SNAKE ISLAND INSTITUTE

Defense Tech Monthly:

Ukraine-Russia Battlefield

Section I:
Frontline Update

Sumy direction:

The liberation of Kindrativska in the Sumy region allowed Ukrainian defenders to improve their tactical situation, stopping the active advance of Russian forces.

Kharkiv direction:

Pressure continues in the Kupyansk area, where the enemy has reached the northwestern outskirts of the city and is trying to gain a foothold there. Active pressure is also being exerted in the Lyman and Siversk areas.

Donetsk direction:

The enemy's inability to advance into Chasiv Yar has led them to desperation, and they have attempted to infiltrate the rear in a propaganda mission to display the Russian flag. They were intercepted and neutralized. Active fighting continues around Kostyantynivka. The enemy also managed to penetrate Pokrovsk in small groups. Still, the Ukrainian forces prevented an attempt to gain a foothold and establish a permanent route for the enemy into the city. Active fighting continues along the administrative border of the Dnipropetrovsk and Donetsk regions.

Southern direction:

Active fighting has emerged in the southern direction, where the enemy has been able to advance in the Kamyansk area successfully.

> *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
- **Advocacy:** Aligning Ukrainian, U.S., and international decision-makers
- **Defense Tech:** Enabling integration of critical technologies into combat operations

Staying in the Loop

○ LAND

Ukraine Continues its Course of Reducing Artillery Shell Dependence

At IDEF-2025, held in Istanbul from July 22–27, Ukraine showcased domestically produced artillery shell bodies of all calibers – both NATO and Soviet, reflecting Ukraine's unique position of deploying both NATO and Soviet capabilities on the battlefield. Despite the rapidly growing role of FPV-drones on the battlefield, **artillery remains a vital means of destruction and suppression.** Moving towards domestic production is another step for Ukraine to reduce operational vulnerability.

As part of this effort, Excalibur has extended its commitment by partnering with Ukrainian Armor to help Ukraine support **the production of 105 mm and 155 mm artillery shells domestically**. In parallel, Ukroboronprom signed a strategic agreement with DM Holding to establish domestic production of critical chemical components for munitions, allowing a secure supply chain for explosives and propellants. These corporations are scheduled to begin deliveries this year, reducing Ukraine's reliance on foreign ammunition and ensuring faster replenishment for frontline artillery units.

155 MM HE-FRAG SHELL BODY (M107M1)	
GUN	M777 and other
CAL	155 mm
WEIGHT	34,7 kg
MAT	Steel 60
BELT	Copper

155 MM HE-FRAG SHELL BODY (M795)	
GUN	777 and other
CAL	155 mm
WEIGHT	35,4 kg
MAT	Steel 60
BELT	Copper

Ukrainian 155 mm artillery shell bodies M107M1 and M795

Drone Warfare Forces Tanks into New Roles, U.S. Follows Suit

In Ukraine, **tanks are now used mainly as standoff fire-support artillery**, as FPV drones have made close maneuver operations too costly. The U.S. also seems to be finally drawing direct lessons: this month, it announced plans to **equip over 1,500 armored vehicles with anti-drone grille systems** and tested an **M134 Minigun on an Abrams tank** to counter low-flying UAVs.

Beyond adapting its systems to withstand drone warfare, on July 11th, the Army **presented** its latest update to its "Tank Platoon" manual, which finally addresses drones as a critical threat against tanks. The revised manual includes over 100 mentions of unmanned systems and includes UAS combat as a "critical tactical task." The manual designated an "**air guard**", a person in charge of watching the horizon and "spotting aerial threats within proximity to the unit's location and providing early warning."

Installation of M19 dynamic protection units from ARAT-1 on M1 Abrams. Illustrative photo by the US Army

Drones Sustain Ops Behind Enemy Lines

In July, the "Skala" unit revealed a breakthrough in drone-enabled logistics. Two Ukrainian scouts operated undetected for over **six weeks on an island 3.5 km inside Russian-held territory**, fully supplied by drones. This marks a shift from zero-line resupply to sustained operations deep in enemy rear areas.

Illustration of the 3.5 km resupply distance

Ukraine Expands Its Strategic Strike Capabilities with Renewed Deep Drone Attacks on Russian Infrastructure

Ukraine has built on its **number of long-range drone attacks in July**, targeting important locations in the Russian military-industrial network with a list of strikes that span oil refineries, weapon factories, air defense units, infrastructure, and critical logistics.

