Institute for Science and International Security

Report

Alabuga Special Economic Zone Post-Attack Analysis and Air Defense Site Identification

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The Attack on Alabuga

On April 23, 2025, six Ukrainian long range unmanned aircraft laden with explosives reportedly targeted the Alabuga Special Economic Zone, the site where JSC Alabuga SEZ currently mass produces Shahed 136 (Geran-2) kamikaze drones and Gerbera decoy drones (see Figure 1).[1] The attack on the plant was not successful, and nearly all of the incoming aircraft were likely shot down outside the site, although two reportedly reached the site before being disoriented by electronic warfare systems. One reportedly crashed on its own, and the other dropped a munition before being shot down by air defenses, but did not cause much visible damage.

This attack, although it involved more aircraft, occurred nearly one year after the last attack on Alabuga by Ukraine and exhibited similar characteristics.[2] The failure of this attack, however, highlights the increasing difficulty in targeting the Alabuga complex. Alabuga is a great distance from Ukraine and is relatively isolated, and equipped with more air defenses, easing the interception of any incoming aircraft or drone.

The Institute has analyzed high-resolution satellite imagery of the site post-attack and has identified a blast crater that caused only minimal damage to the grounds of the Alabuga complex between the former Ford Building and Building 13.2, known as the "sausage," which has offices for Alabuga staff, including those working on the Shahed drones (see Figure 2). The

[1] Stanislav Pohorilov, "Drones attacked a Shahed production plant in Tatarstan," Pravda, April 23, 2025, https://www.pravda.com.ua/news/2025/04/23/7508813/ ; https://t.me/war_monitor/27701 ; https://t.me/mr_Rustem_Nuriev/5438 ; https://t.me/astrapress/79615 ; https://t.me/astrapress/79616 ; https://t.me/news_sirena/38158.

[2] David Albright, Sarah Burkhard, and Spencer Faragasso, "Assessment of the April 2024 Strike on Alabuga Special Economic Zone," *Institute for Science and International Security*, May 2, 2024, https://isis-online.org/isis-reports/detail/assessment-of-the-april-2024-strike-on-alabuga-special-economic-zone/.

visible blast crater is fairly large, about 15 meters across (see Figures 3 and 4). It was likely caused by the dropped munition. No damage to the Shahed 136 production facilities can be seen in available satellite imagery.

Ukrainian sources claim that UJ-22 Airborne drones and Aeroprakt-22 remote controlled aircraft were used in the attack.[3] The UJ-22 has a range of 800 km flying autonomously and can be equipped with up to 20kg of explosives.[4] Footage taken from Alabuga during the attack shows a fixed wing plane similar to the Aeroprakt-22, also used in the April 2024 attack (see Figure 5). This aircraft was likely modified similarly to the Aeroprakt-22 used in the April 2024 attack, enabling it to be remote controlled and carry a large explosive charge inside its airframe. It is unclear where the aircraft or drones were launched from that would enable them to travel the great distance from Ukraine to Yelabuga. The advertised range of the UJ-22 is not enough for it to reach Alabuga from unoccupied Ukrainian territory, a distance of roughly 1200 km. Rather than being launched from within Russia, which would be a dangerous and daring operation, the aircraft and drones were most likely modified with additional fuel supplies to extend their range for the long-distance flight from Ukraine.

Alabuga Anti-Aircraft Site

The Institute has also identified in satellite imagery an anti-aircraft site used to defend Alabuga. The anti-aircraft site is located about one kilometer southwest of Alabuga and is positioned in a direction from where any Ukrainian aircraft would likely approach the site. Although passive defense measures, in the form of steel mesh, had been put in place on top of the drone production buildings of the Alabuga Complex, the Russians have evidently felt the need for additional site security. This is the only anti-aircraft site the Institute has identified so far around the Alabuga Special Economic Zone. It is likely other sites exist to protect the wider area and provide greater defensive zone coverage.

