten Ukrainian logistics nodes, roads, and evacuation routes far behind the front, without committing manned assets**.

The use of air-dropped mines complicates clearance for emergency services and creates persistent hazards for both military and civilian traffic. Strategically, it signals a **broadening of Shahed employment beyond kamikaze strikes**, turning them into multipurpose tools of attrition. If scaled, this practice could make Shaheds a persistent tool for shaping the battlefield by straining supply chains and eroding freedom of movement well beyond the front line.

August 2025: Ukraine's Strategic Oil War Against Russia

Insight

Ukraine launched its most extensive campaign against Russian energy resources so far in August. More than ten long-range precision strikes disrupted **21%** of Russia's oil refining capacity **over a two-week period**, directly affecting the systems that fund the war and support battlefield logistics. Ukraine is expanding its strike strategy by targeting critical infrastructure that sustains Russia's invasion, shifting from tactical raids to sustained economic pressure.

Over the past few weeks, Ukraine's attacks against Russia's energy sector have significantly increased in intensity. In stark contrast to the intermittent targeting of previous months, Ukraine plans to build thousands of Flamingo long-range cruise missiles annually. According to Reuters, Ukraine attacked **10 refineries in August**, shutting down facilities that accounted for **17% of the country's processing capacity**, or **1.1 million barrels** per day.

Source: Telegram-channel Exilenova+

Analysts described the campaign as a "methodical elimination" of major refineries within a 1,000-kilometer radius. **By month's end, only two or three significant facilities in this critical zone remained untouched.**

Dual strikes against the **Ryazan** and **Novokuibyshevsk** refineries on August 2nd marked the start of the month and set the stage for the campaign's pattern of well-coordinated attacks. By August 7, Ukrainian forces had also **targeted** the Afipsky Refinery in Krasnodar Krai, a key supplier of fuel to Russian military forces, with an annual production capacity of 6.25 million tons.

The repeated targeting of key facilities throughout August reflected a deliberate shift toward strategic degradation over symbolic strikes. The Syzran Refinery was hit twice – on August 15 and 24 – while the Volgograd Refinery was struck on both August 13 and 19. Beyond physical damage, **Russia is now being forced to divert critical logistics**, engineering teams, and repair assets from military operations to domestic infrastructure recovery. By striking again, Ukraine guaranteed long-term disruption rather than temporary damage.

The strikes on August 28th showcased high-level coordination and accuracy. According to ISW, the Kuibyshev Oil Refinery, capable of processing seven million tons annually and producing gasoline, diesel, fuel oils, and solvents, was successfully targeted by Ukrainian forces, notably the 14th Regiment of Unmanned Systems Forces, in conjunction with SOF. **The 6.25 million-ton Afipsky Petroleum Oil Refinery, which plays a crucial role in providing fuel** to the Russian military, was simultaneously targeted by **GUR** and Ukrainian Unmanned Systems Forces. Both refineries are key to Russia's war machine. According to the Ukrainian Unmanned Systems Forces Commander, "Magyar," operations on this **one night destroyed an additional 4.7% of Russia's fuel production**, increasing the overall destruction for August to 21%.

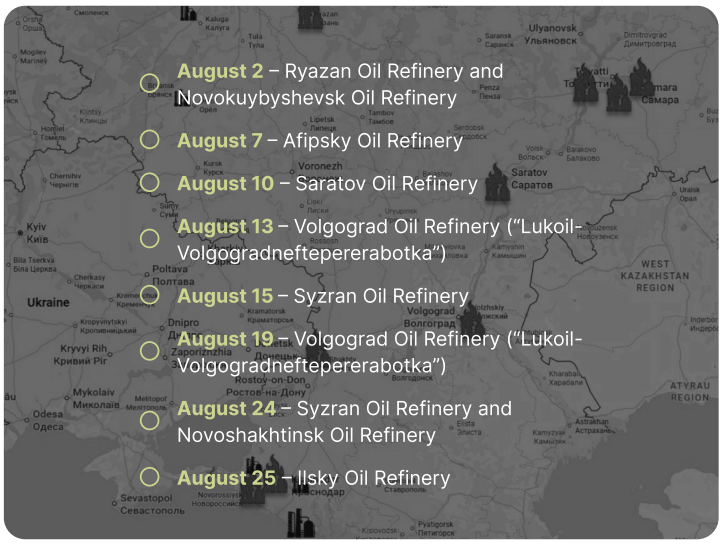
Beyond refineries, Ukraine demonstrated a sophisticated understanding of energy logistics by targeting pipeline infrastructure.

The Transneft Druzhba pipeline pumping station in Unecha was struck twice—on August 13th and 22nd—disrupting Russia's primary oil export route to Europe.

Energy expert Serhiy Kuyun noted the strategic brilliance of targeting pipeline infrastructure, explaining that "blocking pumping stations significantly complicates export and directly hits the aggressor's finances" while requiring fewer resources than refinery strikes.