Ukraine's Long-range Drone Attack on Russia's Oil Refinery in Krasnodar Krai. Source: **Defence Express**

Ukraine's July drone campaign oftentimes **targeted Russian production capabilities**, especially those involved with **Shahed-type drones and their components**. One of the notable strikes was on the **defense plant in Sergiev Posad, near Moscow.** Satellite imagery confirmed that the strike **damaged the key buildings used for the production** of thermobaric warheads for Shahed-type drones and heavy flamethrower systems like TOS-1. Another attack using a powerful FP-1 munition **struck the Krasnozavodsk Chemical Plant** which manufactures warheads for Shahed drones. Ukrainian long-range modified kamikaze An-196 "Feb" drones also successfully **targeted the Kupol Electromechanical Plant in Izhevsk**, a site involved in the production of a smaller-scale Shahed analog.

In addition to targeting drone production infrastructure, Ukrainian forces disrupted operations at **two critical oil facilities, five chemical plants, and three radio factories** closely tied to the Russian war effort. On **July 3rd** and **15th**, Ukraine twice hit PJSC Energia, Russia's largest weapons battery producer, as well as **Shchekinoazot United Chemical Company**, which manufactures **chemicals for industrial and military use**. These attacks reflect a deliberate effort of Ukrainian forces to disrupt the industry that powers the enemy's war machine.

Complementing the strikes on the Russian military-industrial complex, Ukraine's UAV campaign has undermined Russian supply routes by striking logistical and infrastructure locations in Rostov Oblast. At the moment, Rostov Oblast serves as a strategic connection for Russian forces to the occupied southern Ukraine and the Pokrovsk direction, where intensified fighting is taking place. In mid-July, a drone attack on the **Novocherkassk Power Plant** damaged components of the adjacent railway, reportedly **disrupting train routes used for transporting military equipment** from Russia to Eastern Ukraine. In a parallel strike, **drones also hit a major railway junction in the city of Salsk**, connecting Russia with occupied Donbas. The strikes damaged a train carrying petroleum, oil, and lubricants and were likely to have delayed arms shipments and complicated the repair operations, as the **key supply routes had been partially destroyed**.

Recent analysis from **Mezha media** highlights that **a single hit on energy infrastructure**, such as oil refineries, can shut down an entire facility. This contrasts sharply with Russia's decentralized military production, where many critical factories disperse key operations. A clear example is the UralVagonZavod production complex, which spans 827,000 square meters – equivalent to roughly 116 football fields.

If one building is hit, only one node of the whole factory city will be disrupted.

To more effectively undermine the enemy's combat readiness, in recent months, Ukraine has started intensifying its drone campaign to target **not only energy infrastructure** but also the **broader industrial and military base**. Ukraine's increasing range of drone operations forces the enemy to locate their production way behind the zero-line. In April, a Ukrainian **attack targeted the Shahed drone production facility** located deep within Russian territory, in Tatarstan, around **745 miles away from the Ukrainian border**. While such remote locations may offer relative production safety, they come with the tradeoff of increased logistical dependence and potential delivery delays to the frontline.
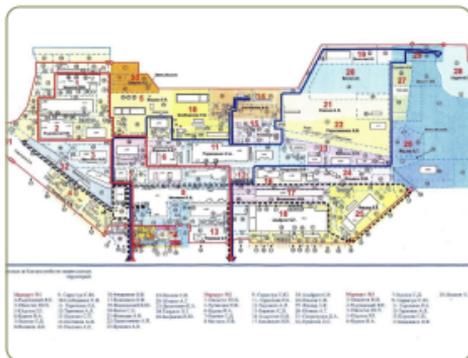
General plan of Uralvagonzavod
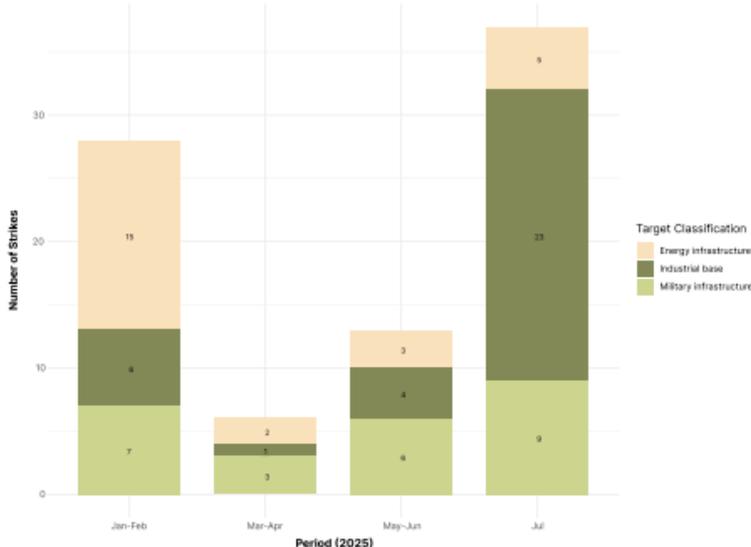
Sources: Mezha, CyberBoroshno, Militarnyi, DniproOsint

