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Drone usage by militant groups: exploring variation in adoption

Ash Rossiter 

Institute of International and Civil Security, Khalifa University, Abu Dhabi, United Arab Emirates

ABSTRACT

Judging by recent media reporting and pronouncements by senior US military and security officials, the use of drones by militant groups is both reshaping conflict between armed non-state actors and state parties and now presents a grave and direct threat to nations in the West and elsewhere. But does this threat warrant the attention it is currently receiving? To answer this question, this article surveys how various militant groups have used drones both tactically on the battlefield and for wider strategic purposes. Closely examining how drones have been employed and by whom provides a basis for understanding variation in adoption. The article shows how drone usage or non-usage is highly contingent on the setting of the conflict, the aims of different groups, and the capacity of groups to adopt the technology. Though advances in drone technology could make the use-case more appealing for militant groups, drones will be subject to the same back-and-forth, techno-tactical adaptation dynamic between adversaries that have accompanied prior military innovations.

KEYWORDS

Drones; militants; non-state actors; technology; diffusion of innovation; adoption capacity theory; countermeasures; low-intensity conflict

Introduction

Judging by recent media reporting and pronouncements by senior US military and security officials, the use of Unmanned Aerial Systems (UAS) – or, to stick with the more commonly used term, drones¹ – by militant groups is both reshaping conflict between armed non-state actors and state parties and now presents a grave and direct threat to nations in the West and elsewhere. Such is the potency ascribed to drones that their mere appearance is enough to worry some authorities. After Boko Haram reportedly flew a drone over a Nigerian army position, defense officials in neighboring Cameroon believed the group was now poised to “wreak havoc” against their country.² The use of a variety of systems by militant groups in Syria and Iraq, and especially by the so-called Islamic State (IS) during its defense of Mosul, has attracted considerable attention from the public, policymakers, and warfighters alike.³ Referring particularly to events in December 2016 in and around Mosul, the head of US Special Operations Command concluded that the adaptive use of commercially available drones by IS was the “most daunting problem” his operators faced on the battlefield in 2016.⁴ General Joseph F. Dunford Jr., chairman of the Joint Chiefs of Staff, recently told a Senate committee during his reappointment

hearing that drones were “at the top of our list for current emerging threats.”⁵ For many in the US security establishment, the threat will only increase in the future and migrate from the battlefield to the homeland.⁶ More specifically, some commentators speculate that terrorist groups may attempt to combine drones with dirty bombs to launch attacks on Western cities.⁷

But does this threat warrant the attention it is currently receiving? In the decade and a half since the US opened the era of drone warfare with Hellfire missiles launched from Predators in Afghanistan, scholarly interest in drones has steadily increased.⁸ Recent discussions have focused on drone proliferation, especially advanced military-grade types among an ever greater number of states.⁹ Although the employment of drones by militant groups has a longer lineage than is usually recognized, current commentary on this issue is usually more concerned with the future rather than the now.¹⁰ Furthermore, the tendency in much of this predictive analysis is to speculate on the emerging threat by charting developments in drone technology and other augmenting technologies.¹¹ Arguably, giving the overriding place to the technology, rather than the end-user’s needs, goals, and capabilities, leads to determinism about technological adoption and application. Understanding first what potential users of the technology hope to achieve can serve as an important corrective. This is particularly relevant for ideologically driven groups whose underlying value calculus often differs from that of states. Such entities, for example, might be willing to lose militarily as long as their ideological agenda or wider organizational goals are advanced. This likely informs the tools they select to pursue their objectives.

Too much focus on future technological developments and, as an unintended corollary, the more sensationalist potential applications of drones, has skewed our understanding of the issue.¹² Any meaningful discussion on this problem should begin by analyzing how groups have (and have not) incorporated drones into current operating models. To that end, after a brief discussion on the relationship between technology and non-state actors, the paper surveys how militant groups have used drones both tactically on the battlefield and for wider strategic purposes.¹³ Though this paper does not prescribe remedies – leaving the formulation of policy solutions to others – it does conclude by giving some thought as to the direction of this evolving challenge and relates it to the adaptation/counter-adaptation dynamic underway.

