

## ● AIR POWER

Unmanned systems ethics

# The 'drone' debate

# THE ETHICS OF ARMED UNMANNED AIRCRAFT

**The RAEs Air Power Group committee considers the moral and legal issues of weapon-carrying unmanned air vehicles.**

**T**he term used for an unmanned aircraft says something about the user. In the public domain, the word 'drone' is now common. It fits neatly in a headline and is readily recognised by most people.

Whether it is correctly understood by most people is another matter. The majority of unmanned air vehicles (UAV) are unarmed and only have a reconnaissance role<sup>1</sup>. However, to place 'drone' in a headline or on a protest placard is to imply a weapon-carrying aircraft and also often to imply that those weapons are used indiscriminately. Indeed, many protestors discard implication and employ terms such as 'killer drone' or 'robot killing machine' so making their point and their opinions entirely clear. Whether their opinions are well founded is another matter.

It is entirely reasonable (indeed essential) that in a free society there should be open debate on major issues such as the aims and actions of the military. However, that debate must be properly informed if it is to be productive, yet this essential quality is often lacking when the employment of armed UAVs comes under scrutiny so leading to erroneous beliefs and unjustified criticism.

This paper is intended to clarify the nature and means of employment of these aircraft and to examine the legal and ethical matters arising. Judging by the continuing controversy, clarification of the technological, moral and legal issues is definitely required

### Autonomy? — Who is in Control?

One very important point must be emphasised from the start. Some protestors appear to believe that armed UAVs are autonomous, that is, that they operate without human control or even oversight in target selection and weapon release<sup>3</sup>. This is categorically and unequivocally not the case. (See the section 'Autonomous or Automated?' for definitions of these control categories). A typical armed UAV is the General Atomics MQ-9 Reaper which is extensively used in Afghanistan by the RAF and the USAF<sup>4</sup>. Every Reaper is under the control of a pilot throughout its entire sortie. The flight path is planned and controlled by the pilot. The sensors (telephoto visible spectrum and IR cameras) are directed by the pilot and the resulting images develop the pilot's knowledge of the area of operation. (Known as 'situational awareness' in the military, Reaper's long endurance is invaluable for gaining and maintaining this essential understanding). A weapon is only released when the pilot has identified a legitimate target and (this is a mandatory requirement) determined that all relevant rules justifying the use of lethal force have been met. Primarily, these necessitate the avoidance of collateral damage (CD)<sup>5</sup>. In short, an armed UAV such as Reaper is under the same type and degree of human control as a manned aircraft such as the RAF's Tornado GR4 or indeed any other weapon system used by the British armed forces.

**MQ-9B Reaper:**

Speed:

**194mph**

Endurance:

**14hours**

USAF

### The Armed UAV as an element of 'The Twenty First Century Character of Air Power'

In one of his last public speeches, the recently retired Chief of the Air Staff, Air Chief Marshal Sir Stephen Dalton presented the Sir Sydney Camm Lecture at the headquarters of the RAeS. ACM Dalton dealt with the issue of armed UAV as follows. "The use of the term 'drones' to describe these systems by commentators and the media merely fuels a narrative of autonomous robots seeking out and destroying targets without human intervention. Of course, nothing could be further from the truth."<sup>2</sup>



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It was to emphasise this fact of continuous human control that the British military adopted the descriptive (though rather lengthy) term 'remotely piloted air system' (pronounced R-PAS) in place of UAV<sup>6</sup>. A truly autonomous armed UAV that made its own independent target selection and weapon release decisions would represent a significant change in military technology and one definitely requiring profound review of the associated issue of control. This would demand very careful assessment of many factors including system reliability, UAV roles and missions, the legality of autonomous systems and the assignment of responsibility (the programmer or the mission planner or both?) before its use could be accepted. These issues of autonomy are outside the remit of this paper<sup>7</sup>.

### Controversy

It appears that some 'drone' opponents oppose all western military intervention viewing it as, at best, interference in another nation's affairs or, perhaps, a form of neo colonialism<sup>9</sup>. If so, the particular focus on armed UAVs as opposed to manned aircraft or ground forces (both of which are used in Afghanistan) is puzzling. Intervention by manned combat aircraft alone (e.g. as in Operation Ellamy, Libya 2012) should, by the logic of the argument, be equally deplored yet 'drones' continue to attract particular criticism. Then there are those who regard armed UAVs as being an unacceptable technology that is somehow different from other military systems including manned combat aircraft. This argument is not well explained but is possibly based on the pilot's remoteness from the target (see below) or on the mistaken belief that the UAV is autonomous.

