

Kyiv  
Dialogue

# UKRAINE AIR WAR MONITOR

Analysis for the Defence of Ukrainian  
Cities and Infrastructure

**Data and analysis:**  
Marcus Welsch

March 20, 2025

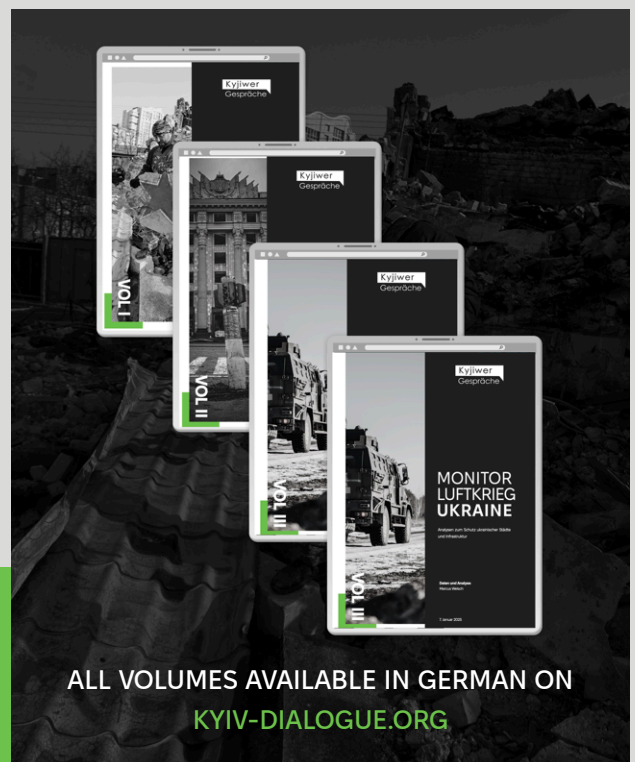
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# EXECUTIVE SUMMARY

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- ▶ Russia is deploying **ever more drones** in the air war against Ukraine to overwhelm the Ukrainian air defences. In February, Russia deployed a record 3,750 drones against Ukrainian cities and infrastructure.
- ▶ The **effectiveness of Ukraine's drone defence has improved again**, rising from 95% in January to 98% in February. 42% of the drones were jammed by electronic warfare (EW).
- ▶ Russia's use of **cruise and ballistic missiles** remains low compared to the previous year.
- ▶ **The suspension of US reconnaissance data rendered key air defence systems, including Patriot batteries, inoperable at times.** Even a one-month interruption in the resupply of interceptor missiles for this essential system would pose considerable problems for Ukraine's missile defence. Early March data suggests an intensification in Russia's air war against Ukraine.
- ▶ **Potential deliveries of North Korean ballistic missiles** are not yet reflected in February's deployment figures. An increased use of these missiles would pose a severe threat to Ukraine's critical infrastructure. The US-supplied Patriot systems offer the best protection against such threats, making any disruption to their availability highly consequential.
- ▶ Russia's use of **glide bombs** surged in early March. However, Ukrainian forces have successfully disrupted the electronic guidance of these weapons at the front lines, significantly reducing their accuracy.
- ▶ **Russia plans to significantly ramp up production of glide bombs, ballistic missiles, and cruise missiles.** According to a study by the Royal United Services Institute (RUSI), maintaining a continuous supply of air defence systems remains crucial for Ukraine.
- ▶ The **European Sky Shield Initiative (ESSI)** aims to improve air defence in Germany and Europe, though reliance on US supplies is expected to continue for the foreseeable future.
- ▶ In response to the threat of Russian ballistic missiles, NATO has launched the **ELSA program** alongside the planned deployment of Tomahawk cruise missiles in 2026. The goal is to develop long-range missiles (over 1,000 km) designed and produced in Europe.