Escalating Threat: The Technical Evolution of Shahed Drones

On July 9, Russia **launched 728 drones in a single day**, the largest mass drone strike since the start of the war. On July 31, Russia launched a new version of the **"Geran" strike drone with a jet** engine that can reach speeds of **700 km/h** (430 m/h). Russia's continued scale-up in drone production and capability signals a growing "Shahed" threat this month.

Regular "Shahed" and "Geran" drones started flying higher and faster. They **oftentimes fly at 3-4km** altitude, making Ukrainian **mobile air defense groups with machine guns ineffective**. When Ukraine responded by deploying interceptor drones, Russia deployed Shaheds with a jet engine that flies significantly faster, allowing them to **avoid interceptor drones**. Other findings suggest that improvements in speed, range, and altitude **may soon become accompanied by computer vision and autonomous swarm operation**.

Shahed-like drones appear to be incorporating capabilities previously seen in more advanced Russian UAVs such as the "Zala" and "V2U." As documented last month, one recovered **Shahed was found to contain a thermal imaging system**, marking a shift toward enhanced onboard sensing. More significantly, engineers identified an Nvidia Jetson processor inside the drone, the same component previously discovered by **HUR in the Russian strike UAV "V2U."**

This processor **enables autonomous swarm coordination and target recognition using computer vision**, suggesting that similar autonomous features may now be transitioning into lower-cost loitering munitions like the Shahed.

Similarly, Shaheds inherited another feature from the "Zala" reconnaissance drone. In 2024, Ukrainian operators reported that "Zala" started to maneuver when an interceptor drone approached the aircraft. This month, some Shaheds exhibited similar behavior, **performing evasion maneuvers as interceptors approached**, as our sources report.

Another finding suggests that Russian-produced Gerberas may soon be able to communicate with each other through a mesh network. A **downed Russian Gerbera decoy** drone was found equipped with a rugged mesh-network router, revealing its role in extending communications and enabling drone swarms.

These developments suggest a near-term shift toward Shaheds capable of operating in coordinated swarms, guided by computer vision and inter-drone communication. **Countermeasures will need to evolve accordingly**, matching not only the scale and cost-efficiency of this emerging threat, but also its growing autonomy and adaptability.

Source: Getty Images

The Interceptor Gap: Matching Russia's Evolving Drone Salvos

In July, Russia had increasingly **concentrated large volumes of drones and missiles on one or two cities at a time** to overwhelm Ukrainian air defenses, according to the Institute for Study of War (ISW). This tactic becomes more accessible to Russia **as its production of drones ramps up**. In these saturation attacks, Shaheds have a **higher chance of reaching their targets** as defensive attention is stretched.

Interceptor drones have emerged as one of Ukraine's key responses to this threat. On July 11, a Ukrainian-built interceptor downed a Shahed-136 over **Odesa**, underscoring a growing pattern of confirmed successes by **domestic systems**, alongside initiatives like Blyskavka and the Shyliky project, the latter of which showed early promise but struggled to scale effectively. Until now, the best-performing interceptions have come from repurposed FPV drones or internationally supplied platforms.

Interceptor drones must evolve in step with Russia's increasingly advanced strike capabilities. As Shaheds begin to exhibit coordination, evasion, and autonomous targeting, **interceptors will need to match that intelligence**, operating with greater autonomy, reduced operator input, and faster target acquisition and engagement cycles.

Source: Air Defense Regiment of the 3rd Army Corps

"Lancet" Loitered for an Hour to Enable Iskander Strike

July marked another important development in the technology behind "Lancet". Recently enhanced by the Russians, **the kamikaze "Lancet" flew over Ukraine to identify a target behind Ukrainian lines and hovered over it for an hour to help guide reconnaissance drones towards the coordinates, which supervised the Lancet's strike**.

The Lancet was able to damage the target, **which allowed for an Iskander strike**. Our source, a Ukrainian military Air Defense officer from the 3rd Army Corps, confirmed that Lancet drones have recently been used for preliminary reconnaissance and fire corrections.

