

3 reasons why lasers could be the future of drone defence

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The three key advantages offered by directed energy weapons for defence against drones, as revealed at Counter UAS Technology Europe



Dragonfire laser system test firing (Credit: UK Ministry of Defence)

The threat from drones has never been more apparent, as the battlefield of today evolves rapidly towards a reliance on unmanned systems for both reconnaissance and combat. With both Ukraine and Russia deploying large quantities of drones in the ongoing war in eastern Europe and attacks by the Houthis in the Red Sea and Iran in Israel occurring recently, the need for effective Counter UAS strategies and solutions is critical.

With this in mind, SAE Media Group brought together a range of both military and commercial experts at the [Counter UAS Technology Europe](#) conference, to discuss the latest challenges, approaches and solutions taking shape around the world. One such solution that has been gaining attention is the application of directed energy weapons, or lasers, to counter drone threats. Below we summarise some of the key advantages of laser weapons that were discussed during the event.

Lasers are cheap and let you save your missiles for when they are needed

The most obvious advantage that laser weapons offer for countering drones is the massively improved cost-to-kill that directed energy weapons offer over more traditional kinetic solutions. We have already seen that the [cost of utilising missiles](#) to intercept drones is not sustainable, with missiles costing £1 million being used to take down £16,000 drones over the Red Sea.

With laser weapons such as the UK's DragonFire costing as little as [£10 per shot](#), such weapons could be the answer to this battle of economics. At the event Lieutenant Commander Kieran Lewis, Above Water Battlespace, IAMD Effects Capability Sponsor, at the Royal Navy spoke on the twofold nature of the cost advantages of laser weapons.

"[When using lasers to counter drones] I'm also virtually increasing the depth of my silo, because for every UAV I shoot down with a laser, that's a missile I've not used in the silo," Lewis said. "So instead of it being a 40-missile silo, maybe in reality when you start doing the analysis, it is an 80 or 120 missile silo, because we have built in those layers."

It is for these reasons that, according to Group Captain Gary Darby, Head UK Joint C-UAS Office, Ministry of Defence, the UK has accelerated the DragonFire program by five years, meaning that we will see the system in use on Royal Navy ships by 2027.

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.