# SITUATION IN FEBRUARY

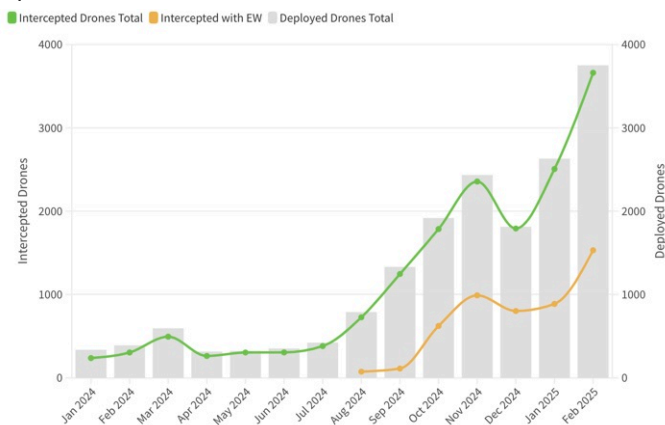
## ANALYSIS AND TRENDS

The analysis of airstrikes on civilian targets in Ukraine in February 2025 confirms a continuation of trends observed in January. Around **3,850 airstrikes** involving various missile types were recorded—the **highest number since Russia’s air war campaign began in autumn 2022**. This increase is entirely due to growth in the use of drones.

### RUSSIA’S INCREASING DRONE WARFARE

Drone airstrikes have surged dramatically since September 2024. While the monthly average in the past two years ranged between 400 and 800, recent months have seen between 1,000 and 2,000 drones targeting Ukrainian cities and infrastructure.

#### Intercepted Russian Drones per month



The trend continued into 2025, with 2,630 drone attacks in January and 3,750 in February—a new record.

These figures include **low-cost decoy drones**, which lack explosive payloads but are

**designed to distract and deplete Ukrainian air defences.** Russia’s strategy remains unchanged: **saturate Ukrainian air defences with drone swarms**, then follow up with ballistic and cruise missiles to strike Ukraine’s energy infrastructure more effectively and disrupt arms production.

However, in **February, Ukraine stabilized its drone interception rates**, achieving an impressive 98% success rate. This includes drones neutralized early by electronic warfare (EW), which accounted for 42% of all intercepted drones.

### SUSTAINED LOW USE OF BALLISTIC AND CRUISE MISSILES

The **use of ballistic and cruise missiles** remained relatively low in February, with just under 110 attacks. This marks a significant decline from the 2024 monthly average of nearly 200 (peak: 295 in November 2024). The deployment of hard-to-intercept ballistic missiles remained unchanged, with Iskander-M and KN-23 missile launches declining steadily over the past six months to around 30 per month. (see [↗ Monitor Vol II](#)).

However, early **March data suggests a slow increase.**

The drop in cruise missile use was even steeper. Although the Russian Kh-101 cruise missiles are easier to intercept, they account for most of the destruction in Ukrainian cities and infrastructure. In 2024, Russia deployed

an average of 130 cruise missiles per month, this fell to 50 in January and 80 in February 2025. The reasons for this decline remain unclear. Possible factors include:

I. **Production issues or supply chain disruptions** for key components.

II. Ukrainian strikes on Russian military infrastructure **limiting Russian air force operations**. (see [↗ Monitor Vol IV](#))

III. **Strategic stockpiling of cruise and ballistic missiles** for future offensives or other regional conflicts.

Notably, **Russia's missile deployment remains far below its estimated capacity**. ([↗ Gressel/Welsch, 12.7.2024](#))

Since the numbers of Iskander-M or the North Korean variant KN-23 have not increased, it is likely the anticipated delivery of North Korean missiles has not arrived in operational numbers yet. Ukraine's intelligence services estimate North Korea to deliver 150 ballistic missiles. ([↗ Suspilne, 23.2.2025](#)) However, quality issues persist: KN-23 missiles have consistently missed targets by over 1.5 km, prompting Russian specialists to assist in their "modernization". ([↗ ISW, 27.2.2025](#))

## THE IMPACT OF THE US RECONNAISSANCE DATA BLOCKADE

Ongoing uncertainty regarding US support makes it difficult to predict Ukraine's access to satellite data and missile resupply, particularly for Patriot systems.

While German IRIS-T systems provide localized protection, **Patriot batteries offer superior defence against ballistic missiles**. Any new suspension of US military aid and

intelligence sharing would significantly weaken Ukraine's air defence.

Even the brief two-week disruption in March created a critical vulnerability. **Without US satellite intelligence, Russian airstrikes were detected only after a delay, leaving Patriot defence systems unused**. ([↗ Mölling/Rácz, 10.3.2025](#))

Unintercepted Russian attacks on energy infrastructure directly impact civilian energy supply, as well as Ukrainian arms production and overall defence capabilities.

