RPAS: Future Force or Force Multiplier? An Analysis of Manned/Unmanned Platforms and Force Balancing

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The focus of this paper centres on rolling back some of the assumptions and misconceptions surrounding Remotely Piloted Air Systems (RPAS) - or Unmanned Air Systems (UAS) as they have most recently been labelled. Debate – both in the media and the political arena – has been poorly informed, and there is a clear requirement to contribute some clarity and facts to the discussion. In particular, language and terminology are key to seizing the vital ground in a discussion that is littered with often wild assumptions. Set alongside transparency and engagement from current operators, the authors suggest that sharing the same lexicon as the public and media would help to allay misplaced fears and suspicions around this recently constructed pillar of air power. In examining the concepts of terminology, platform definition, operator situational awareness, operator detachment and legality, the paper attempts to dispel the myths and extraneous arguments put forward by the uninformed in order to provide some balance to the narrative.

Introduction

Remotely Piloted Air Systems (RPAS) have captured the imagination. An often emotive series of related narratives underpins a discourse on 'Drone Wars', accompanied by widespread speculation.[1] These narratives frequently conflate key issues, giving rise to some media myths which have done little to inform debate upon a technological development which has assumed increasing significance, and which sometimes obscures wider debates about the use of force. Media coverage is often negative in tone as a result.[2] These conflations and misapprehensions include an apparent inability to make clear distinctions between an armed, unmanned air system with full autonomy - the 'killer robot' – and the RPAS with clear human involvement in all aspects of the system's operation, particularly in the release of weapons from armed platforms. The controversial nature of RPAS use in operations since 2001 often conflates systems capability with political direction and introduces serious questions of legality and legitimacy, giving a sometimes sinister air to media coverage of the use of RPAS in lieu of manned platforms or the deployment of combat troops which conflates the RPAS – or 'drone' in current media-speak – and the decision-making process rather than viewing the RPAS as the tool employed to achieve a desired outcome. Media speculation is particularly intense given the involvement of the Central Intelligence Agency (CIA) in the operation of RPAS in the on-going 'war on terror', particularly the use of these systems against key targets – invariably people rather than infrastructure or equipment – in Yemen and Pakistan. This is accompanied by considerable academic inquiry into such operations, found in journals covering everything from military ethics to international relations.[3]

Equally, the nature of the RPAS itself has given rise to an array of speculative comment, suggesting that 'drone warfare' is little more than a dehumanised video game, barely distinguishable from popular gaming titles such as *Call of Duty*, and/or that the nature of the RPAS is such that they can – and in due course probably will – be flown by stereotypical 'geeks' who in no way conform to traditional images of aircrew, either in terms of ethos or physical capabilities. This viewpoint extends to speculation that the nature of air forces will forever be changed as manned platforms are superseded for combat and reconnaissance roles by remotely operated or robotic systems. This foresees the 'death of the fighter pilot' (shorthand for the demise of aircrew in all but the air mobility role) as force structures change to a front line made up overwhelmingly of unmanned platforms.[4] This is not, though, to reject the view of David Hastings Dunn that:

> [Drones]…constitute a 'disruptive technology' – that is, 'an innovative technology that triggers sudden and unexpected effects' and represents the potential for discontinuity from what went before'… both in their use by the United States, Israel and the UK, and in their potential as terrorist weapons, drones and their proliferation represent a new development in aerial warfare the implications of which have not yet been fully grasped, debated or responded to.[5]

Rather than dispute Dunn's contention that the RPAS represents a change in the way in which air warfare is conducted (as opposed to 'traditionalist views' arguing that 'drones' are simply an incremental development of manned platforms), this article seeks to contribute to the wider debate by deconstructing some of the conflated narratives in a bid to illustrate that this has introduced confusion or error to what is an important debate over the employment of RPAS – as distinct from autonomous robotic systems – and the way in which these platforms will influence force structures in the near-to medium-term.

The article does not seek to serve as an apologia for RPAS, the manner in which they have been used or to downplay their significance to either air power or warfare in general, but aims to highlight and clarify some critical issues which need to be properly and accurately understood to enable meaningful, properly-informed debate and the concomitant decision-making that must follow.

We contend that although RPAS have the potential to bring about significant changes to air warfare, the spectre of an inexorable 'rise of the machines' with remotely piloted and autonomous air systems dominating future force structures is unlikely, at least for the foreseeable future. Instead, RPAS will serve as an adaptable force multiplier with inbuilt flexibility through an open architecture systems vision rather than a platform-centric capability focus. In this construct, manned aircraft will remain a critical and predominant capability for major air forces, albeit as a smaller proportion of the manned-unmanned force balance.

While technological progression will undoubtedly influence the composition of the future UK military inventory, the pace and extent of a transition from manned to unmanned air vehicles is neither determined nor inevitable. Once societal perception becomes cognisant of the associated technology, most developments come to be readily accepted amongst the history of military evolution; lethal robots are a different matter.

In this context, it is essential to define some of the emotive coverage of this topic. This work suggests that the on-going opposition amongst air power practitioners to using the word 'drone', while well-founded, may, in fact, be an obstacle to informing the wider debate, and goes on to analyse the narratives on situational awareness, emotional detachment and 'Drone Wars,' before discussing whether RPAS are a future force construct for British Defence, or whether they form a multiplying element within a broader structure. It should be noted that the analysis considers capabilities and roles traditionally associated with larger air power platforms and which larger 'drones' now carry out; the plethora of smaller, man-portable or patrol mounted remote systems inundating the modern battlespace are not examined in detail, although this is not to deny that they may, in the future, become associated with a number of the issues raised. Also, the array of literature on the legal, ethical and political aspects of employing RPAS means that the article does not seek to add to this exceptional corpus of material, although it does inevitably consider these elements in a number of places.

