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**ARE LASER WEAPON  
SYSTEMS THE SOLUTION TO  
DRONE DOMINATED  
CONFLICTS?**

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## Introduction

Currently, there is no effective international legal consensus which defines the use of drones as weapons, despite a steep rise in their use by states, both in the proportion of modern air forces and volume of military operations. This trend is especially concerning due to their employment by non-state actors in hybrid warfare, as it has been reported it happened in the Red Sea. Until an effective legal consensus is agreed upon by states, developing a physical solution to drone attacks seems to be the United Kingdom's objective. The UK's new laser-based weapons system, DragonFire, provides a window into how states are preparing for a future of drone-dominated conflicts.

## Drone Use Internationally

The increase in the operation of drones is recorded globally, by states with conventional military capabilities, non-state actors, and militias. The US is leading the way on drone technology in armed conflict and is the main operator of drone attacks. An investigation was carried out on the use of drone strikes in Yemen, Pakistan, Somalia, and Afghanistan (Holderet al., 2018). Between 2004 and 2018, the US conducted 4788 drone strikes, killing between 7497 and 10,858 individuals, of whom an estimated 10% were civilians (Holderet al., 2018). Moreover, between 2005 and 2014, drones increased from 5% to 40% of all US military aircraft (Holderet al., 2018). This represents a significant change in the structure of the US military, as well as a significant rise in its operations.

This year, drone strikes are playing a significant role in the Red Sea conflict, showing their relevance in the modern battlefield. The Houthis in Yemen are an Iranian backed group, which have recently made multiple attacks on foreign container ships in the Red Sea (BBC, 2024). The Houthis have launched 27 attacks, threatening civilian mariners, international trade, and the freedom of navigation, according to US President Biden (Biden, 2024). Drones constitute a large portion of the weapons employed by the Houthis to attack commercial and military ships (The Guardian, 2023). The United States launched attacks into Yemen following a Houthi drone attack, which killed three US soldiers in Jordan (Bynum, 2024). Among these attacks, the US targeted a Houthi drone site, destroying a ground control station, as well as ten drones being prepared for launch (Jackson, 2024). This is an excellent example of a modern conflict dominated by drone attacks among other low-cost high-performance aerial weapons. For this reason, the use of drones in military operations is likely to increase in volume and precision.

## Drone Warfare in the International Legal System

The use of drones has become a significant dimension of modern warfare, both for states and non-state actors. This could represent a dangerous development, since non-state actors do not have the same legal restrictions on their actions as states. If there were an established international consensus on the use of drones, it would be far more challenging for non-state actors or rogue states to not comply with the existing framework. As it happens, the US and other Western democracies have undermined the establishment of a shared consensus governed by international law. As a result, the employment of drones in armed conflicts has increased, causing a "destabilising effect" (Holderet al., 2018).

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It is necessary to explore the current legal status of drone strikes in international law and how legitimate these strikes are. It has to be acknowledged that under the United Nations Charter, the use of force against another state is already prohibited. In fact, Article 2 (4) forbids states from the threat or use of force against the territorial integrity or political independence of another state (UN Charter, 1945). According to Article 1 of the Charter, a state must seek “settlements” to international “disputes or situations which might lead to a breach of peace”(UN Charter, 1945) through the United Nations. In the context of conducting targeted drone strikes, a state would have to raise a dispute to the United Nations Security Council and receive the necessary international approval. Although this is the legitimate method of conducting drone strikes in accordance with international law, this process has been circumvented frequently.

There are three main international legal perspectives on the use of drones in the “theatre of conflict” (Emmerson, 2014). The first theory maintains that outside of an international armed conflict, international human rights law must be applied (Emmerson, 2014). Under this framework, it is unlawful to engage in targeted killings and it is paramount to protect the right to life, except in the case of self-defence (Covenant on Civil and Political Rights, 1976). Following this system, states should first apprehend targets using lethal force only when the arrest is unsuccessful (Emmerson, 2014).

The second legal perspective is promoted by international lawyers in the United States and John Brennan, head of CIA under President Obama. However, it is heavily disputed by most states and lawyers outside the US (Emmerson, 2014). Its legal standpoint is that Western states were engaged in a global conflict against a stateless enemy during the war on terror. Due to the nature of this conflict, the employment of drone attacks in targeted killings was necessary and, therefore, justified under international law. This type of drone strike is conducted unilaterally without international support or supervision, resembling the US’ drone strikes in Pakistan during the War on Terror (Lushenko & Kreps, 2022). Because the United States has often conducted drone strikes unilaterally, there is no existing consensus on their proper international use (Emmerson, 2014).