Use of armed UAVs outside a war zone has attracted considerable attention, for example the CIA's use of Reapers in Pakistan airspace to target Taliban leaders<sup>10</sup>. It should be emphasised that UK Reaper operations are confined to Afghanistan in support of the UN-sanctioned, NATO-led International Security Assistance Force (ISAF) operations, (See *Aerospace International* April 2013

for a comprehensive review of the extent and nature of UAV use around the world<sup>11</sup>).

The use of 'drones' has been characterised as the West seeking to minimise its own casualties while displaying an indifference to killing its adversaries and even innocent bystanders. A study of NATO actions in Afghanistan can refute this view. As well as manned aircraft and UAV, NATO has deployed extensive numbers of ground troops with many being killed or injured. Innocent people have certainly suffered through errors by NATO air (and ground) elements but those are the unfortunate and rare exceptions. In fact, the great majority of armed aircraft sorties (manned and unmanned) do not involve the release of weapons. If the West's aim was the indiscriminate use of air power, it has definitely failed. In fact, a recent UN report made the following statement: "...civilian deaths and injuries from UAV strikes accounted for less than one percent of all civilian casualties...".<sup>12</sup>

Does 'risk-free warfare' make warfare more attractive? The argument is that the possibility of our personnel being killed or captured deters politicians from taking the military option. Thus, if those risks are absent, force will be used far more readily. It is possible that some politicians might make such a decision; however, (in a democracy) they will still be ultimately responsible for the results and that is a powerful balancing factor and hence a restraint. The high profile of the subject in the media shows that armed UAV use is far from a covert activity. For example, in the UK, Parliamentary Questions and Freedom of Information requests result in the open publication of Reaper operational data. It is worth emphasising that these data prove that Reaper is primarily a reconnaissance platform with weapon release being the exception.

### Capability

Fast jet (FJ) aircraft crew will be in the cockpit for several hours without rest while a Reaper pilot can be replaced during a protracted sortie so minimising fatigue and ensuring high levels of attention and alertness throughout. Thus, despite

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EVERY REAPER  
IS UNDER THE  
CONTROL  
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### Autonomous or automated?



There is an air-to-surface weapon in the RAF's inventory that might be regarded as autonomous by some commentators. The Brimstone anti-armour missile is a 'fire-and-forget' weapon which uses a millimetric wave (mmW) radar to detect potential targets and then applies sophisticated processing to distinguish its target set (tanks, self propelled guns and armoured personnel carriers) from other similar sized yet innocent objects (e.g. a civilian bus). After launch, each missile operates without human intervention. Within its pre-determined search area, the missile alone decides on whether a detected entity is a legitimate target. Is Brimstone autonomous or automated?

The UK MoD's Development, Concepts and Doctrine Centre (DCDC) defines automated and autonomous as follows<sup>8</sup>: "...an automated or automatic system is one that, in response to inputs from one or more sensors, is programmed to logically follow a pre-defined set of rules in order to provide an outcome. Knowing the set of rules under which it is operating means that its output is predictable."

"It (an autonomous system) is capable of understanding higher level intent and direction. From this understanding and its perception of its environment, such a system is able to take appropriate action to bring about a desired state. It is capable of deciding a course of action from a number of alternatives, without depending on human oversight and control, although these may still be present. Although the overall actions of an autonomous aircraft will be predictable, individual actions may not be."

On those definitions, it is clear that Brimstone is an automated system and is not autonomous. Target search and attack is limited to within pre-launch defined geographical boundaries that are subject to pre-attack assessment. Indeed, its use is subject to such restrictions that it has limited utility and so has been superseded by a version (Dual Mode Seeker Brimstone) which is under human control throughout its flight. Neither the automatic nor autonomous category applies to armed UAV types such as Reaper where human control is continuous.

the much longer sortie, the UAV pilot will be equally able as the FJ crew to make good decisions. It does not follow from this that FJ aircraft are less capable than armed UAVs. The two types have complementary attributes making their combined value greater than the sum of the parts. FJs are (currently) far faster than UAVs so enabling rapid response to emergencies such as ground troops requiring close air support (CAS). Though relatively slow, UAVs offer greater persistence; for example, Reaper cruises at only 194mph (313km/h) but has a 14-hour endurance. This enables the extensive development of situational awareness and allows for tactical patience. An opportunity to release a weapon can be awaited over a long period until the avoidance of collateral damage is ensured. It

UAVs and manned aircraft offer complementary capabilities

should be noted that there have been many cases with manned and unmanned aircraft where weapon release against a legitimate target has been ruled out owing to concerns that CD might result.