The air defense site is well protected. A key portion of this site is double secured by both an inner rectangular perimeter wall and outer perimeter fence, which together enclose a probable tracked military vehicle set on an elevated platform (see Figure 6). The elevated platform appears to be bermed providing some defensive protection for the vehicle on three sides. An unidentified auxiliary vehicle that had been parked on the east side of this elevated platform may now be located under a covered structure on the west side of the platform. It is unclear what type of vehicle it is, but it appears to be a tracked vehicle similar to a BMP. That vehicle

[3] https://t.me/mash/63350.
[4] "UJ-22 Brochure," Ukrspecexport, April 30, 2025, https://www.ukrspecexport.com/uploads/redactor/3%20USE_UMEX_Airborne_PRINT.pdf.

and its support infrastructure were rapidly installed over a two-to-three-week period in mid-April 2024. However, prior to this site installation, a lattice tower was erected back in September 2023, possibly for communications and/or visual observation of the complex as well as the sky above it for early warning and perhaps target designation and tracking. Following the installation of the military vehicle and its support infrastructure, a second, similar, lattice tower was erected adjacent to the first one in September 2024. The actual purpose of these towers remains unclear at this time, although they could facilitate detection and tracking equipment, electronic warfare systems, or even additional machine guns or a possible launching point for shoulder-launched surface-to-air missiles.

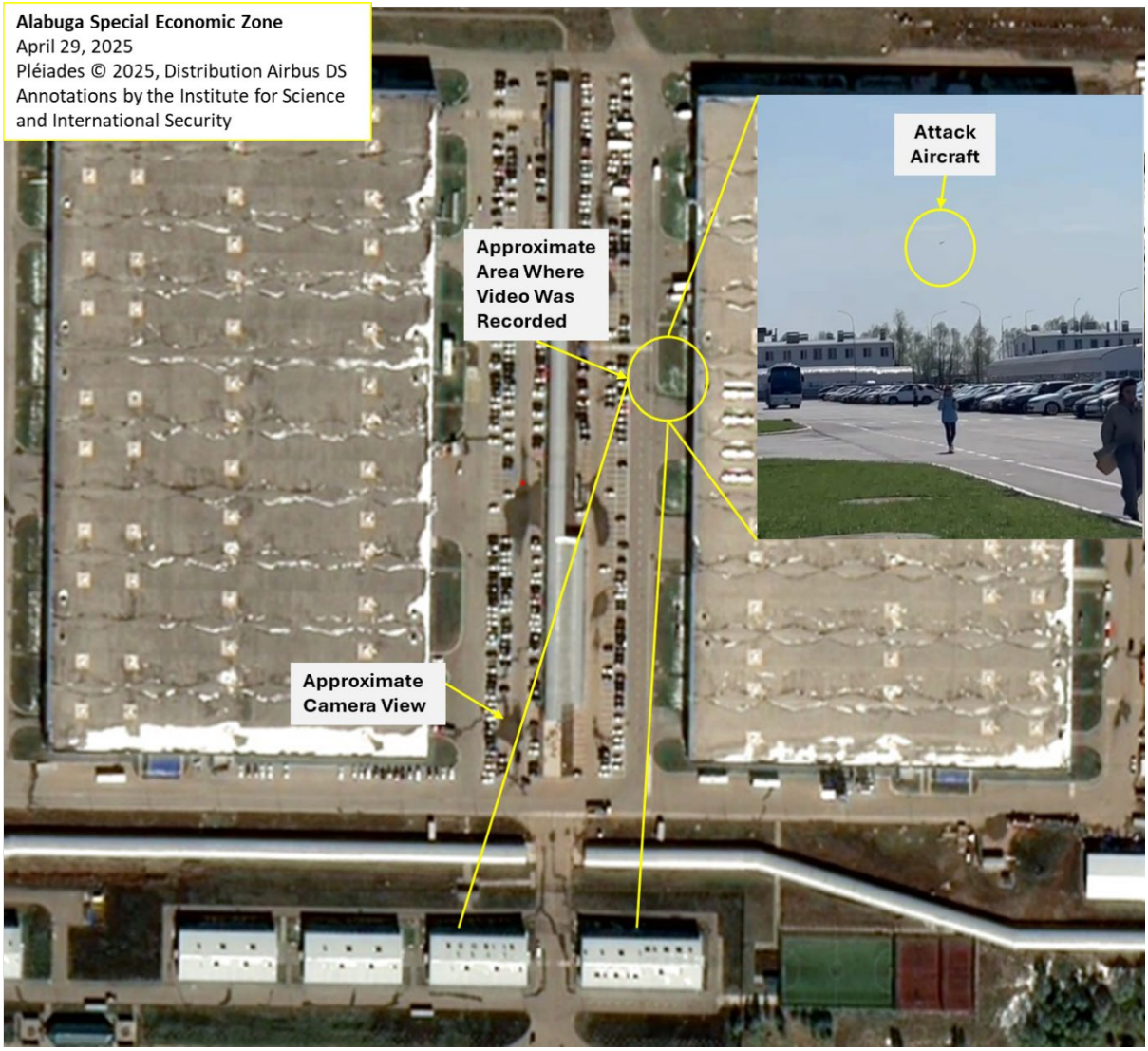

Figure 1. An April 29, 2025, image of Alabuga showing the location from where a video of the April 23 attack was recorded.