Continuous advancements in drone building enable **greater flight time, distance, and sensing capabilities across all systems, allowing systems like "Lancet" to unlock new operational uses**.

Source: Air Defense Regiment of the 3rd Army Corps

Global Collaboration Powers Ukraine's Drone Surge

In July, Ukraine **deepened partnerships with Western firms to scale its drone capabilities**. Ukraine signed an agreement with Swift Beat, led by former Google CEO Eric Schmidt, **to co-manufacture hundreds of thousands of drones**, including Shahed interceptors, strike, and quadcopter drones. Volodymyr Zelenskyy also stated that "some Ukrainian defense companies will have access to new technologies, enabling them to expand their production capabilities". Similarly, Skyeton (Ukraine) and Prevail Partners (UK) announced a **joint venture to produce Raybird ISR drones** for both Ukrainian and NATO use.

Ukrspecsystems launched a domestic repair hub for foreign UAVs to help with costly delays caused by sending drones abroad for servicing.

Western analysts note that Ukraine's UAV production **has surged over 900% in the past year**, underlining the results of joint efforts of Ukraine and its allies to reshape Ukraine into a self-sustained partner. Western companies should view this as an opportunity to not only arm Ukraine but also to co-develop production models that will serve as a doctrine for future conflicts.

Raven SHORAD: Conventional Tech Reenters the Fight

As the race to counter drones intensifies, some conventional systems may be regaining relevance. The UK-supplied Raven short-range air defense system, **based on ASRAAM missiles** and mounted on a Supacat HMT, represents a **traditional missile platform adapted for modern threats**. In its first documented combat use, Raven downed **four Russian reconnaissance drones** (Orlan and Zala) within eight hours.

According to SII, Raven continues to show good results against Shaheds as well. While it's too early to judge long-term impact, this initial success suggests that legacy-inspired SHORAD systems might still have a place in today's evolving air defense landscape.

Russia Deploys New Long-Range UMP-B5 Bomb to Hit Residential Building

Russians used a new guided bomb, "UMP-B5" at a distance of 100 km on Kharkiv. Tactical aviation continues to drift further away from the frontlines as air becomes increasingly hazardous due to the deployment of more advanced anti-aircraft systems.

"UMP-B5" is an improved guided munition that flies 3-4 times further than the commonly used KAB-s. A larger distance from the front lines allows the carrier plane to reduce the risks associated with highly dense air defense.

Ukrainian Uncrewed Surface Vessels Launch "Bomber" Drones that Damage Key Russian Radar Systems in Crimea

As a part of a multi-drone boat campaign that limits Russia's Black Sea Fleet movements, Ukraine's uncrewed surface vessels (USVs) **launched air drone payloads to strike three Russian Nebo-M radar system components** in occupied Crimea on July 1 - 2. The radar arrays are crucial to Russia's long-range air surveillance network.

Video evidence provided by the Ministry of Defence of Ukraine shows the drones being launched from the bow of the sea and dropping several munitions on the Russian radars. By combining maritime and aerial assets, Ukraine continues to restrict enemy's movements and once again exemplifies the effectiveness of its Black Sea naval drone fleet.

Ukraine Introduces "Ursula," a Compact Riverine Drone with Multi-Role Capabilities

Ukraine introduced "Ursula," a compact one-meter river drone designed for inland water operations. Unlike open-water USVs, Ursula is **designed for rivers, canals, and shallow coastal environments**, with the ability to conduct recon, act as a naval mine, or deploy FPV drones. The system further expands Ukraine's naval drone capabilities from open-sea to inland operations, where traditional navies are largely ineffective.

Ukrainian unmanned riverine surface drone Ursula carrying a UAV onboard. Source: Association of Ukrainian Engineers

Ukrainian USV-Led Strikes Force Russian Retreat and Drone Innovation

Ukrainian partisans report Russian Black Sea Fleet withdrawal from Striletska (Streletskaya) Bay, a key Crimean bay in occupied Sevastopol. **Ukrainian USVs continue to be effective in striking the Russian fleet**, pushing the enemy to begin developing a maritime drone named "Briz."

The development, initially branded as civilian, is likely to transition to military use. Although early in development, the project is expected to feature autonomous navigation and larger payloads.

Starlink's Global Failure Raises Need for Alternative Solutions

Starting on **July 24th, Musk's Starlink satellite communication service** went out worldwide. Although the impacts of Starlink being down were global, it's particularly important for Ukrainian troops, where Starlink plays a critical role in providing situational awareness, communicating with drones, and providing stable communications for soldiers operating across the front.