Beyond refineries, the **larger military-industrial complex was also affected by this escalation**. In addition to the significant refinery attacks, Ukrainian forces carried out strikes on several ammunition depots on **August 28**. Earlier strikes targeted ammunition storage facilities in occupied **Crimea**, including depots near the **Simferopol-Alushta highway** that housed military equipment and fuel storage. Russia's Arms Factories Could Be Hit by Ukraine's New **"Flamingo"** Cruise Missile, according to the National Security Journal. A Russian gunpowder plant and military airfields were the targets of coordinated drone raids, illustrating the campaign's progression from opportunistic attacks to the systematic destruction of Russia's war-sustaining infrastructure in several areas at once.

Ukrainian Special Operations Forces targeted railway stations, including **Urožajna** station in **Krasnohvardiiske**, which sustained damage to a traction substation, as well as other logistics facilities in occupied Crimea on **August 26**. Support for southern Russian forces was made more difficult by the **August 21** attack on the **Dzhankoy** station, which targeted Russian fuel and lubricant supplies. Numerous passenger trains heading to and from Crimea experienced delays due to these coordinated strikes on railway infrastructure, necessitating time to clear tracks and reroute military cargo trains, and causing significant disruptions to Russian military logistics.



Source: Defense Express

The campaign's economic impact extends far beyond fuel shortages. At least 17% of Russia's total refining capacity, or **1.1 million barrels per day, has been disrupted** by Ukrainian strikes. The Institute for the Study of War assessed that the ongoing strikes are creating gasoline shortages across Russia, driving inflation and macroeconomic instability.

In an effort to stabilize the domestic fuel market after the attacks, the Russian government extended its ban on gasoline exports, which was set to expire on August 31, to September 30 for gasoline producers and to October 31 for non-producers. Even before the latest wave of Ukrainian strikes, Russia was reportedly already struggling to meet its own domestic gasoline needs, prompting recurring restrictions on gasoline exports since 2022. The current limitations represent an escalation of these earlier, short-term measures.

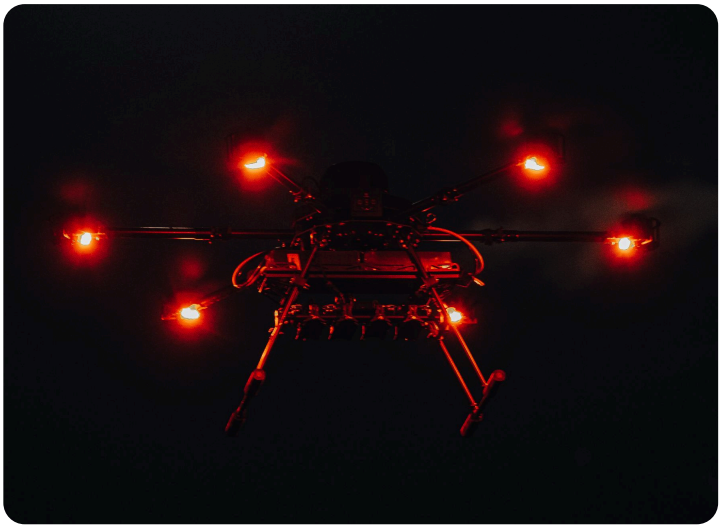
There are still a few high-value targets despite the achievements in August. The **Nizhnekamsk Refinery**, located near the **Alabuga** facility where Russia produces **Shahed** drones, hasn't been struck since February 11th. The most recent attack on the Black Sea coast occurred on **March 14th** at the Tuapse Refinery. Most notably, the **Kapotnya Refinery** in Moscow itself remains untouched, though it benefits from the capital's maximum air defense coverage.

Beyond the Drop: Weaponized Copters Shift the Drone Paradigm

Insight

Weaponized copter drones have become a laboratory of battlefield experimentation. From improvised rifles to guided missiles, operators on both sides of the Russian-Ukrainian war are probing what these platforms can realistically carry. Their payloads echo those long associated with attack helicopters, but core constraints — short endurance and limited stability — make complete substitution unlikely. Instead, their significance lies in **supporting broader drone networks, complicating enemy planning, and denying airspace**.

Missile integration has been the most eye-catching trial. The U.S. **TRV150 testbed demonstrated that multicopters can launch APKWS laser-guided rockets** —a concept that, if adapted in Ukraine, could provide a cost-effective means of targeting helicopters near the front while also striking light armored vehicles or firing positions on the ground. Incendiary payloads have proven more immediately viable. **"Dragon drones," converted from agricultural sprayers**, disperse thermite or napalm mixtures across Russian positions, a grim extension of their civilian use. Other experiments, such as **mounting grenade launchers, rifles, or even ATGMs, have surfaced but remain unreliable**; vibration and recoil quickly undermine accuracy.



Source: Hardin

The limits are structural. Multicopters **lack the mass and recoil absorption of helicopters**, which prevents them from firing accurately in ballistic situations. As the commander of the R&D unit at 21st Separate Regiment of Unmanned Systems, Dolyna, observed **that fixing assault rifles or RPG-type launchers on quadcopters makes little sense under these conditions**. We have noticed, however, that in August, both sides experimented with similar payloads on heavy drones. Endurance is equally constraining: most multicopters sustain only 20–40 minutes of flight, far less than the hours available to fixed-wing drones or rotary aircraft. This rules out persistent close support.