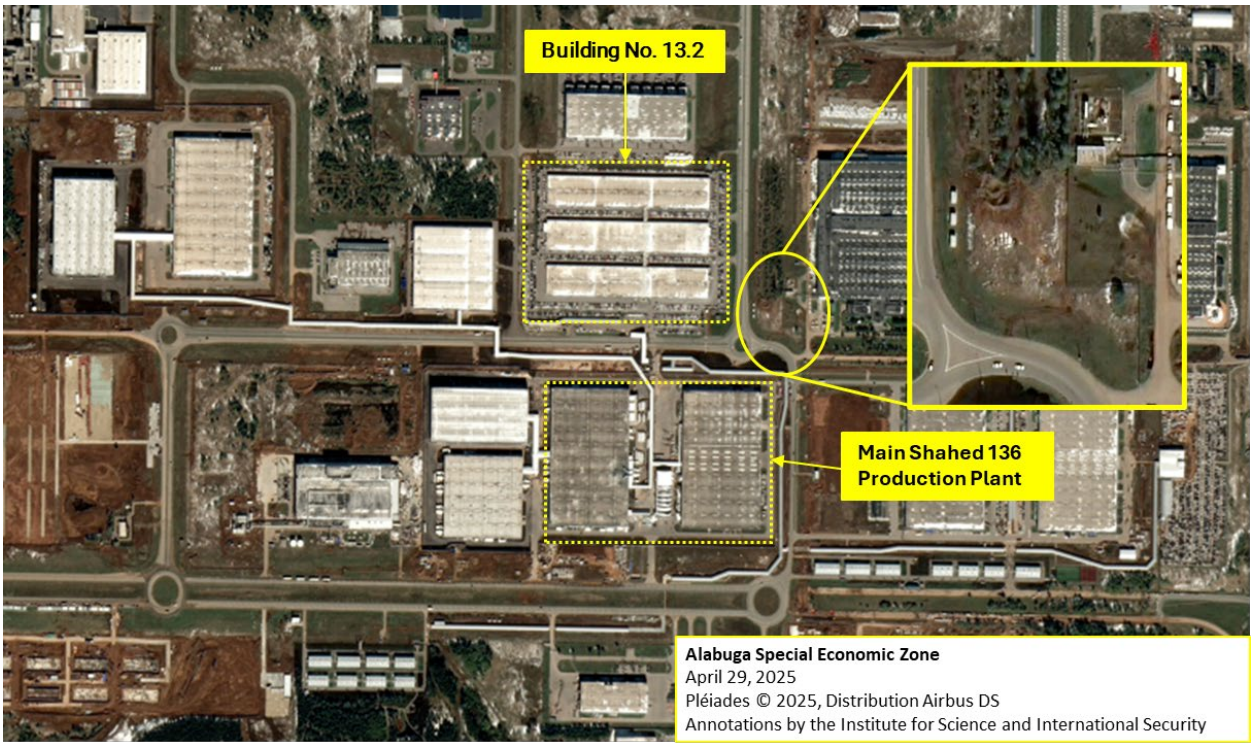

Figure 2. An April 29, 2025, post attack image of Alabuga. A crater can be seen above the primary Shahed 136 production plant.

Figure 3. A close view of the 15-meter-wide blast crater caused during the April 23, 2025, attack. The crater is several meters wide, and the fence nearby appears to be broken.

March 22, 2025 April 29, 2025

Alabuga Special Economic Zone
March 22, 2025, and April 29, 2025
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Annotations by the Institute for Science and International Security

Figure 4. Before and after Airbus Pléiades satellite images of the site where the blast crater appeared.

Figure 5. Above is an image of the UJ-22 Airborne drone. Below is a comparison of video footage showing the aircraft used in the April 2025 and April 2024 attacks on Alabuga.

Figure 6. An April 29, 2025, image of the anti-aircraft site protecting the Alabuga Special Economic Zone. The site is just south of the Alabuga complex.