This time, it seems that the Starlink failure was indeed a technical difficulty, but there have been concerns in the past about **Starlink's reliability for use on the battlefield** after allegations in 2023 that Elon Musk **had shut off Starlink** for Ukrainian missions against the Russian navy in Crimea. Recent **reporting** has also highlighted that **during Ukraine's 2022 Kherson counteroffensive**, Elon Musk ordered the shutdown of at least **100 Starlink terminals in the Kherson-Beryslav region**. This blackout significantly disrupted drone surveillance and artillery coordination – effectively preventing encirclement – raising alarm among Ukrainian commanders and their international partners about reliance on a private satellite provider.

The European Union is **actively searching** for new solutions to reduce dependency on Starlink, and **according** to European Commission spokesperson Thomas Rainier, Ukraine is also interested in switching to alternative communication systems.

A Ukrainian soldier sets up a camouflaged Starlink terminal during a military exercise. Source: Getty Images

Russian Naval Drone Failures Might Reflect Satellite Communication Gap

Russia's domestic alternatives fall significantly short of Starlink's capabilities, recent analyses by **Defence Express** and **Kyiv Post** show. Earlier, Russia claimed that some of its uncrewed surface vessels (USVs) may have been using **Starlink satellite communication**. **Instead, Russia's systems use geostationary satellites positioned approximately 36,000 km above Earth**. This alters the speed and the precision of technology, causing transmission delays and degrading image quality.

In light of failed Russian USV operations, such as an unsuccessful attempt to attack Ukraine's Odesa region last month, Ukrainian military officials emphasize Ukraine's continued advantage in naval drone capabilities.

Denmark Backs Ukraine with European Satcom & Imagery via EDA

In mid-July, Denmark became the first EU country to provide Ukraine with satellite communication services and imagery via the European Defence Agency (EDA). The package includes European-manufactured receiver terminals, giving Ukraine secure, **resilient satcom connectivity independent of services like Starlink**.

Danish Defence Minister Troels Lund Poulsen stressed that this support helps diversify Ukraine's battlefield communications and reinforces Europe's emerging strategic autonomy in space.

○ CYBER

Ukrainian Cyber Forces Target Russian Military Industry

In mid-July, Ukraine intensified its offensive cyber operations, striking two pillars of Russia's defense-industrial complex. On July 14, the Ukrainian Cyber Alliance and BO Team, in coordination with military intelligence, breached the Gaskar Group – a key drone manufacturer – **exfiltrating sensitive UAV data and wiping 47 terabytes of files**, including backups.

Just three days later, Ukraine's military intelligence (HUR) reportedly executed a major cyber strike on Gazprom and its subsidiaries, **erasing administrative data for nearly 20,000 system accounts** and severely disrupting operations. These coordinated attacks highlight Ukraine's growing ability to degrade Russia's warfighting infrastructure through precision cyber operations.

Ukraine Destroys 100 TB of Data in Major Cyberattack on Russian-Run Crimea Administration

Ukraine's military intelligence agency (HUR) carried out a large-scale cyberattack on the Russian-installed government in occupied Crimea, **erasing over 100 terabytes of sensitive data** and crippling key administrative systems. **The operation** began with a powerful DDoS attack that disabled services across the peninsula.

Ukrainian cyber units then accessed internal systems, including document management and accounting platforms, extracting classified data on Russian military infrastructure and logistics. The breach was reportedly aided by access to the account of the Deputy Minister of Health in the occupation government. After exfiltration, all files were deleted, disabling operations across ministries and regional offices.

SilentCrow disrupts Aeroflot, Causing Massive Flight Chaos

On July 28, Ukrainian hacker group Silent Crow and Belarusian allies Cyber-Partisans **launched** a devastating cyberattack on Russia's state airline Aeroflot, **destroying up to 7,000 servers** and halting digital operations. The attack caused over **100 flight cancellations and mass delays**, paralyzing one of Russia's key transport arteries and exposing deep vulnerabilities in its cybersecurity.

Hackers claim to have **exfiltrated 22TB of data**, including customer records, internal surveillance files, and employee communications. Aeroflot's subsidiaries Rossiya and Pobeda also suffered major disruptions. The attack targeted Aeroflot – a symbol of regime prestige – to undermine public confidence in Russian state protections and destabilize internal systems.

# Russian Cyber Threats Evolve with AI and New Hacktivist Squads

Russia's cyber aggression escalated in July with more sophisticated tools and tactics. On July 21, CERT-UA **reported** an **AI-powered malware campaign dubbed "LameHug,"** targeting Ukraine's defense sector and attributed to GRU-controlled APT28 (a.k.a. Fancy Bear).