Still, within those constraints, clear strengths emerge. The mere prospect of APKWS-armed copters forces helicopters to think twice before approaching the frontline and creates a potent option for striking exposed ground systems. **Copter drones are also proving very effective as communication relays and laser designators**, extending the reach and precision of winged UAVs. Most importantly, they **enable a fast, low-cost cycle of battlefield adaptation**—each trial, whether successful or not, pushes doctrine forward.

Copter drones are increasingly taking on the role of delivering fire through munition drops and precision strikes. While the physics of flight prevent them from entirely replacing aircraft, their impact is clear in saturating the battlefield with **strikes, complicating the use of manned platforms, expanding drone networks, and raising the risks for helicopters**. In modern war, changing how fire is delivered can be as decisive as introducing an entirely new weapon.

Helicopters at a Crossroads: Lessons from Ukraine

Helicopters were **once seen as the decisive answer to massed armor**, but the war in Ukraine has demonstrated the **challenges of employing them in modern, contested airspace**. Heavy losses have forced both Russia and Ukraine to adapt, driving changes in how rotary forces are used.

Cold War doctrine had envisioned helicopters like the AH-64 Apache as agile tank-killers: flying low, using terrain for cover, and striking Soviet armored columns with precision missiles. Their survivability relied on "pop-up" tactics from behind ridges or forests. On Ukraine's mostly open steppe, such masking is more challenging to achieve, **leaving helicopters more vulnerable to radar and infrared tracking**.

Adaptations have followed. **Crews** increasingly employ lofted fire, releasing unguided S-8 or S-13 rockets in high arcs from well behind the line—safer but far less precise, blurring the line between helicopters and artillery. **Rotary aircraft are also used for counter-UAV patrols**, with both sides **employing autocannons**, side-mounted guns, or **short-range missiles such as Igla** to defend rear areas. At the same time, longer-range munitions have been introduced: the Ka-52's LMUR and Vikhr-1 missiles have a range of up to 15 km, while guided-rocket kits are under development to improve standoff accuracy.

Even with these constraints, **helicopters are unlikely to vanish from the battlefield**. Their speed, vertical mobility, and ability to rapidly reposition firepower still make them **valuable for reinforcing sectors, conducting deep raids, and responding to sudden threats** in ways artillery cannot.

However, their **roles are shifting**: increasingly as standoff strike platforms that rely on drones for targeting, as mobile air defense units against UAVs and cruise missiles, and as participants in SEAD operations, where temporary corridors are opened for deeper strikes.

Western modernization reflects this same trajectory. The **U.S. Army is integrating Spike NLOS and JAGM missiles on Apaches**, while European programs emphasize the development of manned-unmanned teaming. These efforts anticipate the conditions evident in Ukraine: helicopters remain relevant, but under new doctrinal assumptions that emphasize distance, integration, and flexibility over direct presence at the front.

MI-8, equipped with machine guns, shuts down a Russian Shahed-like drone. Source: Defense-UA

Crop-duster drone-interceptors

In a twist of wartime improvisation, **Ukraine is sending crop-dusting planes to hunt drones**. Fitted with air-to-air missiles, these slow-flying workhorses are proving that sometimes the best way to counter a low-tech threat is to meet it on its own terms.

Z-137 AgroTurbo with P73. Source: Militarnyi

Ukraine has converted **agricultural aircraft into low-cost interceptors for heavy UAVs, arming them with air-to-air missiles**. These propeller-driven planes, generally used for crop-spraying, can operate far from the front lines where the Shaheds are inbound, matching the drones' speed and altitude profile better than fast jets. By flying slowly and staying airborne for longer, they can loiter in likely approach corridors, using missiles for standoff kills without burning expensive jet fuel.

In August, the Wall Street Journal **reported even more unexpected UAV countermeasures. The Yak-52, a multi-decade-old propeller plane, helps Ukraine tackle a growing challenge.** It doesn't have a radar or any integrated munitions. Instead, operators of the "bird" approach the drones and neutralize them with assault rifles or shotguns – a tactic mainly used during WWI.

Shooting at a Russian UAV from the cockpit of a YAK-52. Source: Wall Street Journal

The use of lower-tech illustrates the "circularity" in military technology. In WWII, propeller fighters dominated the skies; decades later, piston and turboprop aircraft are again valuable when the threat operates at low speeds and low altitude. The airframes remain simple, but the integration of modern missile systems turns them into **effective anti-drone platforms**.

Raybird-3's Recon Upgrade Pressures Russian Air Defense Tactics

Ukraine's Raybird-3 drone has been equipped with a new RER (radio-electronic reconnaissance) module that can **detect emissions from Russian radars and electronic warfare system**s. The technology equips the UAV with a more sophisticated role, enabling it to spot enemy sensors and pass targeting data to artillery or strike drones. However, this remains an emerging capability rather than a widespread battlefield threat, as integration and scaling are still in early stages.

For Russia, the significance lies less in the immediate battlefield impact and more in the trajectory. **Even limited deployments force air defense and EW operators to reconsider tactics—running radars risks exposure, while turning them off creates coverage gaps**. Strategically, it shows Ukraine's intent to chip away at Russia's radar advantage with relatively low-cost tools. The Raybird-3 with RER is not yet a game-changer, but it signals a direction where Ukrainian UAVs may evolve into effective SEAD instruments over time.