Technology adoption

A broad consensus has emerged that science and technology is evolving at a speed and rate of acceleration that has never been experienced before.¹⁴ In parallel, the forces associated with globalization have significantly lowered entry barriers for individuals and non-state groups to acquire and use advanced technologies. War is inherently asymmetric; historically the actions available to militants have been constrained by lack of access, relative to the state, to advanced weapons and equipment. Non-state groups, including armed militants, can now access capabilities that were, until recently, largely within the purview of governments.¹⁵ If states can no longer assume a complete monopoly over advanced technologies, the playing field might be evening in some areas.

That militant groups try to leverage the latest consumer technology to make up for capability gaps vis-à-vis regular military forces is well recognized in security studies

literature. Much has been written, for example, about how access to forms of readily available communication and multi-media technology has revolutionized the way a variety of groups raise funds, recruit supporters and fighters, conduct operations, and publicize activities, especially successful attacks.¹⁶ Similarly, the explosion of the commercial drone market means that UAS are potentially available to anyone who has the money to buy them. Through acquiring drones, militants can radically enlarge their presence in the tactical battlespace. “For the first time,” as one analyst puts it, albeit omitting the case of the Tamil Tigers’ experimentation with a rudimentary air wing, “non-state adversaries [by adopting drones] would have an air force.”¹⁷

Yet even when there is a compelling – perhaps obvious – case for a technology, it does not necessarily result in automatic adoption. For one thing, adoption of a new idea, behavior, or product (i.e. “innovation”) does not happen simultaneously in a social system; some organizations are more apt to adopt the innovation than others.¹⁸ Almost half a millennium passed, to bring in an oft-cited example, between the invention of gunpowder and its widespread employment on the battlefield.¹⁹ Scholars in the business field, international security studies, and military history have long sought to understand the processes involved in the diffusion of innovation – whether this is related to a new device or idea – and what best accounts for the variation in the rate and time of adoption among organizations.²⁰ Indeed, one of the most highly contested issues in strategic studies centers on the question of why some militaries adopt a particular innovation and others do not.²¹

When it comes to the diffusion of innovation in the context of militant groups, there are major disagreements about why adoption occurs – and does not occur. Borrowed from business studies, adoption capacity theory (ACT), as the name implies, argues that much depends on the adoption requirements of the innovation and an organization’s capacity to meet these requirements.²² If the innovation is too costly, groups with major resource constraints may not be able to afford adoption. Or, they may not have the organizational wherewithal to incorporate the change that the innovation brings with it. In contrast, other scholars argue that the key factor in innovation adoption is whether there is a perceived tactical or strategic benefit.²³ Proponents of this framework are critical of ACT for starting with the assumption that all groups want to adopt the innovation but only some can. This is especially true of technologies where the entry barriers are very low. The case of cellphones is instructive in this respect. To be sure, the spread of cheap and reliable mobile communications (i.e. cellphones) in the late twentieth century opened up new possibilities for organizational models for terrorists and rebels.²⁴ But their widespread use also allowed some states to monitor the activities of groups and target them, reducing the tactical benefits of usage and leading to some groups to subsequently shun the use of this technology, reverting back to traditional methods of communication for command and control.²⁵

The case of drones can help us better understand the diffusion of innovation among non-state armed groups. Drones, of course, differ tremendously in cost, capability and accessibility. Exploring which devices have been used, how they have been employed, and by whom can help shed light on the explanatory relevance of competing theoretical frameworks and provide a better foundation for speculating about how the threat may evolve in the future.

On the tactical battlefield

Technology is not in and of itself beneficial; unless an application for the technology is found that is superior to current tools and methods, its potential will remain latent. For some security analysts, drones hold out the prospect of radically altering the encounters between state parties and non-state adversaries. The section below evaluates the ways in which different groups have to date attempted to harness drones in tactical settings.

Attack

Based on the recent experiences of Western militaries in Iraq and Afghanistan, it is perhaps unsurprising that much of the current concern about the use of cheap, commercially available or modified drones has focused on their use as a delivery system for improvised explosive devices (IEDs). Since the early 2000s, militants in Iraq and Afghanistan have made great use of hidden IEDs to avoid close-quarter engagement with Coalition forces. Drones carrying IEDs could further increase the physical separation between state and non-state combatants in violent encounters. Given the typical superiority in terms of firepower that state parties possess, attacking indirectly and with a degree of impunity has great appeal for insurgents and terrorists. Moreover, aerial transportation makes IEDs mobile, multiplying the number of possible targets. A drone carrying even a small IED could take out critical equipment such as a radar, be used to kill key leaders, or ignite the explosive potential provided by targets like fuel trucks or ammunition stores.²⁶