The Importance of Definition

Is it an Unmanned Air Vehicle (UAV), an RPAS, a drone, or a robot? Should we care? At first sight, it may appear that indulging in a discussion of terms is little more than a means of delighting those interested in semantics or serves as a mechanism to confuse outsiders attempting to comprehend the nuances within the ongoing debate over what unmanned aerial platforms are and how they are used. Upon closer study, though, it becomes clear that a grasp of the common terms and the distinctions between them matters if the lively discussion over the place of unmanned systems in conflict is to be an informed one.

Those engaging with the debate over remotely piloted systems need to be comfortable with the distinctions, and semantics of language are essential to avoid misinterpretation and allow a mature, informed debate. It is arguable that, at present, much of the discussion in the public domain is based upon misperception and intuition. It seems that there may be a parallel with Noble Frankland's observation about the strategic bombing offensive against Germany, where 'people have preferred to feel rather than to know' about the subject, with concomitant misinterpretations of the reality.[6]

In laying out our definitions, it is important to address the confusion that sees UAVs and RPAS being considered as synonyms. In fact, they are not the same thing. A UAV may be defined as a flying machine that does not contain a human being. It is distinct from a guided weapon, such as a laser-guided bomb or cruise missile because, it is not a single-use warhead delivery vehicle. A UAV may be remotely piloted or it could be autonomous (a term which is itself fraught with misunderstandings).

An RPAS comprises many elements, including the UAV, the Ground Control Station (GCS), the remote communications links, and the aircrew. Using the Reaper as an example, the MQ-9 aircraft is the UAV, but requires crew in the GCS to control it. The whole package, which requires all three elements - the UAV, GCS and crew – to be present for the UAV to be able to operate is the RPAS.

This lexical confusion, coupled with historical baggage over the initial purpose of the unmanned aircraft has led to widespread use of the term 'drone'. The original 'drone' did just that – it droned around overhead, an unmanned aerial target for gunnery practice. The drone might survive its sortie and be reused, or it might succumb to the fire directed at it. This form of drone has not gone away. In addition to the traditional small aircraft flown remotely and designed to be shot down, the United States has been the most obvious in its conversion of numerous retired combat aircraft into drones, which can be employed for weapons testing, often surviving numerous flights. To illustrate how confusing the terminology has become, these drones – for instance the QF-4 and QF-16 – are controlled from ground stations by a crew and could legitimately be described as RPAS, since the components involved in an unmanned sortie by a QF-16 are the same as those found in operating an MQ-9: unmanned air vehicle, crew and GCS.[7] Be they for weapons testing or operations in a war zone, the

aircraft that are now termed 'drones' are far more sophisticated and perform a far wider array of functions than the original craft, but the key point here is that the nickname has stuck and is now employed in a much more formal manner.

Lev Grossman, for one, illustrates why the term has remained in common use, despite the misgivings of those who operate RPAS:

> A word about that word drone: there's a lot of ambivalence about it in the industry because of its negative associations with targeted killing. I've been corrected, and even upbraided, by drone users and manufacturers, military and civilian, for failing to use terms like unmanned aerial vehicle or unmanned aircraft system (UAS) or remotely piloted vehicle. While literally accurate, those terms have a clumsy, euphemistic feel. Hence drones.[8]

Grossman reflects the trend. 'Drone' suffices as a description, has provenance, is in widespread use and is generally understood. In which case, why should a journalist - or indeed any other commentator - use military acronyms which may not be fully understood by their audience, or employ more words than necessary in an article upon which there is a tight word limit? It is difficult to counter this point, not least since those talking about UAVs and RPAS regularly default to the convenience of 'drone', even if they are serving air force personnel. Though some members of the wider public may be comfortable with the terminological distinctions, most are not, and are arguably not even cognisant of the fact that such distinctions exist.

Furthermore, we cannot overlook the way in which the use of technical jargon and acronyms – standard day-to-day fare for those in air forces, armies and navies around the world – is interpreted by a wider audience. There is a tendency to presume that the use of phrases such as 'Unmanned Aerial Vehicle' or 'Remotely Piloted Air System' is nothing more than an attempt to obfuscate through bland language about these platforms and the manner of their use. This cynical interpretation is nothing new, as debates over the term 'collateral damage' have demonstrated.[9]

Unfortunately, popular terminology is problematic. If 'drone' is understood by its definition, 'a remote controlled pilotless aircraft,' then it is appropriate for an RPAS. It can, though, equally be interpreted simply as 'pilotless', which can then – by extension – be taken to mean that there is a lack of human involvement in the operation of such a platform, which can readily lead to dramatic commentaries about 'killer robots'. The ambiguity associated with 'unmanned' and 'drone' is the reason for the military preference for 'RPAS'. The use of this acronym, far from obscuring the reality, is an accurate representation of the presence of a pilot in the operation of the UAV and ultimately the employment of any weapons that UAV might be carrying.

This terminological debate matters, because 'drone' has become attached to the equally loaded term 'targeted killing' (seen in many quarters as another euphemism, this time for illegal

assassination) and is inextricably linked to discussion of 'drone wars', with the risk of introducing imprecision into an important area of debate. Without understanding the nuances within the terminologies employed, it becomes easy for the whole matter of what UAVs and RPAS are to be misunderstood or misrepresented, never mind the critical issue of how such platforms are utilised.

Nonetheless, it seems that efforts to dissuade the use of 'drone' are futile. It may be time for those who use remotely piloted systems to take ownership of the term; such a step would help to improve comprehension of RPAS by bringing detail and precision to the debate, rather than allowing speculation, conflated narratives and factual inaccuracy to drive discussion. It would also serve to remove some of the cynicism that 'RPAS' and 'UAV' are nothing more than efforts to bring euphemism to bear.