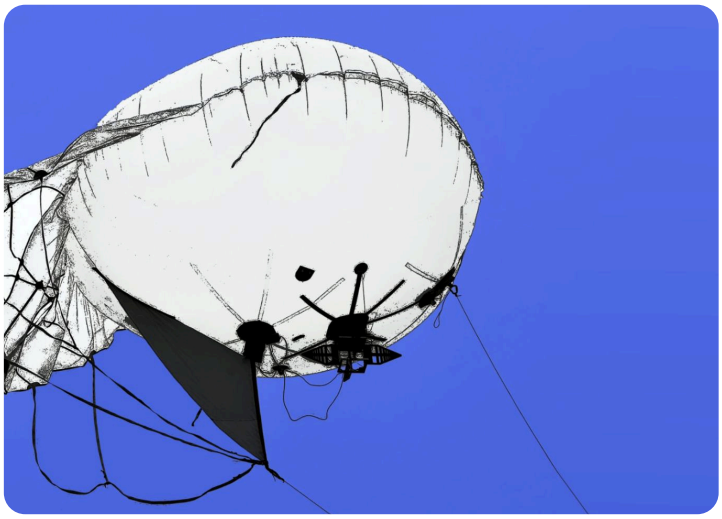
Balloons, Drones, and the New Vertical Layer

Ukrainian developers are exploring tethered aerostats as relatively low-cost, persistent platforms for communication, counter-UAS operations, and reconnaissance.

Aerobavovna's systems are tested with repeaters lifted to 500–800 meters, restoring line-of-sight and enabling reliable radio transmission over 70 km. Inter-user links have been demonstrated **beyond 100 km, depending on terrain and equipment** (Hytera, Motorola, Harris, Himera). This **directly improves FPV drone and UGV control under heavy jamming**, where ground-level range is typically limited to a few kilometers.

Startup MaXon secure $300,000 in August and in partnership with Aerobavovna is developing aerostat-borne autonomous interceptors. Tethered balloons act as elevated detection posts, launching autonomous drones capable of intercepts at speeds of ~300 km/h.

Aerostats also **carry EO/IR and RF direction-finding payloads**, with Ukrainian reports noting the ability to triangulate hostile **UAV operators at a range of up to 90 km**. Persistent observation from altitude offers a cost-effective complement to scarce high-end ISR assets.



Aerobavovna aerostat. Source: Spectrum

Small Ukrainian balloons are reported to **deploy in 7–10 minutes and remain aloft for 7–14 days**, although their duration depends on the availability of helium and ground power. Weather is a limiting factor—systems are engineered to withstand ~90 km/h winds, with larger tactical aerostats rated to 55 kt operational and 70–75 kt survival. Balloons are also visible and potentially vulnerable to small arms or artillery if mooring sites are exposed.

Aerostats are re-emerging as potential practical "towers in the sky" for Ukraine. They can extend FPV strike reach, create a cost-effective counter-UAS layer, and provide persistent ISR—all at relatively low cost compared to manned assets. However, their vulnerabilities—helium logistics, weather, and signature—make us remain skeptical of their potential in the near-term future.

Reusable Jet-Powered UAV Targets Shahed Drones

Ukraine's defense startup **Tekhnari has unveiled the "Mongoose" (Мангуст)**, a reusable jet-powered drone interceptor designed to counter Shahed-136/"Geran-2" drones. The aircraft-type UAV reaches speeds of **300–310 km/h**, a ceiling of **5,000 m**, and a combat radius of **12 km**, enabling it to close in on Iranian-made loitering munitions. Equipped with an **automatic heat-seeking guidance system**, the Mongoose autonomously engages once within 150–200 meters of the target. To disable enemy drones, it fires a **multi-barrel shotgun charge** at the engine or propeller. After a kill, the system can continue hunting or return for refueling and rearming, making it more cost-efficient than expendable interceptors if each unit neutralizes 10–12 Shaheds.

Strategically, the Mongoose highlights Ukraine's efforts to develop **scalable, reusable air-defense layers** against persistent drone barrages. While current performance is sufficient for propeller-driven Shaheds, questions remain about their effectiveness against future Russian jet-powered UAVs reportedly capable of speeds of 500 km/h. Tekhnari has already formed the first squadron of interceptors and is preparing to deliver prototypes to air defense brigades, signaling a shift toward **lower-cost, high-endurance drone-on-drone defense** solutions.

Orlans as FPV Carriers? Russia Experiments with UAV Relay Tactics

In August, Orlan, a large Russian UAV, was **noticed carrying a pair of FPV drones**. The concept of mounting smaller drones on a larger one is not new. In the last issue, we talked about a river maritime drone capable of carrying FPVs. Another example is the installation of FPVs inside freighters, as seen in the Spiderweb operation.

Carrying drones on a **"mothership' UAV can serve more than a transportation function**. Relay can be set up to improve the connection range between the operator and the FPV. This solution is not yet widespread on the battlefield; however, it becomes clear that both sides are **exploring new platforms and ways to extend the range of FPV drones**.