The third legal perspective questions whether a terrorist organisation is engaging in an internal conflict with a particular government, such as those in Pakistan, Yemen, or Somalia (Emmerson, 2014). When investigating this dimension, it is easier to decide at what point it is lawful for a third party to engage in this internal conflict. A state may request assistance from other nations, which has an established precedent under international law. It is only when there is no consent or request for assistance from a state that the intervention of a third party should be considered a violation of sovereignty (Emmerson, 2014). This could be the most effective legal perspective to use among states in the future, as it condemns unilateral use of drone weapons and targeted international killings. By adopting this third perspective, and enshrining it in international law, drone weapons would only be legal when operations have multilateral support and international oversight. Without such laws, it is challenging to condemn and prevent individual states or militias from using these weapons in armed conflict.

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## DragonFire

As discussed previously, the volume of drone attacks has increased exponentially in armed conflicts. Yet, there is no effective legal basis on which states can rely that controls the way these weapons are being used in conflicts. As a result, states have to defend themselves from drone attacks. DragonFire is an example of the UK finding a solution to the threat of drones.

The United Kingdom has been testing a new laser directed-energy weapon called DragonFire (GOV.UK, 2024). DragonFire LDEW is the first high-powered laser used against aerial targets (GOV.UK, 2024). LDEW weapons direct an intense energy attack in the form of a light beam against targets. This weapon is highly accurate, capable of hitting a £1 coin from a distance of 1 kilometre (GOV.UK, 2024). As it fires at the speed of light, the focused energy beam cuts through the target, resulting in structural failure in the target (GOV.UK, 2024). Moreover, the employment of DragonFire is exceptionally cost-effective. Firing the DragonFire for ten seconds is the cost equivalent of running a regular heater for an hour (GOV.UK, 2024). Therefore, operating the weapon typically costs less than £10 per shot (GOV.UK, 2024). UK Defence Secretary, Grant Schapp, stated that LDEWs such as DragonFire have the potential to revolutionise the battlefield by reducing the reliance on expensive ammunition while improving accuracy (GOV.UK, 2024). Increased precision can reduce the risk of collateral damage by taking out a target while avoiding the target's warhead. As a result of DragonFire's success in testing, the UK Ministry of Defence intends to transition this technology from research to the battlefield (GOV.UK, 2024).

What is particularly notable from this report outlining the success in testing of DragonFire is that LDEWs are considered increasingly important for future conflicts. The Chief Executive of the Defence Science and Technology Laboratory (DSTL), Dr. Paul Hollinshead, affirmed that "this expertise will be critical to helping the armed forces to prepare for the future" (GOV.UK, 2024). Dr. Nick Joad, Director of Defence Science and Technology at the Ministry of Defence, claimed that DragonFire provides a "step change in our ability to deal with high-performance and low-cost threats" (GOV.UK, 2024). This statement provides excellent clarity on why DragonFire's cost effectiveness can revolutionise the battlespace as Grant Schapp stated (GOV.UK, 2024). Effectiveness in a modern battlefield depends on a state's ability to deal with high-performance and low-cost threats, such as drone threats among other aerial targets. Director of Strategic Programs for the Ministry of Defence, Shimon Fhima, claimed that this technology would be essential "in a world of evolving threats" (GOV.UK, 2024). The use of low-cost and high-performance aerial targets, such as drones, is one of the most rapidly evolving threats on modern battlefields. Having a weapon as DragonFire may become essential from a cost-effective perspective. Grant Schapp illustrated current ammunition as being extremely expensive (GOV.UK, 2024), not to mention the practical issues in transporting and storing. DragonFire weapons are significantly cheaper and more convenient to operate, making them low-cost while delivering a high level of performance. In this regard, they have a great advantage when facing similar low-cost high-performance weapons, as Dr. Nick Load stated (GOV.UK, 2024).

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## Conclusions

Tensions in the Red Sea have been escalating for the use of drone weapons by both state and non-state actors. This is due to the ease of employment of these weapons, their low cost, and the absence of a legal consensus on their use (Emmerson, 2014; GOV.UK, 2024). As these technologies are relatively new and their use in armed conflicts is still being explored, forming a legal consensus on them has been difficult. As a result, it was necessary to develop a solution to counter them, such as the DragonFire. In the future, it will be informative to observe whether developing cost-effective defence systems, such as DragonFire, will mitigate the threat of drones in the theatre of conflict. Although technological developments may improve a state's defences against drone attacks, an effective solution must be found through international law. By addressing the ineffective legal basis on the implementation of drones in modern warfare, their use in conflict can be monitored and regulated.

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