This, in turn, might help permit informed decision-making based upon a more accurate comprehension of what RPAS can and cannot do. It might also allow a more readily accessible distinction to be made between a 'drone' (a remotely piloted vehicle, involving significant human input) and a - 'robot' a - fully autonomous vehicle.[10]

The importance of the human factor, lost from much of the narrative and analysis at present is illustrated in the doctrinal definition that air power is, 'using air capabilities to influence the behaviour of people or the course of events', we see that this highlights that war is a human activity.[11] Technological developments might change the tactics and strategies applied, but wars originate from human political discourse, or the failure of that discourse. While the operators of RPAS are not necessarily in direct proximity to the battlefield – they can be, and often are, thousands of miles away - they are still participants in a human activity and provide human input through the medium of the platform they are operating; the RPAS/drone is not simply a technical device, devoid of human factors; as this article will demonstrate that in a number of respects, the human aspects of RPAS operation can be far greater than those facing the aircrew flying combat aircraft.

Legal Context

The 'Drone Wars' narrative and its bearing on the 'manned-versus-unmanned' debate, makes it worth conducting a very brief examination of the legal context.[12] It is clear that there is much still to be written on the law in relation to RPAS, particularly in the arena of domestic versus operational law, and the way in which extra-territorial jurisdiction of human rights law and the legal issues pertaining to cross-border operations must be considered in any debate on RPAS, and it is not the intention of this article to analyse this complex arena. It is, though, worth noting that there is, and will always have to be, a legal basis for the use of force when it is delivered through the medium of RPAS. This means that RPAS/drones are no different from any other weapon system or, indeed, munition that is used within the battlespace of any type of conflict.[13] The legal framework is also of critical importance when disentangling the difference between RPAS and 'killer robots'; the influential Human Rights Watch/International Human

Rights Clinic report *Losing Humanity: The Case Against Killer Robots*, defines 'robots' as being capable of operating with a degree of autonomy, which is, of course, true of extant RPAS.[14] This leads on to a definition of 'robotic weapons' under three categories: human-in-the-loop; human-on-the-loop (a human supervises the robot's actions and can over-ride them), through to human-out-of-the-loop were the system can choose its own targets and engage them without any human involvement in this process. The report goes on to state:

> …the terms 'robot' and 'robotic weapons' encompass all three types of unmanned weapons, in other words everything from remote controlled drones to weapons with complete autonomy. The term 'fully autonomous weapon' refers to both out-of-the-loop weapons and those that allow a human on the loop, but that are effectively out-of-the-loop weapons because the supervision is so limited.[15]

The question that arises here, though, is whether a 'drone' such as the MQ-9 Predator is a 'robot' as the report suggests. The report goes on to suggest that 'robots cannot identify with humans, which means they are unable to show compassion, a powerful check on the willingness to kill'.[16] As will be demonstrated below, the presence of humans-in-the-loop in current RPAS brings human instincts to bear, with concomitant psychological issues. Although next-generation RPAS have increasing levels of automation (the X-47 may be seen as an exemplar of development here), if such platforms require human input to select targets and to release weapons – assuming the platform is weaponised – does this mean that defining all RPAS, particularly current types, as robots with inferred linkages to a dehumanised form of warfare is inaccurate? And if this is the case, does this highlight the need to be explicit in our consideration of RPAS, which involves humans remotely, versus robots which do require little, if any human involvement? We would suggest that this apparently minor semantic distinction matters, since human RPAS operators should be subject to the same levels of accountability as, say, aircrew releasing weapons from a manned aircraft.

Drone Wars

Typical reporting of 'drone strikes' in the media can bring about multiple criticisms. These include concerns over the deaths of civilians; breaching national sovereignty and the UN charter, as well as possible illegality. Additional issues include the manner in which RPAS have been employed by the US Central Intelligence Agency (CIA), with suggestions that the lack of involvement by the US armed forces has reduced oversight of RPAS use, while intelligence underpinning the decision to strike has not been subject to sufficient levels of scrutiny.[17] A final concern is that the efficacy of strikes has been limited and perhaps counter-productive, but that the lowering of the risk threshold by making those operating RPAS remote from the fighting also reduces political nervousness about employing lethal force.[18]

'Targeted killing' is an incongruous phrase used to describe offensive lethal force against specific individuals; it is often seen as nothing more than a euphemism for 'assassination.'[19] The term has taken on particular resonance with regard to RPAS, but this rather overlooks one

key point: namely that *all* killing under the rule of law must be 'targeted', otherwise it would be illegal. The nature of the weapon system, be it an MQ-9 Reaper, an AH-64 attack helicopter, a fast jet or a sniper is irrelevant – 'targeted killing' is a far more complex and controversial construct than something simply involving 'drones', and it is in this area that the 'traditionalist' view critiqued by Dunn has clear legitimacy; the RPAS is the mechanism employed. RPAS are not the sole enablers of targeted killing, and it is the concept that should be the source of debate rather than the weapon system used, even allowing for the fact that concerns over the willingness to target individuals may have increased because of the reduced risk to one's own soldiers, sailors, marines or aircrew are absolutely legitimate – the point is that this issue is a subset of a much wider debate and should not automatically be associated with RPAS simply because they have become synonymous with this sort of operation as a result of events in Yemen and Pakistan in particular. It is perhaps germane to note that similar observations about risk-reduction were made in relation to air power in the post-Cold War era, most notably in the comment of Professor Elliot Cohen that air power, 'like modern courtship, offers gratification without commitment.'[20]

This is an issue which must be factored into the wider debate, since it is clear that the number of strikes against individuals has been considerable, and probably far greater than would have been the case were armed RPAS not available to fulfil such taskings.