Orlan-10 as FPV carrier. Source: TheDefender

As discussed above, the current use of FPV effectively **expanded the "kill zone" to 15km from the front line**. Additionally, systems like Lancet, Gerbera, or Lightning made a 50-100 km range more dangerous than it was. "Mothership" UAVs will play a crucial role in further rendering a 50-100 km range even more hazardous than it is now for artillery, logistics, and large air defense systems, especially radars. It might also extend the "kill zone" by an additional tens of kilometers.

While the effectiveness of "mothership" UAVs is yet to be established, countermeasures need to be considered. These should include both the development of systems for direct destruction and adaptations in logistics, artillery, and air defense. The three need to become more mobile, maneuverable, and stealthy. More backup plans will be required at the operational level, as **main routes or positions may become compromised quickly with the extended range of cheap** and abundant FPV drones that can even wait for days and ambush in any location within a 50-100km range. This is not yet everyday life, but it will soon be.

Bridging the Long-Range Strike Gap: Flamingo as Ukraine's Home-Grown Answer

Launch of the Flamingo cruise missile (Fire Point). Source: Anton Korzh

With Western allies **increasingly restricting the use of U.S.-supplied long-range weapons** such as ATACMS and Storm Shadow for strikes on Russian territory, Ukraine has turned to its own capabilities to fill the void. The **FP-5 "Flamingo"** was developed by the domestic startup Fire Point and delivers a potent countermeasure: a **3,000 km-range cruise missile with a 1,150 kg warhead**, capable of reaching deep into Russian infrastructure without seeking external approval.

The Flamingo is launched from ground-based ramps with a rocket booster before transitioning to a turbofan cruise mode at speeds of 850–900 km/h and is **guided by jam-resistant GPS and inertial systems**, achieving strike accuracy within ~14 meters.

Illustration of the Ukrainian FP-5 Flamingo heavy cruise missile. Source: H. I. Sutton, Covert Shores

On August 30, Flamingo was reportedly used to destroy an FSB facility in Russian-occupied Crimea. This marks a significant demonstration of strategic reach without crossing Western red lines. Current production stands at 30 units per month, with a target of over **200 units per month by fall**.

The scale and weight of the FP-5's warhead, nearly a metric ton, give it **greater destructive capability than its Western counterparts** (which typically carry 300–500 kg), positioning it as a uniquely potent tool for deep precision strikes across Russia's logistics and command network.

Specification	FP-5 Flamingo	Tomahawk (various blocks)	Taurus KEPD 350
Place of Origin	Ukraine	United States	Germany/Sweden
Launch Platform	Ground-launched	Sea- and ground-launched	Air-launched
Operational Range	3,000 km	Up to 2,500 km	500+ km
Warhead Weight	1,150 kg	450 kg	480 kg
Maximum Speed	950 km/h	885 km/h	Mach 0.95 (approx. 1,170 km/h)
Guidance System	GPS/GNSS with INS backup	GPS, inertial, and terrain-contour-matching radar	INS, GPS, terrain-reference navigation, and image-based navigation
Length	12–14 m	5.56 m	5.1 m
Diameter	Not specified	0.518 m	1.08 m
Wingspan	6 m	2.67 m	2.064 m
Weight	6,000 kg	1,315 kg	1,400 kg

Comparison of FP-5 specifications with Western analogs. Source: Medium

Strategically, Flamingo provides Ukraine with the capacity to target command centers, logistics hubs, and infrastructure far beyond the frontlines, with a heavier warhead compensating for the few.

Drone Survival in Contested Skies: New Russian Adaptations

Russia's **upgraded ZALA T-20 drone**, previously seen only in development, has **now been spotted in active combat zones**, equipped with long-range capabilities (500+ km), AI-based targeting, and GPS-independent navigation designed to resist Ukrainian electronic warfare.

Meanwhile, a downed Orlan drone was found **with a rear-view camera to spot incoming FPV** threats mid-flight, showing how Russia is adapting drone designs for survival in contested airspace.

Camera from the downed "Orlan". Source: Serhii "Flash" Beskrestnov

The Hollow Fleet: Why Russia Can't Rebuild Its Navy

Russia's shipbuilding troubles are becoming more visible with every setback. The recent capsizing of the Kapitan Ushakov naval tug in St. Petersburg is more than an accident—it is a marker of deteriorating standards in ship construction and maintenance. At the same time, the long-delayed overhaul of the Admiral Kuznetsov aircraft carrier, plagued by a sunken drydock and repeated fires, highlights how **Russian industry struggles to maintain large warships**.

These failures reflect deeper systemic issues. Since the loss of Ukrainian-made gas turbines in 2014, **Russia has lacked reliable propulsion systems for surface combatants**, leading to delays and redesigns across multiple programs. Even smaller missile ships have been slowed by sanctions and supply-chain gaps. While new hulls, such as the Project 22350 *Admiral Amelko*, are still being launched, **they face years-long fitting-out periods before entering service, underscoring the gap between symbolic launches and actual combat capability**.

The consequences of the Russo-Ukrainian war are strategic. With the Black Sea Fleet driven from Sevastopol and forced into a defensive posture, Russia cannot easily replace its losses.

