



Drones in Network: The New Russian Mesh Network Strategy to Bypass Ukrainian Electronic Warfare

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The Russian forces are radically changing the tactics of deploying their unmanned aerial vehicles (UAVs), introducing **mesh network** technology to create aerial transmission chains. This innovation allows drones to act as signal repeaters for each other, massively extending the range of manual remote control deep into Ukrainian territory.

Raising the alarm is **Serhii "Flash" Beskrestnov**, a military communications expert and advisor to the Ukrainian Ministry of Defense, who describes a scenario where traditional jamming systems risk losing effectiveness.

How the Russian Transmission Chain Works

The mesh technology enables drones like the well-known **Shahed** (Iranian-made but assembled in Russia) and the more recent **Gerbera** to communicate with each other mid-air via dedicated

radio modems, overcoming the physical limits imposed by the Earth's curvature.

The system architecture is structured on three levels:

- **Long-range ground antennas:** Positioned on heights or pylons in Russian territory, they can transmit a signal up to 220 kilometers away.
- **Relay drones:** To maintain the line of sight with ground antennas and avoid the obstacle of the Earth's curvature, some drones fly at high altitudes (up to 2,200 meters). These UAVs do not strike directly but bounce the signal to attack drones.
- **Attack drones:** They receive commands sent by the relays and descend to strike the target.

"This transmission chain can theoretically be very long," explains Beskrestnov, "however, practice shows that as the number of nodes increases, data speed decreases and latency increases. For this reason, the enemy almost never uses more than 2 or 3 relay drones at a time."

The Expansion of the Danger Zone

Thanks to this satellite-independent system, the operational area where Russia can manually guide drones has expanded significantly, reaching much deeper than in the past:

- **From the north** to Kyiv.
- **From the west** to Poltava.
- **From the south** covering Dnipro, Kryvyi Rih, Odessa, and Mykolaiv.

Attack Tactics and the Failure of Traditional Electronic Warfare (EW)

Beyond the range, the Russians have refined penetration tactics. During the final phase of the attack, the Shahed tend to **fly in close proximity to each other**. This grouping is not random: it serves to generate a much stronger and more concentrated overall radio signal, extremely difficult to disrupt by local jamming systems.

The main problem for Ukrainian defense lies in the very nature of the countermeasure. Most Ukrainian electronic warfare (EW) systems are designed to **suppress satellite navigation**

(GPS/GLONASS).

However, if the drone is manually piloted by a remote operator who navigates using the camera and onboard instrumentation of the vehicle (thanks to the mesh network), the GPS blackout becomes completely ineffective. Behind this infrastructure is a massive industrial and human component: a team from the Russian special economic zone of **Alabuga**, which alone counts about 40 experienced pilots dedicated to these operations.

The Response: Ukrainian Interceptor Drones with Japanese Support

While Ukraine studies electronic countermeasures to break the mesh networks, the defense sector is moving on the kinetic plane. The partnership between the Ukrainian tech industry and international investors is accelerating the production of hardware solutions for short-range air defense.

The Japanese aerospace company **Terra Drone** has announced a massive increase in the production of Ukrainian-designed interceptor drones, the models **Terra A1** and **Terra A2**, locally assembled by the Ukrainian company *Amazing Drones*.

The goal of this synergy is not only to meet the current frontline requirements but also to finance and develop the **next generation of jet-propelled interceptor systems**, weapons that will be crucial to hunt down the new fast variants of Russian UAVs directly in the skies of inland Ukraine.