David Aaronovitch's consideration of the matter, leads to him supporting drone use as a lower collateral damage option compared to inaction or a ground campaign.[21] Technically, Aaronovitch's analysis applies to air power use rather than drones. He cites up to 3400 drone strikes deaths in Pakistan, including an estimated 400 to 900 civilians, meaning 2500 to 3000 were Al Qaeda, foreign jihadis or Taleban. He suggests that the Government of Pakistan allowed the Taleban to occupy Swat in 2007, which he describes as a failed appeasement theory resulting in many civilian deaths, public decapitations, destroyed schools, and a base for attacks on the Pakistan State. He offers that during the Pakistani ground campaign to retake Swat, thousands died and hundreds of thousands were displaced. He concludes that 'to leave militants alone is to invite attacks [against civilians] in Pakistan and around the world; not conjecture. To root them out through a ground campaign would kill and displace far more civilians than drone use would'.[22]

Over the course of recent campaigns, there has been a change in the strategic risk threshold from that in the immediate aftermath of 9/11, an evolution which has emphasised the wisdom of more subtle force use within counter-insurgency campaigns. General David Petraeus directed escalatory responses were to be used, rather than a default to excessive air power for short tactical gains that risked strategic success. The phrase 'courageous restraint', attributed to General Stanley McChrystal, saw ISAF troops ordered to limit the use of force, 'against residential compounds and other locations likely to produce civilian casualties'.[23] These initiatives were evidence of a learning process for the missions, and also perhaps a product of the changed operational scenario. Both generals were directing more tactical

patience after initiating troop surges, creating a less precarious situation for ground forces and giving them more manoeuvre options than their campaign predecessors. Those tactical directives applied across all forms of military force.

Drones are not uniquely egregious in causing collateral damage, as might be inferred from some of the 'drone wars' narrative. Compared to manned platforms, the persistence of drones allows more tactical patience - of the sort required in the evolving campaigns in both Iraq and Afghanistan - and provides the ability to obtain and assess greater amounts of information about the individual under observation. This in fact reduces collateral risks.[24] Collateral damage risks apply to all military operations, whether they are manned or unmanned.

A further sub-set of the 'drone wars' debate is that the use of RPAS increases radicalisation. Once again, this seems too simplistic. Aaronovitch claims evidence suggests a reduction in terrorist incidents in Pakistan and elsewhere because of American attacks, although this does not, of course, represent a linear progression.[25] The key here is that the potential for radicalisation is most probably linked to the use of force of all kinds, rather than the nature of the platform used. Once again, the drone-related factor to be discussed is that of the willingness to make use of the platforms because of the perceived advantages they offer in terms of risk reduction.

The essential core of this debate, then, is strategy, and the strategic balance between using force or not. Focussing upon one particular mechanism for the delivery of force is not a particularly helpful approach to considering this much wider question. This element of the drone wars debate is the one with most relevance. Does the use of unmanned platforms lower the political thresholds for military intervention? This is a very important point, but must be examined from all perspectives and with consideration to multiple scenarios and contexts.

The conclusion of this argument is that lower deployment costs, lower casualty potential, and a liberal democratic desire to export and enforce human rights and law, will increase the incidence of interventions and conflict rather than reduce it.[26] Claims that drone technology alone lowered political thresholds for targeted killing seem conjectural, particularly in light of post-9/11 public and political sentiment. In this scenario, political will arguably exceeded any threshold and air and it is not unreasonable to suggest that air and missile strikes would have been authorised in the absence of drones, particularly given pre-9/11 willingness to launch such attacks against Saddam Hussein and AQ camps in Afghanistan and elsewhere.

Aaronovitch also provides an interesting, positive, perspective. He suggests that a move away from 'boots-on-the-ground' interventions should not precipitate an aversion to intervention and nation building. Aaronovitch suggests that drones allow assistance to be provided when it would be politically unpalatable otherwise.[27] This would certainly be the case when considering air power capabilities such as ISR for providing clarity in crises. How humans decide to employ technology remains critical. 'Drone wars' are not a new conflict typology,

but a sub-set of war; to drill down and focus in detail upon context-specific use of particular systems is of utility, but should not obscure much larger questions about the way in which states might chose to wage conflict, particularly through the employment of all sorts of technology. The way in which extant technology can be employed, though, is also subject to confusion. Two of the most notable areas where this applies in terms of the 'drone debate' pertain to the situational awareness of RPAS crews and their perceived detachment from the events they witness on their monitor screens. It is to these two areas we turn next.

Situational Awareness (SA)

A common claim about RPAS suggests that operators possess low SA because their world is perceived 'through a soda straw'.[28]

> During the later stages of targeting, drone operators may be hampered by what is known as the "soda straw" effect. As a weaponised drone zooms in to pinpoint the target, it loses a wider picture of the area—like viewing a small amount of liquid through a soda straw, instead of the entire glass. The soda straw effect creates a risk that civilians may move into the vicinity of the strike without being noticed by drone operators, thereby overlooked in targeting analysis.[29]

The question of field of view raises concerns about the operator's ability to detect possible collateral damage risks outside the 'straw', as well as ethical detachment concerns. Other concerns relate to platform attrition through an inability to detect threats, and the potential for mid-air collisions.[30] Additional speculation exists concerning operator capacity and sensory overload.[31] Finally, concerns are raised about the narrowing of campaign perspective to the seductive, hypnotic full motion video feed.[32]

Comparisons of the relative SA of manned aircraft and RPAS is generally speculative and made by individuals with experience of one or neither type. Aircrew in manned platforms have the benefit of peripheral vision, but an unmagnified view from the cockpit is of little use for cluttered target distinction. It can be difficult to ascertain the ground from medium altitude in the utter blackness of an unlit desert landscape, even with NVGs. Both manned and unmanned crews can select wide, relatively unmagnified sensor fields of view to permit similar spatial orientation. Resolution is reduced in wider fields of view; hence narrow, zoomed views are used for target distinction and attack.

A fallacy exists that peripheral vision from the cockpit gives an advantage during precision weapon attacks.[33] Both manned and RPAS crews use sensors to acquire and distinguish the target, and both are fixated on the cockpit-targeting screen during weapon time of flight. The target is likely to be under the aircraft fuselage, obscured from direct human sight, through the attack flight profile. A last second collateral risk is detected by manned and unmanned crews in the same way; on the sensor targeting screen. This is particularly true with stand-off weapons – the Grdelica railway bridge bombing during Operation Allied Force is a good example of this.[34]

Aircrew cite the benefit of their wingman's peripheral vision providing a defence against collateral damage unavailable to RPAS. This presumes RPAS cannot have 'wingmen'; furthermore, RPAS have a technological advantage because any FMV feed on the network can be displayed on any GCS computer monitor.[35] The vast majority of visually detected aircraft threats are perceived by wingmen rather than manned occupants, a fact of perspective. The human eyeball detects movement laterally more easily than it perceives an object closing on a constant angle. The vast majority of contemporary threats are detected, and responded to, by automated defence systems, which would be no different for equipped manned platforms or RPAS.