Turkey's Montreux enforcement prevents reinforcement through the straits, further exposing the fleet's vulnerability.The result is a shift toward smaller corvettes, submarines, and coastal missile systems, accompanied by efforts to counter Ukrainian uncrewed surface vessels. Yet none of these can substitute for the air defense and presence provided by large warships. **Russia's inability to build and sustain major surface combatants will erode its capacity to project power far from its coasts, leaving the Kremlin dependent on smaller, less expensive platforms that reinforce a defensive rather than a global naval posture**.

Russian "Captain Sergeev". Source: Defense Express

U.S. Sea Drone Setbacks Expose Need for Frontline Lessons

The U.S. Navy's drive to build an autonomous drone boat fleet to counter China **has encountered significant setbacks**, according to reports from Bloomberg and Reuters. During recent tests off the California coast, **one uncrewed vessel stalled due to a software glitch and was subsequently struck by another drone**.

Meanwhile, a support boat capsized when a drone tugged it unexpectedly, highlighting the growing pains of developing complex, fully autonomous platforms. In contrast, **Ukraine's battle-tested, remote-controlled sea drones, costing roughly $250,000 and optimized for reliability over autonomy**, have proven tactically effective in real combat.

These contrasting approaches underscore the need for the U.S. and its allies **to partner more closely with Ukraine** and learn from its step-by-step, battlefield-driven development of maritime drone capabilities. Ukraine's iterative, resilient innovation model may offer a more practical path to effective uncrewed systems than top-down autonomy-focused programs alone.

Global autonomous reconnaissance craft (GARC) in San Diego, California. Source: REUTERS

Strike and Retaliation: Drone Battles Heat Up on Inland Waterways

On August 20, **Ukraine's HUR used a Bayraktar TB2 drone armed with a laser-guided bomb to destroy a Russian patrol boat** near Zaliznyi Port in the Kherson region. This marked a rare example of a precision riverine drone strike, showcasing Ukraine's growing capability to conduct targeted inland operations using air assets. The attack disrupted Russian logistics and surveillance in a contested zone where conventional naval forces are ineffective, underlining how Ukraine continues to adapt airpower and laser targeting to shape the fight along shallow inland waterways. Just over a week later, on August 28, **Russia responded by striking the Ukrainian reconnaissance ship Simferopol** with an unmanned surface vessel in the mouth of the Danube River, resulting in one fatality and several wounded.

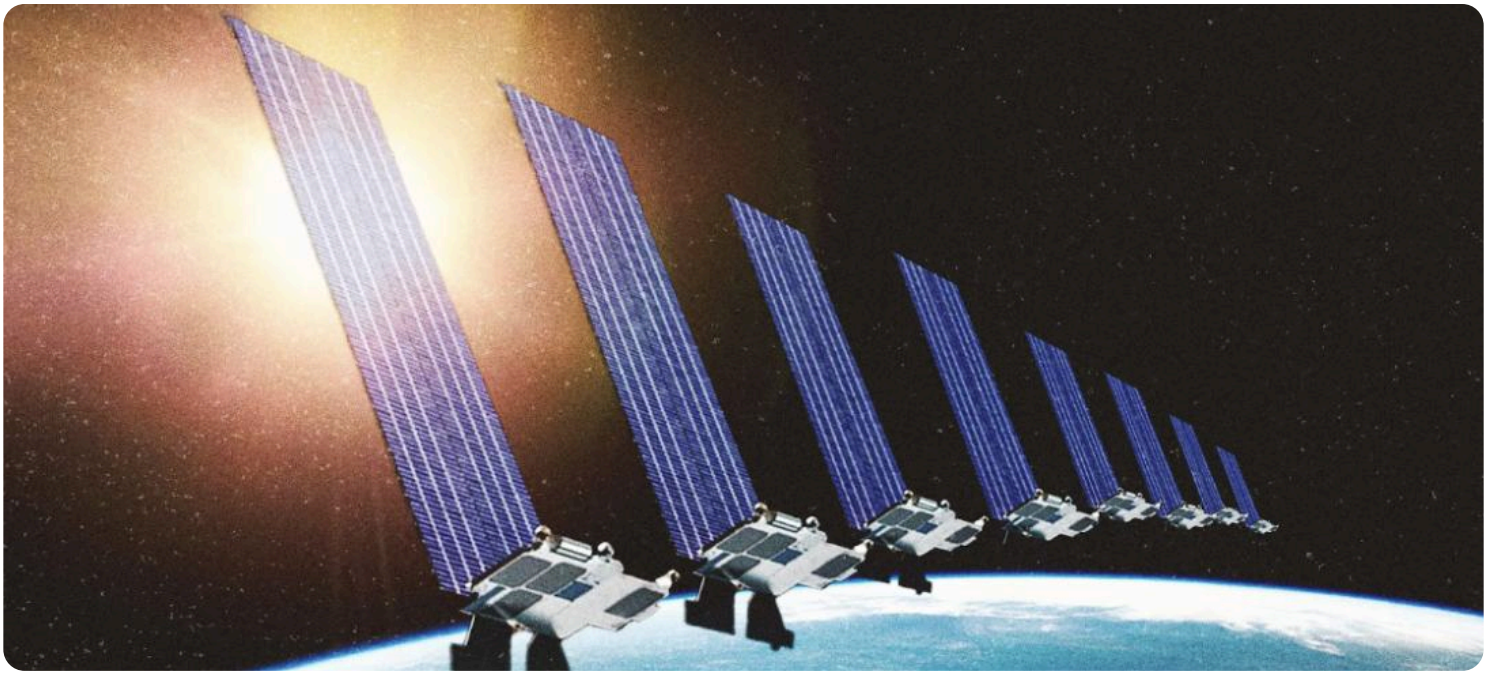
This tit-for-tat escalation underscores how **both sides are rapidly adapting air, sea, and unmanned systems to contest control over inland waterways**, highlighting an evolving technological arms race.

