Fiber Optic Guided Drones: A New Era for Electronic Warfare

Published on 04/05/2025

The use of drones in warfare is now well-established, but a recent innovation is changing the rules of the game. These are fiber optic drones, which, thanks to a fiber optic cable connected to the pilot, are able to evade electronic interference, a common problem for traditional drones. Drones piloted via radio frequencies are vulnerable to electronic attacks, such as jamming, which can block or disrupt their operation. However, fiber optic drones, which use a fiber cable up to 10 km long, are immune to these interferences. This has made this technology particularly interesting and useful on the battlefield, as evidenced by their use by Ukrainian forces during the conflict with Russia.

How Fiber Optic Drones Work

The operating principle of fiber optic drones is simple but effective. Unlike traditional drones, which send and receive radio signals for remote control, fiber optic drones are connected to the pilot via a fiber optic cable that unrolls during flight. This cable, resistant and difficult to

interrupt without causing significant physical damage, allows the pilot to control the drone directly and safely, without worrying about electronic interference. The advantages of this technology are numerous: superior image quality, greater signal stability, and improved shot accuracy, all while reducing the risk of data loss in case the drone is shot down.

Fiber Optic Guided Drones: A New Era for Electronic Warfare - brigatafolgore.net

Fiber optics are not vulnerable to interference waves, a crucial advantage in a war environment where electronic warfare plays a fundamental role. Russian forces, for example, have developed advanced jamming systems to block Ukrainian drones, but fiber optic drones represent an effective solution to counter this threat.

The Strategic Use of Fiber Optic Drones on the Battlefield

Fiber optic drones are rapidly becoming one of the most powerful weapons in modern warfare. Ukrainian forces have begun adopting this technology to strike enemy targets with lethal precision, avoiding interference from Russian jamming devices. The use of these drones has had a significant impact, especially in regions like Kursk and Donetsk, where Russian advances have been hindered by fiber optic drones. The drones, equipped with explosive charges and guided by the fiber cable, are capable of striking deep behind enemy lines, destroying equipment units and creating chaos on supply routes.

Maksym, a Ukrainian soldier who participated in operations in these areas, recounted how fiber optic drones managed to hit his armored vehicles, despite Russian soldiers' efforts to prevent the operation. Thanks to the stable and secure connection provided by the fiber optic cable, the

drones are able to carry out precision attacks, causing irreparable damage without being easily blocked by enemy jamming systems. This has made fiber optic drones a fundamental resource for the conflict, so much so that even Russian forces have begun adopting similar technologies to defend against Ukrainian incursions.

Furthermore, the physical resistance of the fiber optic cable, which is almost impossible to interrupt without causing serious damage, has made this technology very difficult to neutralize. The only way to stop a fiber optic drone is to cut the cable, but doing so requires targeted actions that are difficult to implement on the battlefield.

Fiber Optic Guided Drones: A New Era for Electronic Warfare - brigatafolgore.net

The Innovation of Fiber Optic Drones for Ground Units

Recently, Ukrainian developers have extended this technology to ground drones, which are now equipped with fiber optic control systems, making them immune to electronic interference. During a demonstration event organized by the Dronarium team, ground and aerial drones controlled via fiber optics were presented. These drones are equipped with a fiber optic spool up to 10 km long, allowing stable transmission of telemetry, control data, and video with a bandwidth ranging from 100 to 1000 Mbps. These systems have demonstrated great maneuverability, even on difficult terrain, making the drones even more efficient on the battlefield.

The introduction of fiber optic drones has solved one of the main problems in the use of drones in urban or wooded areas, where traditional radio signals are easily disturbed. Fiber optic

drones, on the other hand, are able to operate stably even in these difficult conditions, maintaining continuous and secure communication. The adoption of this technology also allows multiple drones to operate simultaneously in the same area, freeing up the limited radio frequencies used by traditional drones.

Fiber optic drones are a direct response to the problems caused by electronic interference in modern warfare. With their ability to operate safely and precisely, without the risk of being blocked or damaged by enemy jamming systems, these drones are redefining tactics on the battlefield. Ukrainian forces have demonstrated the effectiveness of this technology, which is destined to grow in importance as electronic warfare continues to evolve. The ability to use drones in a secure mode, even in high-interference contexts, offers a decisive strategic advantage, and the adoption of this technology could mark the beginning of a new era in armed conflicts.

News link: https://www.euronews.com/next/2025/01/27/this-ukrainian-drone-is-safe-from-electronic-warfare-thanks-to-fibre-optic-cables