### 'It's not fair'

The West is criticised by some for using sophisticated aircraft to attack adversaries who have only low-technology weapons such as assault rifles. War is not a sport and there is no requirement for those involved to be at equal risk, let alone to expect one protagonist deliberately to increase the risk they face on the basis of some spurious notion of fairness. Technology level is not related to legitimacy, it is the use of the technology that matters. Assault rifles have been sufficient to enable terrible crimes such as the ethnic cleansing in the Balkans during the 1990s. Using high technology to counter a war crime, as in NATO's Balkan campaigns, is surely a laudable aim and therefore a justifiable action. In contrast, a readiness to kill indiscriminately by any means at any distance is immoral and unlawful. This is not the case with the West's use of armed UAVs, as they have been directed against armed enemies. Mistakes have been made, resulting in the death and injury of innocent people, but mistakes can be made with any weapon system and such results are equally to be regretted irrespective of the weapon type. Careless or deliberate misuse of force is, of course, deplorable whatever the sophistication of the weapon.

Obviously, no protagonist likes facing a technology that they cannot counter, but being an 'underdog' does not confer legitimacy on your cause. Aims and actions are more important than the equipment employed. If outmatched by an adversary it is tempting to claim that the advantage





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Earlier in 2013, the RAF awarded the first RPAS pilot's wings — a recognition of a specialised unmanned aircraft branch.

is somehow immoral<sup>13</sup>. This argument has been used by the Taliban with respect to FJ and attack helicopters where they claim that it is cowardly to fight at a distance rather than confronting your adversary face to face. The claim is highly suspect when one considers that NATO ground troops directly engage Taliban insurgents and that the latter use remote methods themselves. These include rockets fired into NATO bases from several miles distance and improvised explosive devices (IED) which can be triggered by innocent people.

Perhaps the fact that the UAV operator is not at risk is the protestors' main objection. If our personnel face low or zero risk, does this call into question the legitimacy of our actions? This argument is definitely not valid. The operator of a CCTV camera faces no risk from the criminal who is being monitored yet no one would suggest that this invalidates a subsequent arrest and conviction. A sniper faces no immediate risk from his target (though he will often face considerable risk entering and leaving enemy territory) yet his shooting of a distant, and probably unsuspecting, enemy combatant is lawful<sup>14</sup>. In this respect, the use of an air-launched weapon against a valid target is entirely equivalent. The use of tactics and technology to reduce your own risk is entirely sensible. Remotely controlled systems are used for bomb disposal and no reasonable person would regard that as indicating a lack of commitment or courage<sup>15</sup>.

### Remoteness

The operator of a UAV (armed or otherwise) may be many miles from the aircraft's location. Indeed, a pilot may be in another continent in another hemisphere. For example, Reapers are flown over Afghanistan by crews based in the continental US.

The fact that the pilot is not in the UAV has prompted some critics to claim that this physical separation will lead to emotional remoteness of the operator, a detachment from the consequences of their actions. This point merits careful consideration but it must be emphasised that many forms of military activity involve a degree of detachment. The crew of a fast jet attack aircraft will generally be several miles away from the target and will have a similar view to that of the UAV operator as they will use an ISR system, zooming in on the scene and studying it on a monitor. The clarity and resolution of the images will be very similar, indeed practically identical, for both crew types. The aforementioned sniper may be over one mile from the target; at what point does physical separation result in moral disengagement? Essentially, the claim is that geographical distance from the scene results in emotional detachment from the results, i.e. the so-called 'Play Station mentality'. However, it does not follow that minimising one's own risk increases a readiness to cause casualties. The UAV pilot is subject to legal control and remains responsible for his (or her) actions. Those actions, and the events leading to them, are recorded (weapon system video: WSV) and the records are available for detailed review and, if necessary, investigation. This fact alone (which also applies to manned aircraft such as Tornado GR4) is a powerful reminder of the pilot's responsibility to use force judiciously. It is also a notable point, that as UAV pilots are not in danger, this reduces the stress they face, so facilitating sound decision-making in complex environments.