## GLIDE BOMBS: HIGH DEPLOYMENT BUT PRECISION ISSUES

Alongside drones, Russia's heavy use of glide bombs remains a major challenge. With a range of up to 90 km, these weapons pose a serious threat especially along the front lines. ([↗ Monitor Vol IV](#))

Early March saw another surge, with **1,200 glide bombs dropped between March 2-9 alone**.



*Patriot weapon system during exercise, photo: Bundeswehr/Lars Koch*



This escalation in the use of glide bombs may be linked to US intelligence disruptions, which prevented Ukraine from targeting Russian air defences with HIMARS and ATACMS strikes, allowing Russian bombers to operate at a lower risk of being shot down and drop bombs closer to the front lines.

(↗ [ISW, 5.3.2025](#))

**Russia plans to significantly ramp up glide bomb production in 2025** as reported by the Royal United Services Institute (RUSI). Maintaining a steady supply of Western air defence systems remains crucial. (↗ [RUSI, February 2025](#))

However, Russia faces technical difficulties. The GLONASS satellite navigation system, essential for readjustment and satellite-guided corrections of glide bombs exhibits variable reliability and is susceptible to jamming maneuvers by the EW. Similar guidance issues were already evident during the Syrian war.

The increasingly used laser-guided targeting, which proved effective in small-scale deployment areas like in Syria, struggles in Ukraine's large-scale battle zones.

**Ukraine's EW capabilities have expanded significantly**, disrupting Russian glide bomb tracking. Russian pilots report declining accuracy, with glide bombs still capable of hitting large targets like factories, but failing increasingly to strike pinpoint positions on the front lines due to large-scale jamming from both sides. (↗ [Forbes, 26.2.2025](#))

Some OSINT analysts suggest that this **precision decline has contributed to Russia's recent loss of ground offensive momentum.**

## UKRAINE MAINTAINS TECHNICAL SUPERIORITY IN PRECISION WEAPONS

Meanwhile, Ukraine continues to lead in precision-guided munitions by employing laser-guided bombs (LGBs), directed by Forward Air Controllers (FACs) and Joint Terminal Attack Controllers (JTACs). Although costly, this method remains highly effective and difficult for Russia to intercept. (↗ [Don's Weekly, 3.3.2025](#))



*A Ukrainian Bukovel-AD System to detect and jam drones, photo: Ukrspetsexport*

For now, Ukraine retains an advantage over Russia in both Inertial Navigation Systems (INS), which allow guided munitions to operate independently of satellites and electronic warfare (EW) jamming, as confirmed by a Forbes analyst. (↗ [Forbes, 26.2.2025](#))

# BACKGROUND

## INTERDEPENDENCE - AIR DEFENCE SYSTEMS IN EUROPE

### THE EUROPEAN SKY SHIELD INITIATIVE (ESSI)

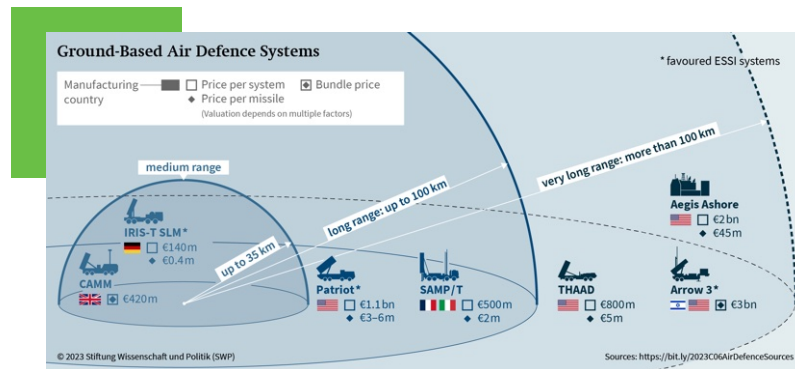
The **European Sky Shield Initiative (ESSI)** aims to close existing gaps in European air defence and reinforce NATO’s overall capabilities by strengthening the European pillar. In addition to optimizing procurement and advancing technical development, the initiative focuses on improving general interoperability—a long-overdue step given the **highly fragmented and complex array of weapon systems in Europe**.

Russia’s military build-up and the deployment of missiles in Kaliningrad are escalating the need for stronger missile defence, particularly against threats with ranges exceeding 1,000 km. ([↗ BMVg](#))

The **Israeli Arrow-3 system**, ordered in 2023, protects against exoatmospheric threats but lacks the capability to intercept low-flying cruise missiles. While its radar system is set to become operational in 2025, full defensive capability against high-altitude offensive weapons will not be achieved until 2030.