Patrol boat destroyed by Ukrainian intelligence. Source: HUR

Star Wars: China's Laser Ambitions Signal the Next Spacefront

China is exploring ways to neutralize Starlink. This month's discussion is focused on **laser-based methods to combat Starlink** and is best understood as a **strategic signal shaped by lessons from Ukraine**: commercial LEO constellations now sit at the heart of wartime communications, making them a key target in any significant conflict. Open-source reporting indicates the Chinese government–linked researchers are exploring **directed-energy options—"dazzling" or blinding satellite sensors**, and other disruption concepts—as part of a broader counter-constellation toolkit. If Starlink can maintain connectivity when terrestrial networks are degraded, then undermining that connectivity is a **priority for any adversary planning against the United States and its partners**.

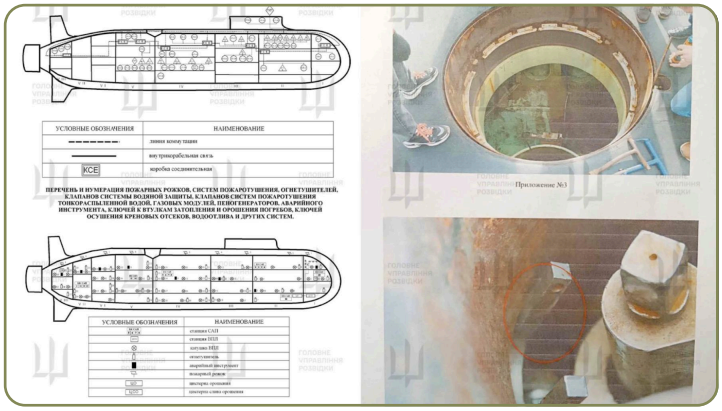
Ukraine's experience explains the urgency. **Starlink underpinned resilient C2, logistics coordination, and drone operations**, even as Russia attacked infrastructure and fought in the electromagnetic spectrum. Attempts to curtail access or funding only highlighted both the system's value and the risks of single-vendor dependence. For military planners, two imperatives are clear. First, **commercial space is now a battlespace** and we should expect attacks on satellites, ground stations, and supply chains. Second, **resilience means diversifying providers**, hardening against EW and lasers, and preparing for constellation disruptions.



Starlink satellites. Source: Starlink

Blueprint Breach: Ukraine Exposes Russian Nuclear Sub Secrets

Ukraine's military intelligence, HUR, **claims to have successfully stolen classified documentation from the Russian Navy related to its newest Borei-A class nuclear missile submarine**, Knyaz Pozharsky. The leaked files reportedly include crew rosters, combat procedures, engineering diagrams, survival systems blueprints, and operational schedules, potentially revealing critical vulnerabilities across the Borei fleet.



Scheme of the Knyaz Pozharskiy submarine and its communications system. Source: DIU

Eyes Everywhere: Delta Becomes Backbone of Ukrainian Command and Control

In August, the Ukrainian Armed Forces **completed the implementation of the Delta system** on all levels. Delta **is a situational awareness and C2 (command-and-control) platform**. It integrates reconnaissance data from drones, satellites, radars, and electronic intelligence into a single digital map. Users see friendly and enemy positions in near-real time, along with layers such as terrain, logistics routes, and air defense coverage.

The rapid growth of unmanned systems on the battlefield and the information they provide requires new methods of processing and coordination. This makes Delta a **crucial link in Ukraine's effort to defend itself against the enemy**, with an advantage in manpower and ammunition.

Source: Dev UA

CYBER

The First in Ukraine Lab for AI Security

Ukraine has launched its **first dedicated AI security laboratory**, a joint project between Kyiv Academic University and the Ukrainian-founded company AxxonSoft, with an investment of over 5 million hryvnias. The facility will focus on **advancing artificial intelligence tools for video surveillance, object recognition, and real-time threat detection**, aiming to enhance both civilian safety and defense applications.

While presented as a research hub, the lab also highlights how Ukraine is leveraging private and academic partnerships to drive security innovation amid the ongoing war.