Risk of mid-air collision is shared by manned platforms and UAVs. RPAS operators and air traffic controllers have learned many lessons and developed robust procedures for deconfliction, much enhanced in the last few years.[36] Key to this are airmanship, training and technological developments, including the addition of Link-16 into some RPAS – not, therefore, greatly dissimilar to manned platforms.

The ICRC raised concerns of information overload, during which a plethora of information, sometimes contradictory, could saturate an RPAS operator.[37] This situation is much more likely in a manned aircraft than an RPAS. Though an RPAS has a networked mass of data available, more humans can quickly and easily be brought into a GCS to assist with processing it. This is not, of course, possible with manned aircraft. The latest fighters use numerous automated sensor-fusion routines to identify beyond visual range targets before the data is ever presented to the human for a decision to use lethal force.[38]

The criticism that RPAS hypnotise individuals from a strategic or operational perspective to tactical myopia is centred on the seductive nature of full motion video feeds; there are accounts of General Wesley Clark re-directing individual RPAS during Allied Force, presumably to the detriment of his strategic perspective as Supreme Allied Commander Europe.[39] There are, of course, occasions when that approach would be entirely appropriate for strategic targeting events; a real advantage for the networked RPAS compared to manned platforms. Nevertheless, the temptation to micro-manage must be resisted: 'rarely will [strategic and operational level commanders] have the full tactical situation and put bluntly, such activity is not their job'.[40] The criticism regarding myopia seems more appropriately directed at those receiving distributed video feed than the RPAS operators themselves.

Detachment

There is an assumption that physical distance from the battlefield means psychological and emotional detachment, with concomitant erosion of notions of sacrifice that deters the initiation of wars, leading to questions whether it is ethical to kill in the manner of sending an email.[41] This assumes a link between personal risk to life and warrior values, used to justify claims of inevitable psychological detachment.[42] 'Throughout history, as each technology has pushed soldiers farther and farther away from their foes, many lamented the effect it would have for warriors and their values....using a gun was once seen as cowardly'.[43]

Coker, drawing on Homeric tradition, argues that 'war is the ultimate face to face encounter' and that fidelity of resolution does not reveal moral character of the enemy.[44] His warnings are very appropriate for the debate on robots but less so for drones. Indeed, his study of mirror neurons can be turned to argue the advantage of drones over manned platforms.

> It's like a video game. It can get a little bloodthirsty. But it's [expletive] cool.[45]

This comment was attributed to 'a cubicle warrior' during the Iraq war. Both Singer and Coker reflect upon the worrying implication of detachment, '[with] remote soldiers no longer having any "emotional connectivity with the battlespace"'.

Questions, though, arise. Was the cubicle warrior attempting to relate a novel concept via analogy? Was he a seasoned veteran or a young man displaying bravado? Is the quote indicative of all RPAS operators, across all cultures? Whilst conjectural, the context matters – particularly when compared with the sober views of British crews, reflecting upon their lethal duties.[46]

Regardless of public banter and bravado, private squadron conversations concerning choices of when to and not to kill, despite tactical imperatives from other interested parties, are the same amongst manned and unmanned crews - extremely sombre and humane.[47]

The ICRC raised concerns that physical and emotional distance from the adversary 'makes targeting easier and abuses more likely'.[48] Yet, the military profession demands a degree of detachment to permit killing as part of warfare; too much attachment either prevents completion of duty, or can lead to emotionally charged behaviour exceeding political and moral limitations.[49]

Whetham argues that a good commander remains slightly detached, and that an RPAS operator, with an absence of fear for their own safety, would be more capable, not less, of behaving justly.[50] Aircrew traditionally have been more detached than infantrymen. Until the advent of targeting pods, visual clarity of targets was limited at best – one needs only to consider the ground resolution from the window of a commercial airliner at 20000 feet. In the 1990s, targeting pods allowed views of buildings and perhaps vehicles on their low resolution images. Contemporary sensors allow aircrew to distinguish between individuals wearing brown and black, one walking with a limp, carrying an AK74 rather than an AK47.[51]

As Coker notes, visual resolution does not reveal the moral character of the enemy. What can is persistent observation coupled with networked intelligence. RPAS have a design advantage over manned platforms in their persistence; even air-to-air refuelling of a manned platform will interrupt surveillance unless the tanker moves to the location of a surveillance aircraft.

Some manned platforms can receive in-flight data, but the scale of networked connectivity is insignificant to an RPAS. Mid-mission, an RPAS crew can access their own optical, infra-red

and radar sensors, rewind and review digital recording of the footage, manipulate current images and compare with a squadron archive of relevant imagery, peruse military mapping, satellite and radar data, access Google Earth, receive updated intelligence packs from the task force or distributed intelligence fusion centres via email, constantly talk to relevant members of the coalition community via chat rooms, talk to forward air controllers via UAV radio, and if necessary, talk to the task force commanders or forward air controllers via secure telephone from the GCS on the other side of the world.

Attachment to friendly infantry comes from that, plus a shared culture and empathy, personal relationships, either through training events, collocation or liaison visits, or through remote working relationships over a protracted period of time. Attachment is stronger when collocated, but remains relevant and tangible across dispersed sites.[52]

Conjecture that remoteness creates inappropriate behaviour appears unsupported by many credible sources. RPAS crews are conscious that their actions are recorded and observed across the networked community, including by strategic leaders; that centres any human tendency for risk shift whilst facilitating an unprecedented degree of oversight and accountability. Quintana supports this theory and offers, 'if anything, this is proving that it is more ethical to use remotely piloted aircraft than traditional combat aircraft'.[53] Whetham suggests the nature of RPAS offers a higher degree of oversight than any other military activity. He does not restrict that to the crew, but includes the restraining effect of persistent surveillance on emotional risk shift potential in any friendly land force.[54] RPAS recordings can be used to rebut allegations of inappropriate friendly troop behaviour, also acting as a reputational defence.