Despite Europe’s broad air defence production capacity, it will remain **reliant on US cooperation for the foreseeable future**. For shorter-range defence, the **German IRIS-T system** has proven effective, particularly in protecting critical infrastructure. The system is also being successfully deployed in Ukraine.

Meanwhile, since the 1980s, Germany and six other NATO countries deployed the **US-developed Patriot system**, which remains essential for defending against ballistic missile threats.



Air defence systems in ESSI, infographic: German Institute for International and Security Affairs (SWP), [↗ SWP Comment 2023/C 06](#)

**NATO’s major procurement of Patriot systems** in early 2024 has led to plans for new production lines in Schrobenhausen in Bavaria—the existing German-American joint venture site, which has thus far focused on system maintenance. ([↗ Handelsblatt, 3.1.2024](#)) However, **final delivery decisions remain under US control**, as the license holder.

The US has also developed two complementary systems, **THAAD (Terminal High Altitude Area Defence)** and **Aegis**, which extend coverage beyond Patriot capabilities, offering longer-range interceptor missiles. Currently, **two Aegis systems are stationed in Poland and Romania**, supported by an early warning

system in Turkey and on Aegis-equipped Spanish naval vessels.

## PREEMPTIVE STRIKES AND THE CHALLENGE OF DEFENCE AUTONOMY

The concept of preemptive strikes—disrupting Russian logistics hubs, command centers, or airbases through drones and stand-off weapons—remains central to discussions about enhancing Ukraine’s defence capabilities. ([↗ Monitor Vol III](#))

While British and French cruise missiles such as Storm Shadow and Scalp operate independently of US components, the **German Taurus missile remains reliant on US-made turbofan engines and GPS guidance.**

The question of (in)dependence in deploying missiles and air defence has become even more pressing following the temporary suspension of intelligence-sharing between the US and Ukraine. OSINT analysts are actively discussing ways to enhance the Taurus missile’s autonomy, such as retrofitting it with advanced map synchronization for improved independent navigation and increasing onboard memory. ([↗ Augen geradeaus!, 24.1.2024](#))



Downed Shahed-136, photo: Oleksandr Fedienko

While Europe’s push for greater independence from non-European arms suppliers is growing, technological dependence on the US—especially in air defence—will persist for the foreseeable future. ([↗ FAZ, 12.3.2025](#))

## TWO NATO DECISIONS TO STRENGTHEN DETERRENCE IN EUROPE

Beyond challenges related to navigation systems and supply chains, the **threat of Russian ballistic missiles remains one of Europe’s most pressing security concerns.**

Recognizing that no air defence system can provide complete protection, NATO adopted a two-stage deterrence strategy at its 2024 summer summit:

I. From 2026, land-based **Tomahawk cruise missiles** will be gradually deployed in Germany.

II. Simultaneously, France, Poland, Italy, and Germany will collaborate on developing a new class of missiles with a range exceeding 1,000 km under the **European Long-Range Strike Approach (ELSA)**

Sweden and the UK have also joined this project, contributing technological expertise to missile development. The Netherlands and Norway are expected to become future backers of this strategic technology initiative. ([↗ IISS, November 2024](#))

Europe finds itself in a race against time. Establishing a **credible deterrence— independent of the US—is becoming increasingly urgent.**

# ABOUT THE UKRAINE AIR WAR MONITOR



The **Ukraine Air War Monitor** ...

- ▶ **Reports on the latest developments** in Russia's air war against Ukraine
- ▶ Is built on a **unique database** tracking all airstrikes since autumn 2022.
- ▶ Provides **data-driven recommendations** to enhance short- and medium-term support for Ukraine.
- ▶ Is **designed for policymakers, experts, and journalists.**

The monthly „**UKRAINE AIR WAR MONITOR – ANALYSIS FOR THE DEFENCE OF UKRAINIAN CITIES AND INFRASTRUCTURE**“ provides in-depth analyses of ongoing airstrike campaigns, identifies emerging trends, and enables assessments of Russia's evolving military strategy and capabilities.

The **UKRAINE AIR WAR MONITOR** is tailored for political decision-makers, security and military policy experts, and journalists. Its primary objective is to **provide data-driven recommendations** on how Western partners can enhance Ukraine's air defence against Russian attacks.