Simultaneously, new pro-Russian hacktivist groups – IT Army of Russia and TwoNet – **intensified** DDoS attacks, data breaches, and website defacements via Telegram, aiming to destabilize Ukraine and its allies through constant hybrid pressure. Both groups are actively recruiting insiders and coordinating strikes on Ukrainian and Western infrastructure.

Gap: Radio Frequency Escalation Threatens Viability of RF Jamming

Radio frequencies for drone operation persistently rise, which raises concerns about the future of radio jamming. Since the beginning of the war, 2400-5700 MHz has served as a standard. As EW measures evolved to cover the range, frequencies on both sides started to increase to avoid being jammed, our sources in the military say.

The trend may have existential consequences for RF-jamming in general. **When drones operate on a new frequency, new modules must be added to EW devices.** This requires more energy, and the systems become more expensive. In the end, there might be so many frequencies to jam that EW will no longer be a cost-effective solution as it once was, and alternatives will have to be found.
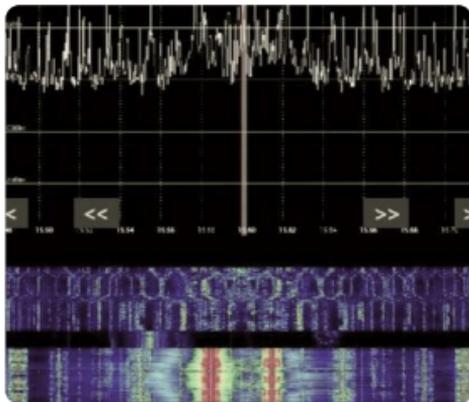
From Monoliths to Mesh: Rethinking Electronic Warfare in Ukraine

Ukraine's National Guard recently received a new radio-electronic warfare system, Atlas, an integrated mesh of four Mirage jammers and an Azimuth ELINT node designed to detect UAVs at up to 30 km and jam within 8 km. The system covers the 2.4–5.8 GHz range standard to most FPV and quadcopter drones while retaining flexibility to track frequency shifts, reflecting the ongoing escalation of drone communication bands. Its mesh-based, networked design departs from centralized EW hubs, promising broader frontline coverage and dynamic frequency control.

SII military sources view the concept as strategically sound and potentially transformative, but emphasize that execution is not yet fully effective. As one officer noted: **"The idea to combine detection and suppression is the right approach, but the current implementation lacks full effectiveness."** Multiple firms are field-testing integrated systems capable of simultaneous detection and jamming, but we have yet to see how this approach will perform on the battlefield.

Insight: Laser Systems and Their Operational Limits

Lasers in military use are primarily envisioned for three roles:

○ Targeting and Guidance Support (Precision Fires): Illuminating targets for guided artillery, bombs, and missiles to improve strike accuracy.

○ Tactical Point Defense (Counter-Drone/Counter-Munition): Neutralizing UAVs, loitering munitions, and other small aerial threats cost-effectively and at close range.

○ Strategic Air and Missile Defense (Fixed-Site Protection): High-power systems defending cities, bases, and infrastructure as a complement to missile-based interceptors.

As of July 2025, **lasers remain experimental and are not systematically deployed in combat**, but several nations are testing distinct approaches to their use. Ukraine is advancing tactical-scale laser developments along two paths. In July 2025, its R-34-T UAV, developed by FRDM GROUP and codified to NATO standards, marked an early attempt to use lasers for target designation, enabling precision-guided munitions. Complementing this, the Tryzub laser, unveiled in April 2025, is a prototype designed for frontline counter-drone defense, capable of destroying UAVs at ranges up to 3 km and blinding optical sensors at longer distances. While both systems remain in early stages, one focused on precision strike support and the other on active point defense, they illustrate Ukraine's **push to integrate lasers into tactical battlefield roles**.

Israel, by contrast, has achieved the first confirmed operational use of a laser air defense system. Earlier this year, its Iron Beam successfully intercepted dozens of UAVs during a conflict with Hezbollah, marking a milestone in laser deployment. However, Iron Beam is a **strategic fixed-site system intended for city and infrastructure defense**, requiring substantial infrastructure and power.

Meanwhile, in July 2025, Russia publicly revealed and tested its Posokh laser, marking its first open demonstration. State media showcased the system **destroying a stationary FPV drone battery from roughly 500 meters in about a second**, using a 3 kW prototype, with claims of future variants extending range to 1.5 km. Analysts remain skeptical: Posokh lacks multi-target engagement and its operational range is limited, making it more a point-defense prototype than a viable area defense asset.

