

NATO counter-drone training hit with GPS spoofing

17 July 2024 Adam Jeffs, Editor, SAE Media Group

As NATO forces conducted training exercises to test the tenets of its counter-drone doctrine GPS spoofing, potentially by Russia, complicated the operation



The Parrot Disco FPV drone, featured in the NATO training exercises (Credit: Brian Craig/Parrot)

Following adoption of the much-delayed counter-drone doctrine by NATO, efforts began to test its tenets through training exercises along the coast of the Black Sea in Constanta, Romania. These

exercises were overshadowed by all too real electronic interference impacting the drones involved in the operation. The Ramstein Legacy drill was held between June 3 – 14, with a one of the goals being to assess and develop NATO's capabilities for countering Class 1 UAS. The drill included units from Romania, Germany, Portugal, Hungary, France, Turkey and Poland, with exercises supported by fighter jets from Britain and Finland. Several commercial C-UAS developers were also included, with Echodyne, CS Group and Rhode & Schwarz all invited to introduce some of their C-UAS equipment.

Cristian Coman, chief scientist at NATO's Communications and Information Agency's (NCIA) Joint Intelligence, Surveillance and Reconnaissance centre, [commented on the threat](#) of Class 1 UAS:

"Class 1 UAS have become one of the most important threats we observe at the moment in military conflicts. Where for many years having air superiority was one of the pillars of the NATO doctrine, we have seen recently that's no longer the case."

Officers from the Italian C-UAS Centre of Excellence played the role of the enemy forces in the training exercise, with LT. Cmdr. Federico Fugazzotto of the Italian Navy noting:

"We are here acting in the role of the red team in this exercise, where we are the threat the trainees need to identify and counteract. We are flying the drones, which are common civilian ones."

Fugazzotto explained that scenarios involved hiding the drones' points of departure and attacking with multiple systems at once, with the goal of testing readiness for UAS attacks and building NATO forces' familiarity with countering the role Class 1 UAS play in modern warfare.

NATO forces experience potential Russian jamming

The drones used in the training exercises experienced unexpected interference however, with NCIA experts claiming that GPS spoofing was used to feed false coordinates to the drones' navigation systems. GPS spoofing aims to confuse the task of navigating drones, potentially crashing or disorienting them.

Mario Behn, Principal Scientist at NCIA, explained:

“When I had the hand-held device from the drone, where you basically have the controller, my hand device would ‘be’ on a foreign location in Crimea, but the drone was still here, which of course is physically impossible, as it is a huge range.”

British and Finnish pilots also reported similar interference surrounding the Romanian Mihail Kogalniceanu Air Base. Lt. Col. Rami Lindström of the Finnish F/A-18 detachment noted that such interference is not unusual in Finland:

“We have a lot of reports in Finland about the same kind of jamming, so we are used to that. But the F-18 is a warhorse and is resistant against that. You can say we know our neighbour and we like to share this knowledge with our allies.”

The statement hints at potential Russian interference in the jamming attempts, although the source of the electronic interference has not yet been confirmed.

Dr Cristian Coman, Principal Scientist, Joint Intelligence, Surveillance and Reconnaissance, at NATO will speak at [Counter UAS Technology USA](#) in December, where he will discuss collaborative efforts to integrate C-UAS into wider air defence networks.

It is much easier to recharge a battery than resupply a missile silo

Another advantage of laser weapons comes from the fact that they do not require traditional munitions, needing only batteries to operate. Laser weapons offer a significant logistical advantage for counter UAS efforts in areas where resupply is a challenge, according to Aaron Westman, Senior Director, MDA Business Development at BlueHalo:

"[Consider a] forward operating base that is being supplied sporadically and being attacked by drones. It is not getting resupplied with ordinance and munitions constantly and might not be able to repel those attacks consistently," he said.

The application of laser weapons could provide an effective and sustainable defence against drones for forward operating bases and other regions where it is difficult to deliver a consistent supply of more traditional munitions such as ballistic missiles or 30-50mm rounds.

Laser weapons offer a level of precision we have not seen before

The precision that directed energy weapons offer is another advantage to consider. For example, the DragonFire weapon system discussed by Ministry of Defence's Darby is said to be [capable of hitting a £1](#) coin from up to a kilometre away, at the speed of light. This not only further enhances the cost benefits of laser weapons, since kills can be confirmed instantly due to non-existent lead times which negates the need to fire extra salvos for redundancy, but also improves the chances of hitting the target that you are aiming at.

According to BlueHalo's Westman, this reduces the risk of collateral damage when utilising energy weapons over kinetic ones:

"It's like a light switch turning on and off, it's not very dramatic. It is a lot less collateral damage to shoot the laser than it is to shoot a bullet or even worse

a missile,” explains Westman. “If the commander has a choice for a target that is flying low, and they can choose between a gun, a missile or a laser inside the line, you will pick a laser every time.”

This is unsurprising, as there is much less risk involved with a focused laser that has missed its target as opposed to a ballistic missile that explodes on impact.

Despite the advantages that laser weapons offer, there are some challenges that still need to be overcome before they are widely adopted as a primary counter UAS solution, such as the limited effectiveness that they display in rainy or foggy conditions.

For reasons such as this, many counter UAS experts, such as Squadron Leader Hugo Morris, SO2 Counter-small Uncrewed Air Systems, Project 6 Lead, British Army HQ, believe that it is “still too early for laser weapons to be meaningful”. The counter UAS community will likely follow the development of the technology closely over the coming years.