The analysis is based on a **comprehensive and unique database** tracking every Russian airstrike on civilian targets in Ukraine since autumn 2022.

The monitor is published by „Kyiv Dialogue“ in collaboration with OSINT and data analyst Marcus Welsch.

More information about the series and access to former volumes (in German) can be found on our website. ([↗ kyiv-dialogue.org](https://kyiv-dialogue.org))

**This is the first English-language edition** of the Monitor, specifically created to provide international audiences with broad access to our analyses.

## Support our work:

The monthly **UKRAINE AIR WAR MONITOR** is a crowdfunded effort and depends on financial contributions. If you would like us to continue our English language version, please consider supporting us [↗ here](#).



# METHOD

The airstrike database is regularly cross-referenced with daily reports from the **Institute for the Study of War (ISW)** in Washington ([↗ ISW](#)).

Launch records originate from the **Ukrainian Air Force** reports ([↗ KPSZSU](#)), and data on regional targets and damage—if available—is supplemented with **civilian and military administration sources**.

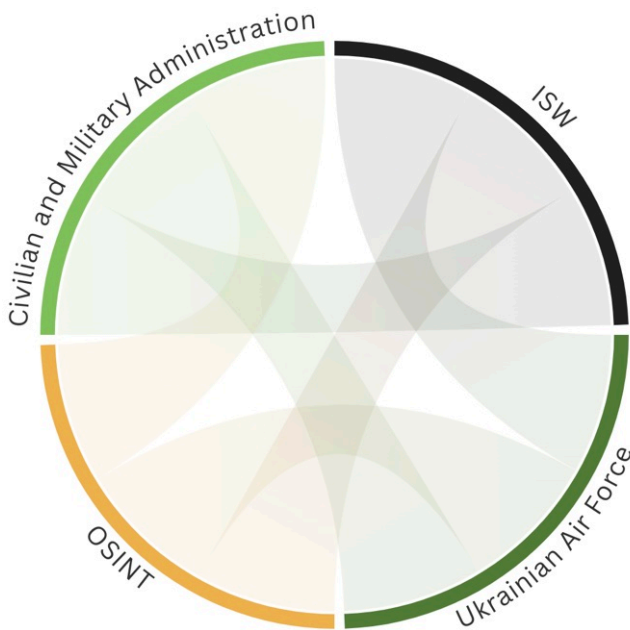
These figures are further verified using additional **OSINT sources** and are considered highly reliable.

**on attack patterns and dynamics** rather than detailed damage assessments.

With over **30 months of data and around 25,000 documented attacks**, robust trends have emerged. Monthly missile counts are approximate values, as irregularities have been noted in Ukraine’s reporting system. Discrepancies with other OSINT sources remain within a 10% margin, often below 3%.

Official weekly and monthly figures from the Ukrainian Presidential Office ([↗ President of Ukraine](#)) generally align closely with the numbers presented here.

**For attacks lacking definitive quantification, the lowest plausible estimates have been used.** Due to possible underreporting in high-intensity phases, actual interception rates may be slightly higher, with an estimated deviation of less than 5%.



Data sources of the database

Accurately quantifying **airstrike damage** during an active war is inherently challenging. Providing overly precise information could aid Russian military planning, which is why certain reporting restrictions apply. ([↗ Expro, 2.1.2025](#)) Consequently, this analysis **focuses**



*Presenting a new type of Ukrainian-produced drone, photo: 12th Special Operations Brigade "Azov" of the National Guard of Ukraine*

# ABOUT US

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## ABOUT THE AUTHOR

Marcus Welsch is a freelance analyst, documentary filmmaker, and publicist.

Since 2014, he has specialized in OSINT journalism and data analysis, focusing on the Russian war against Ukraine, military and foreign policy issues, and the German public discourse.

In cooperation with Kyiv Dialogue, he has conducted research and panel discussions on Western sanctions policy since 2023.

## ABOUT KYIV DIALOGUE

Kyiv Dialogue is an independent civil society platform dedicated to fostering dialogue between Ukraine and Germany.

Founded in 2005 as an international conference format addressing social and political issues, it has moved to support civil society initiatives aimed at strengthening local democracy in Ukraine since 2014.

Since Russia's full-scale invasion in 2022, the focus has shifted to social resilience, cohesion, and security policy—including military support for Ukraine and Western sanctions policy.

Kyiv Dialogue is a program of the European Exchange gGmbH.

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