There is a further consideration to bear in mind, namely the quality of the view that RPAS crews obtain of their possible adversary. This is not dissimilar to the view that those involved in relatively close-quarter fighting obtain.

Coker relates the story of Emilio Lusso, a soldier on the Italian Front in 1916. Lusso held a dim view of officers and Austrians, and on one occasion found an Austrian officer in his rifle sights. Lusso's reaction was to take up pressure on the trigger – at which point the Austrian lit a cigarette. Lusso was disturbed to note that although he was focused upon killing his enemy, his trigger finger relaxed: 'in the random act of lighting a cigarette, the Austrian had become a man like himself. Lusso found himself overwhelmed by pity.'[55]

Coker uses neuroscience to explain the sniper's behaviour: mirror neurons, or empathy neurons, allow humans to grasp the minds of others not through conceptual reasoning, but through direct simulation of feeling, that is to grasp the minds of others as if their thoughts and behaviours were their own.[56]

Aircrew with contemporary sensors get a view of their adversary just like that Lusso gained. Over days of surveillance on the same target, RPAS crews will get to know an individual's habits,

shadowing them through their daily routines, gathering the intelligence that is vital to targeting decisions. If a targeting decision is made, the crews can continue watching for hours or days, choosing not to shoot – even though they legally could – preferring to wait for an opportunity with least risk of collateral damage occurring. After engaging the target, the crew will watch the aftermath for minutes or even hours, to provide as full a picture as possible. All engagements are thoroughly reviewed, dissected and debriefed by the operational accountability chain.[57]

The psychological and emotional implications of events not involving killing are often overlooked. Aircrews' professionalism enables them to compartmentalise killing as fulfilment of their military duty in accordance with the rule of law, removing clear threats to friendly forces and civilians. It does not help resolve witnessing a soldier walk towards a compound gate before being caught in the blast of an Improvised Explosive Device; the RPAS crew will keep watching the macabre scene, beaming their sensor feed to the networked community for recovery coordination. Watching over a friendly patrol under sporadic fire, which chooses tactical patience, but later loses a soldier to enemy fire when being less patient would have offered the RPAS several firing opportunities, is also hard to resolve.

The 'detached' RPAS aircrew then return home from their 'office job', interact with their family, with the images of the dead still fresh in their mind. The 'detached' RPAS aircrew returns to do the same 'office job' again for the duration of their three year tour, and perhaps into their second or third tour.[58] This observation is not to garner sympathy; rather to provide an insight into the realities faced by RPAS crews – 'detachment' is nowhere near as clear-cut as some commentators appear to believe.[59]

A continuation of the factors in this section favouring human involvement with the decision to kill, are very relevant when applied to an autonomous future. The logic of humanity, empathy and Homeric values warn of a dangerous threshold when considering autonomous attack, reinforced by the arguments on LARs and the IHL requirement for humanity.

Conclusion

This brief article attempts to separate some key issues within drone narratives to contribute towards enabling debate based on fact. Terminology is crucial to unambiguous debate and attempts to persuade adoption of acronyms appear futile. There is a case for suggesting that the military should embrace common parlance and provide clarity within the debate. Under this construct, 'drone' could describe RPAS, whilst 'robot' would distinguish autonomous systems. This may help in providing clarity in legal debate. International law on the use of lethal force applies equally to manned aircraft, drones and robots. Calls to codify the use of lethal robots, with the added layers of complexity inherent in their use are entirely appropriate but precision is required in the use of language - drone operations, which should be considered alongside other human controlled activity, rather than by being merged with discussion of autonomous systems – as noted above, there is considerable confusion in thinking on such matters, even from highly credible organisations.

Drones do not necessarily cause excessive collateral damage; indeed, they can reduce collateral risks compared with other military options. Speculation about low SA and detachment for drone operators often seems not to accord with RPAS crews' experiences of the realities of networked capabilities and persistent, high resolution surveillance systems. The intellectual and emotional attachment of remote operators to the battlefield is facilitated by networked systems and by ethos, training, liaison, and leadership; the complexities of this aspect of 'drone wars' require more precise attention by those debating the issue.

The benefits of drones, across all air power roles, will evolve and become more apparent. Unlimited by human physiology, UAVs can be optimised for persistence or agility. The alternatives are manned operations, or an acceptance of robots. Manned aviation is limited by human endurance and incurs aircraft design penalties, but the human occupant helps negate communication vulnerabilities. Complex military judgements, including human 'instinct,' on the use of lethal force will likely remain beyond autonomous technology for some time; societal consent for robots may never materialise. Drones and robots must be considered separately, bringing precision to debate.

The force multiplying potential of drones is evident. The current UK vision predicts a medium term balance of one-third unmanned to two-thirds manned. It is conceivable that balance will be reversed, but the pace of transition will be governed as much by economics, politics and commercial affairs as military factors. There is no inevitable transition to a total drone or robot force; many obstacles remain, and certain military scenarios favour manned operations. Nevertheless, the drone is a critical part of considerations for a future force.

The 'Drone Wars' narrative includes extraneous elements. It is essential when considering drones to recall that issues of sovereignty, host state consent, controlling ungoverned regions, the legality of targeted killing, transparency, generating radicalisation, and the strategic efficacy of airstrikes, are not drone-specific debates, but rooted in broader political, legal, ethical and generic air power debates. A clear understanding of drones driven by factual, experience-based input from operators is essential if considerations of RPAS as a future force or a force multiplier are to be effectively realised. Dunn's contention that drones are a 'disruptive technology' is not misplaced, but the vital ground of debate around how to use that technology often is misguided. To misquote Sir Sydney Camm, drones have five dimensions: span, length, height, capability and politics – for understanding the contribution of RPAS to future force constructs, the fourth and fifth elements must be disentangled to permit capability to inform wider debate. Only then can we be confident that decision making regarding the place of the RPAS will be properly informed.