### The Rules

Some of the criticism that armed UAVs attract is puzzling to the military perspective. A pacifist will reject any form of force and will hold the consistent view that weapons released from manned and unmanned aircraft (or any weapon use) are exactly equivalent and thus equally objectionable. Pacifism is a reasonable viewpoint, though it is not supported in international law which recognises that force can



THE OPERATOR OF A CCTV CAMERA FACES NO RISK FROM THE CRIMINAL YET NO ONE WOULD SUGGEST THIS INVALIDATES A SUBSEQUENT ARREST

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Next-generation armed stealth UCAVs such as the Dassault nEUROn will still have a 'human-in-the loop'.



Dassault

be legitimately used in certain precisely defined circumstances and under careful control. Any force that fails to meet the strict criteria, even a single pistol bullet, will be deemed unlawful, with the perpetrator held legally accountable. It does not follow that greater force such as a 500lb bomb is less lawful than a lesser weapon. To be legitimate, its use must meet the same criteria, though its greater potential for destruction makes meeting those criteria more demanding. The magnitude of the results may differ but the actions are morally equivalent and subject to the same restrictions. The killing of an adversary combatant is a serious matter and must be conducted in accordance with the law of armed conflict (LOAC) and the rules of engagement (ROE) if it is to be held as lawful. Even injuring an innocent person, i.e. a form of collateral damage (CD), is a serious matter whatever weapon is used.

### Conclusions

Armed UAVs are not autonomous (nor even automatic) weapon systems. They are under human control throughout their sorties, including the most important issues of target selection and weapon release. The operators are subject to military and international law to ensure that the use of force is justifiable. If the legal requirements for a just war (i.e. the lawful use of lethal force) are met then the use of any weapon is acceptable, providing it does not conflict with the principles and laws governing armed conflict (e.g. necessity, humanity, distinction and proportionality). It can, therefore, be concluded that the use of armed UAVs is not inherently unjustifiable and certainly not illegal if, as is the case for any weapon, that use accords with the law. The remoteness of the UAV pilot is not inherently different from that of a FJ or attack helicopter pilot or even an army sniper. It does not follow that this

Reaper spends the vast majority of the time in the ISR role with weapon release being the rare exception.



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## The Law of Armed Conflict

The Law of Armed Conflict (LOAC)<sup>16</sup> defines legitimate military actions in war. Its main aim is to minimise the suffering arising from armed conflict rather than to impede military efficiency. There are four fundamental principles: military necessity, humanity, distinction and proportionality.

**Necessity** Military necessity permits only that degree and kind of force, not otherwise prohibited by law, which is required to achieve a legitimate purpose.

**Humanity** Humanity forbids the infliction of suffering, injury or destruction not actually necessary for the accomplishment of legitimate military purposes. The principle confirms the basic immunity of civilian populations and civilian objects from attack because they make no contribution to military action.

**Distinction** Military operations are to be conducted only against the enemy's armed forces and military objectives so there must be a clear distinction between the armed forces and civilians, or between combatants and non-combatants, and between objects that might legitimately be attacked and those protected from attack.

**Proportionality** The principle of proportionality requires that the losses resulting from a military action should not be excessive in relation to the expected military advantage.

remoteness results in an emotional and moral detachment from events. Indeed, the nature of UAV operations achieves excellent situational awareness and permits particularly measured decision making. The lack of risk to the UAV pilot is irrelevant to the legitimacy of the action or the campaign of which it is a part.

The opposition to aircraft such as Reaper may be based on a sound moral argument, such as an objection to the use of force in any circumstance. Or it may be based on disapproval of a particular campaign. Or it may be based on a general disapproval of any action taken by the West. Whatever the grounds of the objection, if the use of force can be justified in an operation, then the appropriate use of armed UAV is justifiable as well. In short, 'drones' are no different from any other type of weapon in legal or moral terms.