It speaks to the Pentagon's worry about aerial IEDs that the agency initially tasked with countering hostile drones in general, the Joint Improvised-Threat Defeat Organization, was the same one that had earlier been established to thwart IEDs.²⁷ Contrary to the attention placed on the aerial-borne IED threat, however, there are few known instances, successful or otherwise. During the Israel-Lebanon war in 2006, Hezbollah reportedly flew three explosive-laden, Iranian-built *Ababil* drones into Israel, but these were destroyed in the air by the Israeli air force.²⁸ In late 2016, Syrian government forces claimed to have shot down three IS drones loaded with IEDs, but there are no means of confidently assessing the veracity of this claim.²⁹ There has been only one recorded successful use of an aerial-borne IED, in northern Iraq in October 2016. After shooting down one of IS's small drones, Iraqi Kurdish forces began taking apart the device. A hidden, Trojan-horse IED, however, detonated killing two Kurdish fighters and wounded two French special operators.³⁰ This probably marks the first time any group has lethally used an IED-laden drone to kill troops on the battlefield.³¹

Beyond IEDs, analysts have warned that weaker opponents could use aerial drones to achieve a combat kill against a stronger military opponent by flying the vehicle, in kamikaze style, into critical targets, such as planes taking off, radars, or even against aircraft on the flight deck of a carrier. Whilst some vulnerable assets can be hardened, others, like large parked aircraft, radars and satellite dishes, cannot without considerable cost and disruption. In the Gaza Strip, Hamas have threatened Israel with kamikaze drones but have never followed through on this threat or specified what the target might be. Houthi forces in Yemen have recently flown their Iranian-built *Qasef-1* military-grade drones into the radar sets of the Saudi-led coalition's MIM-104 Patriot surface-to-air missile systems.³²

They achieved this by programming the drone systems with open-source GPS coordinates of the Patriots' positions.³³ They may have opted for this direct-strike use of their relatively sophisticated drone because they did not possess the technical know-how to take full advantage of its full reconnaissance capabilities. To date, the kamikaze role has not been a significant means by which militants have used drones on or off the battlefield.

The most prolific direct attack application by militants has taken the form of dropping small explosives from commercially available small drones as well as larger modified devices. As the fight to retake Mosul intensified at the end of 2016, IS increasingly used tricky-to-intercept, small quadcopters modified to release small grenades (those manufactured for grenade launchers), small mortars, or bomblets from cluster munitions against Iraqi Security Forces (ISF) in the city.³⁴ These "killer bees," as one senior US Special Forces commander nicknamed them, brought the US-supported effort to wrest Mosul from IS to a temporary halt.³⁵ Hezbollah and other groups operating in Syria have also used small drones to drop bomblets on enemies.³⁶ Although these attacks have a low kill rate, they do, judging by the reaction of the human targets on the ground, generate considerable psychological and disruptive effects.³⁷

Away from the battlefield, even miniscule incendiary devices dropped from a drone can cause huge damage to arms depots and energy infrastructure by igniting explosive material on the ground. Moscow-backed rebels in Eastern Ukraine likely used drones to drop grenades which caused the explosion that destroyed Ukraine's giant Balakliya arms depot in March 2017. According to some reports, this method of anti-material aerial attack led to the destruction of some 70,000 tons of munitions at a cost to Kiev that may reach a billion US dollars.³⁸ At least one analyst believes there were at least two previous attacks by these means against other ammunition depots in South-east Ukraine and a prior, failed attack against Balakliya in December 2015.³⁹

Until recently, few states possessed armed drones in their inventories. This capability, however, is proliferating to an ever-larger number of states and perhaps also to non-state actors. In September 2014, it was reported that Hezbollah had successfully carried out a drone strike against Jabhat Al-Nusra in Aarsal, Syria killing dozens of fighters. If true, it would mark the first time a non-state entity carried out an armed drone attack. Also, in early June 2017, an Iranian *Shahed-129* armed drone attacked US-led Special Operations forces near the border outpost of al-Tanf. The munition launched proved to be a dud and the drone was shot down.⁴⁰ It is not publicly known which group was operating this drone, but the reality that states have already equipped some non-state proxy forces with armed drones can no longer be discounted.