Notes

[1] *Time Magazine*, Vol.181, No5 (2013): cover; Peter Bergen and Jennifer Rowland, 'Drone Wars', *Washington Quarterly*, Summer 2013, pp.7-23.

[2] See Peter Lee, 'Remoteness, Risk and Aircrew Ethos', *RAF Air Power Review*, Vol.15: 1 (Spring 2012),

pp.11-12 for just one example.

[3] Chris Anders, "Obama's Drone Killing Program Slowly Emerges From the Secret State Shadows," *The Guardian*, March 26 (2013), http://www.guardian.co.uk/commentisfree/2013/mar/26/obama-drone-killing-program-secret-state (accessed March 27, 2013); Diederik W Kolff, 'Missile Strike Carrier Out With Yemeni Co-operation – Using UCAVs to Kill Alleged Terrorists: A Professional Approach to the Normative Bases of Military Ethics', *Journal of Military Ethics*, 2:3 (2003), pp.240-244; Michael J Boyle, 'The costs and consequences of drone warfare', International Affairs 89:1 (2013), pp.1-29; David Hastings Dunn, 'Drones: disembodied aerial warfare and the unarticulated threat', *International Affairs* 89:5 (2013), pp.1237-1246.

[4] See http://wiredforwar.pwsinger.com/ (accessed 18 September 2013) - 'Military officers quietly acknowledge that new prototypes will soon make human fighter pilots obsolete'

[5] Dunn, 'Drones: disembodied aerial warfare', [note 2], p.1238.

[6] Noble Frankland, *The Bombing Offensive Against Germany: Outlines and Perspectives* (London: Faber and Faber, 1965), p.18.

[7] It should be noted, of course, that drones such as the QF-4 and QF-16 can be flown by a pilot (as was the case with their predecessors in American service). The gender-specific term 'unmanned' is used throughout this article simply for convenience as it is a long-established term, even though it is now entirely inaccurate in ascribing the operation of RPAS to males alone. Although 'uninhabited' briefly enjoyed favour, it has fallen out of fashion, in part because of concern that it might be seen to suggest that there was no human involvement in the operation of UAVs.

[8] Lev Grossman, "Rise of the Drones," *Time* 181-5: pp.20-21.

[9] See, for instance, Michael Mandel, *How America Gets Away With Murder: Illegal Wars, Collateral Damage and Crimes Against Humanity* (London: Pluto Press, 2004), pp.46-56 for a strident critique, and Deborah Cameron, *Verbal Hygiene: The Politics of Language* (London: Routledge, 1995) pp.72-74 for a consideration of the term 'collateral damage' and its association with the use of euphemism .

[10] To add to the acronyms, it should be noted that 'LARs' has emerged as the abbreviation for 'Lethal Autonomous Robots', but this may not be widely adopted, especially since this adds further levels of confusion to the discussion - beginning with the question 'what is an 'autonomous robot', exactly?'.

[11] Ministry of Defence, *Joint Doctrine Publication 0-30: UK Air and Space Doctrine* (Shrivenham: 2013), 1-1. Carl von Clausewitz, *On War* ed. and trans. Michael Howard and Peter Paret. (Princeton: Princeton University Press, 1976), p.149 and Michael I. Handel, War, *Strategy and Intelligence*. (London: Frank Cass, 1989), p 60 serve as just two points of reference for the extensive discussion of war as a human activity.

[12] See, for example, William H. Boothby, *The Law of Targeting* (Oxford: OUP, 2012); and ICRC, "International Humanitarian Law and the challenges of contemporary armed conflicts" *31IC/11/5.1.2* (2011), ICRC, "International Humanitarian Law and the challenges of contemporary armed conflicts" 31IC/11/5.1.2 (2011), http://www.icrc.org/eng/assets/files/red-cross-crescent-movement/31st-international-conference/31-int-conference-ihl-challenges-report-11-5-1-2-en.pdf (accessed May 11, 2013).

[13] The authors are grateful to Wg Cdr Mark Phelp for his observations on this matter; any errors of fact or interpretation are, of course, theirs.
[14] Bonnie Docherty, *Losing Humanity: The Case Against Killer Robots* (Human Rights Watch, 2012), p.2
[15] Ibid.
[16] Ibid, p.38.
[17] See, for instance, Micah Zenko, Council on Foreign Relations Policy Innovation Memorandum 31, *Transferring CIA Drone Strikes to the Pentagon* http://www.cfr.org/drones/transferring-cia-drone-strikes-pentagon/p30434 (accessed 17 October 2013); Human Rights Watch 'Transfer Drone Strikes to the Military', *http://www.hrw.org/news/2012/04/20/us-transfer-cia-drone-strikes-military* (accessed 18 September 2013); http://www.reprieve.org.uk/investigations/drones/ (accessed 18 September 2013).
[18] See, for instance, PW Singer, *Wired For War: The Robotics Revolution and Conflict in the 21st Century*, (London: Penguin, 2011), especially Chapter 21; Docherty/Human Rights Watch, *Losing Humanity*, p.39-41.
[19] William H. Boothby, *The Law of Targeting* (Oxford: OUP, 2012), pp.530-532 (also see the references therein).
[20] Elliot Cohen, 'The Mystique of US Airpower', *Foreign Affairs*, January/February 1994; see also Conrad C Crane, 'The Lure of Strike', *Parameters*, 43(2), Summer 2013, pp.5-12.
[21] David Aaronovitch, 'Drones or Jihadis: Which Would You Prefer?', *The Times*, 22 November 2012; http://www.thetimes.co.uk/tto/opinion/columnists/davidaaronovitch/article3607759.ece (accessed 22 November 2012 [subscription-only service].
[22] Aaronovitch, 'Drones or Jihadis?'
[23] Tim Ripley, *Air War Afghanistan: US and NATO Air Operations from 2001* (Barnsley: Pen and Sword Aviation, 2011), pp.162-164.
[24] William H. Boothby, *The Law of Targeting* (Oxford: OUP, 2012), p.280.
[25] Aaronovitch, 'Drones or Jihadis?'
[26] Frank Sauer and Niklas Schornig, "Killer drones: The 'silver bullet' of democratic warfare?" in *Security Dialogue* 43, (2012) (at http://sdi.sagepub.com/content/43/4/363; accessed March 21, 2013) pp.363-380.
[27] Aaronovitch, 'Drones or Jihadis?'.
[28] See, for example, Mary Louise Kelly,'The Nevada Home of the Predator Drone Craft', NPR report 16 September 2005 at http://www.npr.org/templates/story/story.php?storyId=4851765 (accessed 1 November 2013), quoting an RPAS operator; 'Taming the UAV Data Explosion', *Defense Industry Daily*, May 16 2010 at http://www.defenseindustrydaily.com/uav-data-volume-solutions-06348/ (accessed 1 November 2013), David Jordan and Ben Wilkins, 'Unmanned Aerial Vehicle Operations Since the 1980s', in Owen Barnes (ed) *Air Power: UAVs, the Wider Context* (Shrivenham: RAF Directorate of Defence Studies, 2009)p.36.
[29] 'Civilian Harm from Drone Strikes: Assessing Limitations and Responding to Harm', Written statement of Naureen Shah to Congressional Hearing on US Drone Policy 8 May 2013, https://web.law.columbia.edu/sites/default/files/microsites/human-rights-institute/files/Drones%20Ad%20Hoc%20Testimony%20Naureen%20Shah%20May%208%202013.pdf