EW

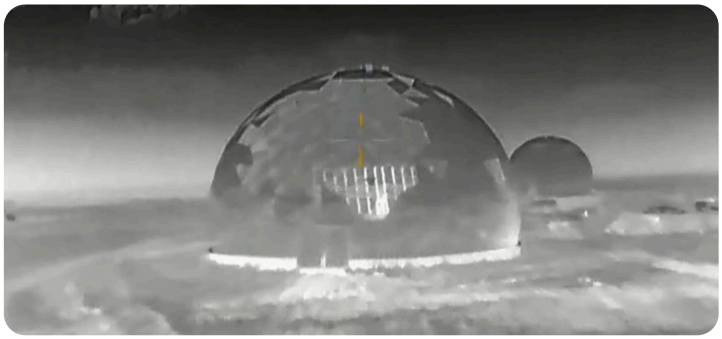
When LTE Becomes a Weapon

LTE connection became increasingly important in the drone component of the Russo-Ukrainian war. In June, **we reported that an LTE module** was found on one of the Russian FPV drones. This month's news prompted us to revisit LTE.

This month, **HUR released the list of components on a new Russian UAV**. There, they discovered **LTE modules that enable Russian drones to utilize the Ukrainian LTE network** for control and video transmission. Compared to analog signals, **LTE is harder to jam and offers virtually unlimited range within network coverage**, making it highly attractive for operational and strategic use.

Currently, Shaheds follow fixed, pre-programmed routes, but LTE would give them real-time flexibility. **Ukraine has already adopted LTE for drone control**, prompting Russian countermeasures: following repeated strikes on air defenses in Crimea, **Russia disabled LTE in the region**.

Russia has carried out over **2,800 LTE shutdowns across 60+ regions** between May and July, with disruptions rising each month alongside Ukraine's deep strikes.The broader concern is that **LTE makes long-range drones far more adaptable to countermeasures**. A Gerbera decoy, for instance, could map air defenses while strike drones adjust course in real time. The only way to deny this advantage is to cut LTE, though doing so also hampers civilian emergency response and creates new risks.



A Russian radar moments before being struck by a Ukrainian drone. Source: Defence Intelligence of Ukraine (HUR)

ZALA's GEOKOSMOS: Secure Drone Network or Expensive Illusion?

ZALA Aero has unveiled GEOKOSMOS, a system that provides secure drone communication and navigation **without satellites or mobile networks**. Using ground-based stations and UAV relays, it creates a distributed, software-defined network resilient to jamming and capable of long-range, high-speed data transmission. Drones not in the network will be automatically jammed. GEOKOSMOS is positioned as a **cornerstone of Russia's "Digital Skies" initiative**, aimed at ensuring sovereign control and independence from GPS or cellular infrastructure.

The concept, however, raises questions. Will each antenna combine RER, EW, and signal functions? Such integration would be highly costly, and adequate coverage would demand a dense network of installations, **every 50–100 km, even in frontline regions**. The idea is ambitious, but the implementation appears far more challenging than the presentation suggests.

Russian Laser Downs Ukrainian Long-Range Drone

In the previous issue of **Defense Tech Monthly**, we explored the latest developments in laser-based systems from both Ukraine and Russia. New footage now confirms that Russian mobile laser air-defense units have used a China-linked system known as LASS (Low-Altitude Laser Defending System) to **destroy a Ukrainian FP-1 long-range strike drone** in combat.

The laser delivers 10–20 kW of power, requiring about 10 seconds of sustained targeting to neutralize UAVs at ranges up to 1.5 km for destruction and 3 km for optical disruption. Does this mark the beginning of lasers entering true operational use, or is it still a highly controlled demonstration?

Built Under Fire: How Soldiers Are Scaling Their Own Tech as Industry Falls Behind

Insight

Faced with urgent frontline needs and slow civilian timelines, ***Ukrainian soldiers are building, codifying, and scaling battlefield solutions themselves*** *— and changing the defense innovation model in the process.*

Across Ukraine, frustration is growing among combat units over the slow pace of defense **tech development by civilian companies detached from frontline realities**. A growing number of soldiers are taking matters into their own hands — designing, testing, and deploying custom solutions from the ground up. One standout example is the **Pavuk Dophina, a new drone-based retransmission system** with a stabilized signal, extended air time, and flexible frequency support, created by a team from the 3rd Army Corps. Initially developed to overcome spoofing and jamming that disabled off-the-shelf drones like the M30T, **the system was built from scratch by operators** who had a deep understanding of the tactical pain points. It was named in memory of a fallen brother-in-arms from their unit — a tribute to the combat realities that shaped both the problem and its solution.

We spoke with the head of R&D for their unit, who explained that no existing market options met their needs. After successful field testing, the team partnered with trusted manufacturers to scale and standardize production. **The system was officially codified for serial production this month**, marking a significant milestone in transitioning from ad hoc frontline fix to deployable national capability.

The Pavuk Dophina is already in use with Ukrainian Wings of the 3rd Assault Brigade, 21st Regiment, and Marumasa, and has received consistently positive feedback from strike drone teams. However, FPV drone operators requested a more compact version. In response, the team is now in the final stages of completing a smaller, lighter variant. **Their experience highlights a growing trend: soldiers are not just end-users, but also front-line innovators driving the evolution of military technology**. They are fast, functional, and tailored to operational needs. As traditional suppliers struggle to keep up, these battlefield-born solutions are shaping the next generation of Ukraine's defense ecosystem.

Pavuk Dophina. Source: 3rd Army Corps

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