In sum, the use of drones by militant groups to attack enemy combatants and infrastructure has to date been episodic. The intense use of modified drones to drop munitions against ISF in the fight to defend Mosul has not been emulated on the same scale by other groups or even IS itself, which points to the particular conditions of that battle.

Eyes in the sky

In tactical terms, militants have used drones – especially small, off-the-shelf devices – for surveillance and reconnaissance tasks.⁴¹ Libyan anti-Gaddafi rebels from Misrata employed the small *Aeryon Scout* drone to help their rapid march on Tripoli in the summer of 2011.⁴² Islamic State have made extensive uses of "spotter mini-drones"

with smart cameras to reconnoiter Syrian and Iraqi military bases and positions ahead of attacks as they swept through much of Eastern Syria and Northern Iraq in 2014.⁴³ Easily purchasable, small UAS have proved valuable to militants for reconnaissance missions ever since. Also, various groups in Syria and Iraq have used drones both to locate targets for indirect fire attacks and, using real time video feeds, for adjusting fire for accuracy.⁴⁴ A commander of Iraq's largest Shia militia, the Badr Organization, noted that drones "have helped us lock onto targets with our mortars and cut Isis's supply lines."⁴⁵ A myriad of groups from the Syria to the Philippines have used off-the-shelf drones to gather information on their opponents' movements and facilities, to aid infiltrations or plan assaults, or to anticipate lines of attack and evade capture.⁴⁶ Maritime non-state actors have also shown an interest in employing aerial drones to help avoid interception by state parties or to locate ships to hijack.⁴⁷

The requirements for adopting commercially available "spotter drones" are low. Simple systems can be operated with minimal technical know-how, and, unlike with weaponization of drones, the devices need little modification. In short, the entry barriers for using drones for surveillance and reconnaissance are relatively low while there appears to be a clear use-case.

Strategic incentives

Beyond use on the battlefield, militants also acquire and operate drones for the wider organizational goals of propaganda and publicity. Hezbollah's repeated penetrations of Israeli airspace with advanced drones since at least 2004, for instance, have formed a key part of the organization's publicity efforts.⁴⁸ Its leader, Hassan Nasrallah, boasted after the first drone penetration of Israeli airspace that its *Mirsad-1* drone (an updated version of the early Iranian *Mohajer* drone used for reconnaissance of Iraqi troops during the 1980s Iran–Iraq War) could reach "anywhere, deep, deep" into Israel with 40–50 kilograms of explosives.⁴⁹ More recently in 2012, Hezbollah claims to have flown a sophisticated drone over the Mediterranean, capturing imagery of US and Israeli warships, and then entering Israeli airspace over the Gaza-Ashkelon area, documenting the position of Israeli security forces. Hezbollah-affiliated *Al-Manar* TV aired a video animation simulating the flight path of the drone, claiming that it avoided detection by Israeli radar.⁵⁰ Though there may have been some operational utility in the flight – the testing Israeli responsiveness, for example – the main benefit was surely in undermining perception surrounding the efficacy of Israel's air defense system whilst simultaneously enhancing the credibility and reputation of Hezbollah.⁵¹ In the Gaza Strip, Hamas claims to possess drones for spying, firing missiles and "suicide missions." Yet in practice, Hamas' main use of drones has also been penetration of Israeli airspace for propaganda purposes.⁵² The cost–benefit calculus of penetrating an opponent's airspace with sophisticated drones is currently peculiar to the dynamics of the Arab/Palestinian-Israel conflict and the user groups – Hamas and Hezbollah – which have pretensions to statehood. Operating sophisticated drones is likely a symbolic attempt to show the groups' state-like capabilities.

With the objective of enhancing organizational reputation, many groups fighting in Syria and Iraq have used drones extensively to film fighting and martyrdom operations.⁵³ Uploading the footage onto social media, these militants want to enhance their group's

brand to attract recruits and bolster external support. The high-grade production of propaganda material from drone footage is likely designed to make the organization look strong and its enemies weak in effort to buttress the morale of its own fighters.⁵⁴ Islamic State in particular have been an early adopter of using drones in this fashion.⁵⁵ Through clever curation, IS has even used footage of winged drones in flight with imagery of bomblets being dropped to mislead viewers about the extent of their capabilities.⁵⁶ In late 2016, the use of drones for publicity and propaganda had migrated to Afghanistan. A highly polished aerial video of a suicide car bomb attack against a police station in Helmand Province in Afghanistan was posted on Taliban social media accounts (a far cry from the grainy, shaky footage captured with hand-held cameras by the group).⁵⁷