Unlike most traditional technologies in use, l**aser systems require only electricity for power to destroy the targets**. It gives them an edge in cost per kill because each shot can be up to 100 times cheaper than a missile from an advanced air defense system. Such an advantage is appealing, but it currently comes with high manufacturing and development costs, rendering the strategic use of laser systems economically justified.
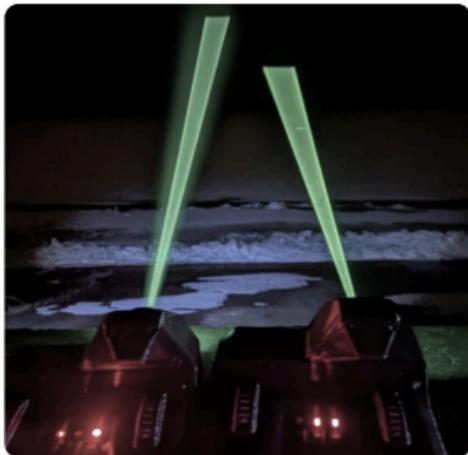
A mounted machine gun equipped with a green laser used for night targeting or signaling. Source: Petro Shegedin

However, as a system for strategic site protection, laser air defense technology has serious limitations. "Developing an automated laser system with long-range capabilities remains a challenge," says Petro Shegedin, COO of Sumix Ukraine.

Kurinnyy, a drone pilot in Ukraine's III Separate Assault Brigade and former physicist, emphasizes additional concerns: **to meet sophisticated air defense capabilities, laser systems must be mounted on a turret and powered by a significant energy source**, which limits their maneuverability and makes them more detectable. Additionally, in poor visibility or dirty battlefields, even minimal lens contamination can degrade the system's performance.

As pointed out by Silver, a representative from the 13th Khartiia Brigade, "while both Ukraine and Russia have resources to explore the development of automated laser systems, **full deployment is not expected before 2026.**" Ultimately, previously cited sources agree that even if Russia moves to scale and upgrade its laser use, it is unlikely to fundamentally alter the dynamics with Ukraine, given the high costs and the large number of systems required.

A mounted machine gun equipped with a green laser used for night targeting or signaling. Source: Petro Shegedin

Next Steps in Drone Comms: Analog Links Increasingly Vulnerable

Analog video connections on drones are **becoming a liability**. Beyond offering lower-resolution imagery, they are far more **susceptible to interception**. While digital links encrypt and decode transmissions, analog systems broadcast raw video that anyone within range can capture.

However, analog has one key advantage - its range. Flight distances over **40 km** remain feasible on analog links, which keeps it relevant for longer-range operations.

As a result, the next phase in drone communications will likely center on **introducing encryption to analog video feeds**. The Ukrainian military suggests that Russians have been successfully deploying an encryption approach called "scrambling" that **allows them to encrypt the image of intercepted video**.

Adapt or Fall Behind: U.S. Recalibrates Drone Production After Ukraine's Lessons

In July, Secretary of Defense Pete Hegseth issued a directive called **"Unleashing US Drone Dominance."** It addresses the critical gap between US capabilities and modern battlefield needs by streamlining the design and procurement of small drones.

In congressional testimony, the Defense Innovation Unit claimed that in 2025, **the DoD plans to buy 4000 drones.** As frontline experience shows, **the Ukrainian army can expend 4,000 drones in a matter of one or two days.** The opposing side has comparable capabilities. In July, one of the Russian FPV drone producers announced that they can produce **tens of thousands per month,** and the Chinese industrial base is **capable of producing 500,000** per month.

"Our adversaries have a head start in small UAS, but we will perform a technological leapfrog and establish small UAS domain dominance by the end of 2027," says Hegseth.

The new budget request reflects the shift. Despite the historical focus of the US armed forces on expensive high-precision systems, **the DoD is decreasing procurement and R&D of legacy aircraft,** such as the F-35, F-47, and F/A-XX. Unmanned systems, on the contrary, received a significant boost.