(accessed 2 November 2013).
[30] Jordan and Wilkins, 'UAV Operations Since the 1980s' [note 30], p.43.
[31] ICRC, 'International Humanitarian Law and the challenges of contemporary armed conflicts'[note 14], p.39.
[32] This has given rise to the term 'Predator Porn' (in the United States) or 'Kill TV' (Australia).
[33] Damian Killeen, personal experience.
[34] See 'Final Report to the Prosecutor by the Committee Established to Review the NATO Bombing Campaign Against the Federal Republic of Yugoslavia, paragraphs 58-62, at **http://www.icty.org/sid/10052#IVB1** (accessed 10 November 2013). Paragraphs 63-70 cover the bombing of the Djakovica Convoy, noting the difficult for aircrew in manned platforms to visually distinguish between civilian and military vehicles at altitude.
[35] Killeen, personal experience.
[36] Jordan and Wilkins, 'UAV Operations Since the 1980s' [note 30], pp.38-39.
[37] ICRC, 'IHL and Conflicts', p. 39.
[38] Killeen, personal experience
[39] John J Cummings, 'Does Network Centric Warfare Equal Micromanagerial Warfare? Minimizing Micromanagement At The Operational Level Of War', Report for Joint Military Operations Department, US Naval War College, at **www.dtic.mil/cgi-bin/GetTRDoc?AD=ADA415392** (accessed 13 November 2013), p.10; also Jordan and Wilkins, 'UAV Operations Since the 1980s' [note 30], pp.38-39.
[40] Wg Cdr Richard MacMahon, 'Unmanned Aerial Vehicles in the Royal Air Force – 2047', in Owen Barnes (ed) *Air Power: UAVs, the Wider Context* (Shrivenham: RAF Directorate of Defence Studies, 2009), p.58.
[41] Christopher Coker, *Warrior Geeks: How 21st- Century Technology is Changing the Way We Fight and Think About War* (London: Hurst, 2013), 119-122.
[42] Seb Cox, 'Unmanned Aerial Vehicles – Cultural Issues', in Barnes (ed) *Air Power: UAVs, the Wider Context* [note 42], p.95; Bradley J Strawser (ed), 'Introduction: The Moral Landscape of Unmanned Weapons', *Killing By Remote Control: The Ethics of An Unmanned Military* (Oxford: OUP, 2013), p.16.
[43] Singer, *Wired For War*, p.331.
[44] Coker, *Warrior Geeks*, p.122.
[45] Singer, *Wired for War*, p.332
[46] Rob Blackhurst, "The Air Force Men Who Fly Drones in Afghanistan by Remote Control," **http://www.telegraph.co.uk/news/uknews/defence/9552547/The-air-force-men-who-fly-drones-in-Afghanistan-by-remote-control.html** The Telegraph, (accessed May 18, 2013).
[47] Killeen, personal experience.
[48] ICRC, 'IHL and Conflict', p. 39.
[49] For instances of emotional attachment leading to an increased willingness to kill, possibly to the point of the commission of war crimes, see, for instance, Bradley A Thayer, *Darwin and International Relations: On the Evolutionary Origins of War and Ethnic Conflict* (Lexington: University Press of Kentucky, 2004), pp.185-192.
[50] David Whetham, "Remote Killing and Drive-By Wars", in D Lovell & I Primoratz (Eds), *Protecting*

Civilians During Armed Conflict: Theoretical and Practical Issues During Violent Conflict (Farnham: Ashgate, 2012), pp.206-207.
[51] Killeen, personal experience.
[52] Killeen, personal experience.
[53] Elizabeth Quintana, 'Unmanned Systems: Confusing Ethics', *RUSI Analysis* 20 April 2011 at **http://www.rusi.org/analysis/commentary/ref:C4DAEB5DD10A7F/** (accessed 13 November 2013).
[54] Whetham, 'Drive By Wars' [note 52], p.203.
[55] Coker, *Warrior Geeks*, p.132.
[56] Ibid.
[57] Whetham, 'Drive By Wars' [note 52], p.203; Killeen personal experience.
[58] Killeen, personal experience. Also see Lee, 'Remoteness, Risk and Aircrew Ethos' [note 2], pp.12-16.
[59] See Zygmunt Bauman, 'Wars of the Globalisation Era' *European Journal of Social Theory* 4:1 (February 2001), p. 27 and Derek Gregory, 'From a View to a Kill: Drones and Late Modern War', *Theory, Culture & Society* Vol27-28 (2011), particularly pp. 196-197.