It is very difficult to estimate the degree to which drone video footage has actually benefitted various groups. The fact that more and more groups are uploading footage of their operations tells us that they at least think it is an important tool in what is a competitive marketplace for support.⁵⁸

Theorizing about variation in drone adoption

As the above discussion shows, the record of drone usage is varied. What best explains the variation in adoption? Some groups may simply lack awareness as to the value of a technology. According to proponents of tactical incentives, the key factor in adoption is that the person or group must perceive the idea or product as having a relative advantage. In short, there needs to be a clear operational use-case, otherwise combatants will likely stick with the tried and the tested.⁵⁹ Militant groups pursue diverse political, economic or social agendas, and, partly for this reason, they differ tremendously in the methods and tactics they employ and the scale of effect they seek to achieve.⁶⁰ Some groups may simply see no current benefit in integrating any type of drone into their *modus operandi*.

Meaningful adoption requires the application and exploitation of the technology in a way that delivers some kind of advantage. Militant groups, as the preceding discussion showed, have found a number of beneficial applications for drones; but these may be highly context specific. The urban terrain of the city of Mosul was in many ways perfect setting for the type of drone operations that IS conducted. As one terrorism expert notes:

the city offers a close-quarters urban combat environment where the battle's front lines may be across the river, across the street or even in the building next door. Enemy troops are never too far away and are easy for small drones with a limited range to reach.⁶¹

Drones present less of a viable use case to groups operating in heavily forested areas, for example, or in situations where groups rarely engage directly with enemy combatants.⁶² In addition, states have already exploited vulnerabilities inherent with the systems. Drone controls more often than not use radio-frequency emitters, making it relatively easy for states with advanced collection platforms to identify and track down and target the ground-based pilots.⁶³ Furthermore, in Iraq the US has carried out precision airstrikes against IS positions using GPS data recovered from targeting systems of downed drones.⁶⁴ In the case of advanced drones, such as those used by Hezbollah and Hamas, these have proved relatively easy to destroy once detected.

ACT tells us that the speed at which organizations are able to adopt new technologies and techniques varies. But cheap, commercially available drones are so easy to acquire and

operate that few groups would find the requirements of adoption too demanding. For much of the world, there are few logistical constraints involved in obtaining commercial drones such as the ubiquitous *Phantom*, built by Chinese SZ DJI Technology Company, the world's biggest consumer drone maker.⁶⁵ Shia militias in Iraq, for example, purchased hobbyist drones from a Baghdad toy shop before they marched off to the frontline.⁶⁶ Although off-the-shelf drones are relatively easy to acquire, it does not mean, however, that they can be easily weaponized. Lightweight military ordnance, such as bomblets from cluster bombs and small grenades, were in abundance after IS routed the Iraqi military in the summer of 2014. Not all groups can expect such ready access to a steady supply of light military-grade munitions that are ideal for the low carrying capacity of small commercial drones.

Not all drones are equal, of course: they vary widely in affordability, accessibility, and capability. Designing, building and operating advanced drones remains beyond the ability of non-state groups, as well as most states for the time being. Although the Houthis in Yemen claim their *Qasef-1* drone is indigenously designed and manufactured⁶⁷ it is almost certainly Iranian built.⁶⁸ Hezbollah, which possesses more state-level features than perhaps any other militant group, is reliant on external transfer for the drones it uses to penetrate Israeli airspace. Furthermore, few militants groups can develop the necessary technical expertise to operate and maintain sophisticated drones.⁶⁹ Operating sophisticated drones also requires training. Once devices are transferred to a group, the principal type of technological diffusion is disembodied diffusion, that is, the transmission of knowledge.⁷⁰ Here, external networks are an important enabler for groups to reach an understanding about the possible applications of the technology. After Hezbollah received drones from Tehran in the early 2000s, it likely sent operatives to Iran to receive training on the systems from the Iran Revolutionary Guard Corps.⁷¹ The importance of external networks to groups is thus relative to the sophistication of the drone technology. The diffusion of more advanced technology to groups tends to be fostered through access to outside sources, making the level of external support an important variable.⁷²

Conclusion

"[I]n Iraq War 3.0," Peter W. Singer observes, referring to recent anti-IS operations, "every single side in the war – whether it's the U.S., ISIS, Iraq, Hezbollah – is using unmanned systems. That's the definition of the end of proliferation. That discussion is over; the technology has proliferated."⁷³ Though drones are now among us, future usage by militant groups will still be guided by both a calculation of incentives versus costs and the ability of the group to absorb the technology.