## REFERENCES

1. For example, the British Army uses UAVs ranging from the 16gram Black Hornet to the 450kg Hermes 450. They are all unarmed and used for reconnaissance purposes ranging from an infantry section 'looking around the corner' through to long range area surveillance.
2. See the August 2013 edition of *AEROSPACE* for the text of ACM Dalton's lecture 'The 21st Century Character of Air Power'.
3. For a review of incorporating high level cognitive skills into autonomous systems see Nicholson, A. N. Air Cdre. 'The autonomous air system: far beyond the foreseeable future'. *Aerospace International*, October 2012.
4. The MQ-9 Reaper can carry the 500lb (250kg) class GBU-12 laser guided bomb (LGB) and the AGM-114 Hellfire laser-guided missile. It is also fitted with a sensor suite and spends the great majority of its time in the intelligence, surveillance and intelligence (ISR) role with actual weapon release being the rare exception. For further details see [http://en.wikipedia.org/wiki/MQ-9\\_Reaper](http://en.wikipedia.org/wiki/MQ-9_Reaper)
5. The word 'collateral' comes from medieval Latin collateralis, from col-, "together with" + lateralis (from latus, later-, 'side') and is mainly used as a synonym for 'parallel' or 'additional'. The first known usage of the term 'collateral damage' in this context occurred in a May 1961 article written by T. C. Schelling entitled 'Dispersion, Deterrence, And Damage'. The USAF *Intelligence Targeting Guide* defines the term as "unintentional damage or incidental damage affecting facilities, equipment, or personnel, occurring as a result of military actions directed against targeted enemy forces or facilities. Such damage can occur to friendly, neutral, and even enemy forces." [http://en.wikipedia.org/wiki/Collateral\\_damage](http://en.wikipedia.org/wiki/Collateral_damage)
6. The abbreviation UAS from 'unmanned air system' has also been used. UAV is still commonly used in conversation by service personnel, with R-PAS gradually taking over. The word 'drone' is rarely used in the military and usually with the ironic implication that the protestors' notion of UAV autonomy is incorrect.
7. For a discussion of the issues of autonomous systems see: Blount, C, Group Captain. 'War at a Distance – Some Thoughts for Airpower Practitioners'. *Air Power Review*, Vol 14, No. 2, Summer 2011. Wheeler, R, Dr. 'War at a Distance – An Alternative Perspective'. *Air Power Review*, Vol 15, No. 1, Spring 2012.
8. Joint Doctrine Note 2/11. 'The UK Approach to Unmanned Aircraft Systems': The Development, Concepts and Doctrine Centre, Shrivenham 2011.
9. "The nature of drones means they hover above communities 24 hours a day, seven days a week. They present an aerial occupation, almost a form of collective punishment that causes huge concern and distress to people living in those communities. In addition to the terrorising of populations that we see living under drones, there is real concern about the accuracy of the targeting". Kat Craig, legal director of human rights charity Reprieve quoted on BBC News <http://www.bbc.co.uk/news/uk-england-lincolnshire-22320275>
10. Estimates suggest CIA UAV attacks in Pakistan killed up to 3,533 people between 2004 and 2013. About 890 of them were civilians and the vast majority of strikes were carried out under President Barack Obama's administration. The Bureau of Investigative Journalism quoted on BBC News <http://www.bbc.co.uk/news/uk-england-lincolnshire-22320275>
11. Bratby, M. *Aerospace International* April 2013, 'Unmanned air power revitalizes old debates'. A RAeS Air Power Group study of the expanding use of UAV by the US. *Inter alia*, this article covers the particularly controversial issue of the CIA's use of armed UAVs over Pakistan to target Taliban and al Qaeda leaders.
12. Page 40: Afghanistan. Mid-Year Report 2013. Protection of Civilians In Armed Conflict. United Nations Assistance Mission in Afghanistan. Kabul, Afghanistan July 2013. <http://unama.unmissions.org/LinkClick.aspx?fileticket=EZoxNuqDtps%3d&abid=12254&language=en-US>
13. The West, indeed the UK, is not immune to this tendency. When the submarine first posed a threat to the Royal Navy's battleship-based naval supremacy, it was condemned as an unreasonable, even unacceptable form of warfare: 'unfair, underhand and damned un-English'. Despite these heartfelt objections, use of the submarine proliferated.
14. It must be admitted that there is anecdotal evidence that soldiers regard snipers as somehow operating at the edge of or even outside the normal practices of conflict.
15. See Blount, p34.
16. UK Joint Service Publication JSP 383. *The Joint Service Manual of the Law of Armed Conflict*. 2004 edition



'DRONES' ARE NO DIFFERENT FROM ANY OTHER TYPE OF WEAPON IN LEGAL OR MORAL TERMS

Even if a fully autonomous UCAV was possible — would it even be desirable?