Spendings on Unmanned Systems Versus LegacyAircrafts
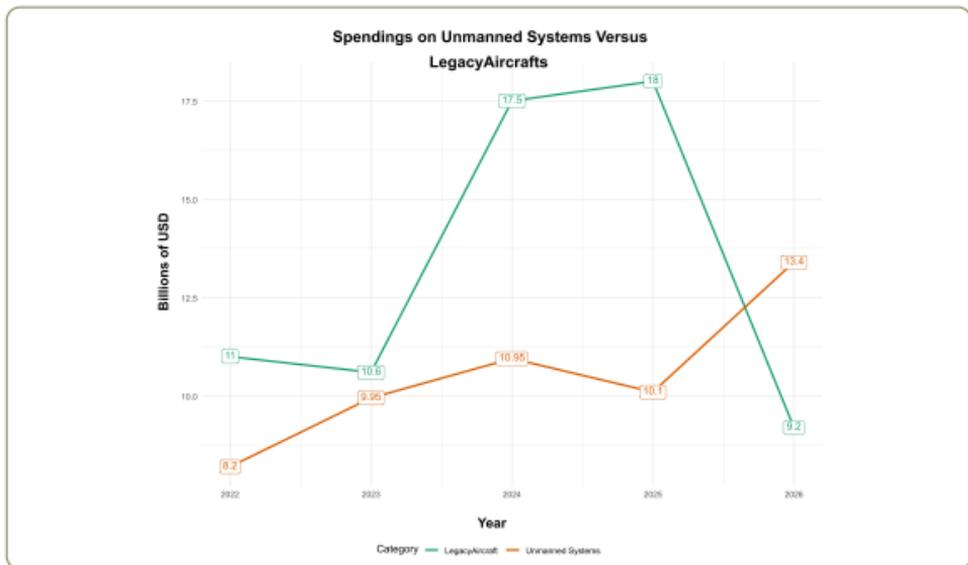
Sources: US Department of Defense, Association for Uncrewed Vehicle Systems International (AUVSI), Defense News

Investment Insight: Helsing's $600M Funding–Grounded in Frontline Reality?

In June 2025, Helsing closed a monumental **€600 million Series D round** led by Daniel Ek's Prima Materia, propelling its valuation to approximately **€12 billion**, among the highest in European defense tech. But **on the Ukrainian battlefield**, Helsing's only deployed system - the HF-1 drone - offers far less than the hype suggests.

HF-1's only real edge lies in last-mile targeting, aided by separate onboard computers for pilot and payload. While operators report ~70% general accuracy and ~50% direct hits, even these figures are not exceptional and are achieved under conditions that few Ukrainian drones would tolerate: extensive workshop modification, a heavy ground setup, and ~15 minutes of prep time per launch.

On the electronic warfare front, HF-1 has performed stably, with no reported control losses due to jamming. This advantage comes with increased risks. Its exposed antenna setup reduces stealth, and the fixed 3-watt video transmitter exposes to **detection risk at a range of 20km**. Its vertical maneuverability is limited, restricting options in cluttered or high-adaptation environments. And while the drone's software is stable, it does not offer capabilities that **justify the system's high price tag**, especially given that the airframe is Ukrainian-built. HF-1 is an expensive, costly to modify, and dangerous system for the operators.

To Helsing's credit, the company is more responsive to operator feedback than many local producers. Yet, some frontline sources suggest this responsiveness is reactive, not proactive.

The HF-1 reportedly costs around **€17,000 per unit, according to field users**. That puts it at a **5–8× premium over Ukrainian strike drones** like "Baton", which have demonstrated comparable or, in some cases, superior performance.

Beyond its inflated cost, according to internal reports from several frontline units, up to **10% of all HF-1 units have been lost mid-air** due to unexplained failures, often with no signs of EW interference or mechanical impact. These losses suggest underlying stability or software faults, casting further doubt on the drone's reliability for high-tempo combat operations.

Given the scale of the investment, follow-on systems like the HX-2 will serve as the critical benchmark for whether Helsing can translate investor confidence into front-line reliability.

HF-1 suicide drone used by Ukrainian Special Operations Forces, built from plywood and equipped with AI-assisted targeting. (Source: Julian Röpcke / X)

Epirus Gets $43M, but Microwave Weapons Still Fall Short of Tactical Battlefield Needs.

On July 17, Epirus secured a $43.5 million contract from the U.S. Army for its next-gen IFPC-HPM systems, **high-power microwave weapons aimed at neutralizing drone swarms**. While Gen-II promises greater range, autonomy, and energy efficiency, the system remains poorly suited for Ukraine's tactical battlefield needs. It requires large external generators for recharge and is **limited to a 2 km effective range**. These constraints make it impractical for deployment in fast-paced, decentralized frontline environments. This challenge echoes Russia's own experience: after nearly a decade of development, its analog microwave system was quietly shelved and sent straight to a museum. Without tactical portability and energy independence, **microwave weapons remain more conceptual than combat-ready**.

Source: Epirus

SOURCES

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