Various militant groups have found tactical use-cases for a variety of drone systems on and off the battlefield. To date, however, drones have not produced rapid and revolutionary change in contests between militants and state parties. There are currently major limitations on the distance and length of time cheap, off-the-shelf drones can be flown, not to mention constraints on the weight of the objects they can carry. Indeed, these shortcomings are not lost on many of the user groups.⁷⁴ Some militant groups have attempted to alleviate range and flight time limitations by augmenting existing systems with more powerful antenna or adding additional batteries to the vehicles.

Advances in drone technology could make the use-case more appealing to militant groups. The distances drones can be flown, for example, are increasing exponentially. One might expect a determined group to fly a drone great distances (perhaps even over several days) in order to attack a target. The great attraction here is that it allows groups to move their range of attacks to beyond the immediate combat zone.⁷⁵ Presently, commercially acquired drones are severely restricted in how much they can carry, but it may not be long before drone carrying weight increases, creating a much more dangerous IED threat. In parallel, carrying weight might be less of an inhibitor in the future due to developments in other technologies that lessen the payload burden.⁷⁶ Also, ease of access to more advanced sensors could increase incentives for drone usage. In the not-too-distant future, militant groups could, for example, equip short- or medium-range drones with small explosives and heat detection sensors to seek and destroy anything with such a signature within a given area.⁷⁷ Utilizing 3D printers, insurgents may not even need to purchase drones but instead be able to produce dozens of cheap devices every single day. Possessing a potentially limitless supply of drones, groups could continuously keep drones over the flight line of key government airbases.⁷⁸ Rapid advances in the autonomy of drone systems will reduce the training requirements and experience levels needed to pilot devices further lowering entry barriers for operating drones.⁷⁹ In addition, removing a drone's reliance on GPS coordinates would make it more difficult for state parties to jam or spoof a drone's guidance system. Greater automation also opens the prospect of multiple small drones working in concert in mass formations, i.e. "swarming." In short, technological developments may serve to increase the incentives of drones to groups whilst at the same time lowering the entry barriers for adoption. But these developments will not happen in a vacuum. Drones will be subject to the same back-and-forth, techno-tactical adaptation dynamic between adversaries that have accompanied prior military innovations.⁸⁰

As stopping the spread of readily available commercial drones is not an option, warfighters engaged in low-intensity conflict will need to develop preventative measures either physically to stop drones⁸¹ or interrupt their radio signals electronically.⁸² After encountering IS drones during efforts to recapture Mosul, US forces accelerated the deployment to the field of electromagnetic and radio frequency technologies.⁸³ Even the relatively low-tech Iraqi military units have been using a Taiwan-built Raysun MD1 Multi-copter drone jammer to disable incoming drones.⁸⁴ As countermeasures mature, militant groups may see fewer advantages in obtaining and operating drones. Many solutions to drones, such as directed energy, on-the-move systems are, however, some way of actual deployment, and question marks remain over their efficacy in an urban setting.⁸⁵

Technology diffusion – in the form of new or improved technology and the transmission of knowledge or technical expertise – rarely occurs at a uniform rate. Drones are no exception. Their usage or non-usage is highly contingent on both the setting of the conflict, the aims of different groups, and the capacity of groups to adopt the technology, especially the greater the device's sophistication. But organizations also only know what they know. As entry barriers lower further, there is even more urgent need for research on the transmission of drone *praxis* within and between militant groups. This will help us understand how adopters learn from and emulate early innovators (such as IS) and to anticipate whether laggards will ultimately copy what the majority are doing.

Notes

1. US Department of Defense defines a drone as,

a powered, aerial vehicle that does not carry a human operator, uses aerodynamic forces to provide vehicle lift, can fly itself (autonomously) or be remotely piloted, can be expendable or recoverable at the end of the flight, and can carry a lethal or nonlethal payload. (*DOD Dictionary of Military Terms*, 2013, http://www.dtic.mil/doctrine/dod_dictionary/)
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ORCID

Ash Rossiter  <http://orcid.org/0000-0001-5427-2229>