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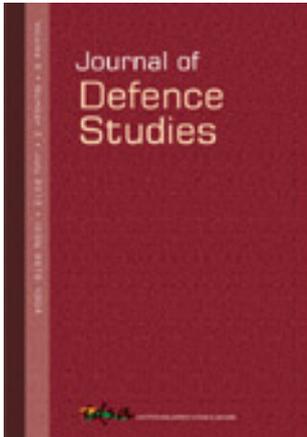
Drones: An Emerging Terror Tool
Atul Pant

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Drones
An Emerging Terror Tool

Atul Pant[*]

From the days of their inception, remotely piloted aero models (known popularly as drones) have been feared as a means of spreading terror. Recently, the use of drones by terrorist outfits like the Islamic State of Iraq and Syria (ISIS), also known as the Islamic State (IS), has seen an increase and this has brought those fears to the fore. Experts fear that the drones have given terrorists a near-perfect solution for spreading terror and a major terror act may be around the corner as legal and illegal drone activities are on the rise. Many solutions have been put forth but none are foolproof, and the governments are looking for more reliable and acceptable solutions by seeking answers in technology. This article reflects on the extent of the problem and highlights the nuances of looking at such technology and its misuse. It deliberates on the current solutions available to counter the use of drones for terror activities and suggests some new and possible counters to the same.

Late in January 2017, an Islamic State video appeared on the Internet depicting fighters using a drone to bomb military targets in the Iraqi city of Mosul.[1] The use of drones by terrorists is not new, nor has such use ever been discounted by security analysts. In fact, it has been widely, and rightly, considered as a nightmare scenario. From the days of the

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availability of radio-controlled (RC) aircraft models, these devices have been seen as a highly viable and effective means of spreading terror. However, thus far, it has not happened on a scale that could terrorise the masses or cause any major damage. This could be attributed to a possible lack of awareness and limited access to aero models and RC technology in the past; hence their potential could not be exploited as much by terrorists. But now with open and increasing availability of these devices and associated modern technology, the risk of their use as a key weapon by terrorists has increased manifold. The January 2017 incident was one of the many that were seen in Iraq in recent times.[2] The terrorists have used drones only in West Asia thus far, and it is probably still limited to that region only. However, the use of drones for terrorist activities all over the world is fast becoming a real possibility.[3] Terrorists can use these to pull off some dreadful scenarios, for example, the assassination of a prominent leader or a chemical attack during a gathering. Experts say that now it is only a question of 'when', and not 'if'.

The drone has been put to multiple uses by the state forces. Its use has been incrementally increasing in warfare. American forces now employ drones in various roles in West Asia and Afghanistan almost routinely. Even countries like Pakistan and Nigeria have employed these in anti-terror operations. Modern armed forces, having realised the advantages of such technologies, are now inducting unmanned aerial vehicles (UAVs) or drones extensively into their arsenal. These have been found to be significantly advantageous in multiple high-risk roles such as reconnaissance and surveillance using optical and radar devices, electronic intelligence gathering, communication relay, target designation by laser, directing and correcting artillery fire, battlefield logistics, search and rescue, disaster management, security as well as operations in chemically, biologically or radiation-contaminated environment. In terms of non-military uses, aerial photography, surveying purposes, disaster management, logistics, inspections, security, and policing are some of the professional uses that drones are being employed for. A few more are in pipeline. Advanced militaries have already developed drones for armed roles, while almost all other militaries are working on similar lines.

Drones have, in fact, opened a whole new chapter in warfare, bringing about a change in both the concepts and tactics of war fighting. While armed drones have hitherto enabled state forces to remotely fight the war operating from an environment of relative safety, it is almost certain that

in the future, these will find similar use at the hands of terrorists and rogue elements too. Thus, this envisaged scenario raises a whole new realm of threats and security challenges.

The Burgeoning Threat Posed by Drones

According to Joby Warrick of *The Washington Post*, the bombing incident of January 2017 was one of the many such attacks that occurred earlier in an accelerating campaign of armed drone strikes by the IS in northern Iraq.[4] The group very soon formally announced that it had established an 'Unmanned Aircraft of the Mujahideen' unit, and claimed killing or wounding 39 Iraqi soldiers in drone attacks in a single week.[5] At the time, news reports quoted the United States (US) Central Command as saying that '…coalition troops reportedly have had as many as 30 encounters a week with UAVs in the recent times. These drones were inexpensive ones, modified to drop grenades or to surveil troop movements.'[6] The American and Iraqi commanders, in fact, had to issue warnings to front-line troops to take countermeasures.[7] Here, it is pertinent to say that the terrorists have the advantage of initiative and ingenuity in their use of drones and it is left to the state system to match up to counter the resourcefulness of the terrorists.

Terrorists have been using drones for over a decade. Hezbollah has been flying them into Israeli airspace for intelligence gathering and attacks. Most recently, they have used them for dropping bomblets on Syrian rebels. In an article published on the *Bloomberg View* website in 2014, the editors wrote: 'Al-Qaeda has planned to use remote-controlled planes for a range of brutal attacks. A Massachusetts graduate student has been imprisoned, in 2012, for plotting to strap plastic explosives to small drones and fly them into the Pentagon and the US Capitol.'[8] It was also reported that Al-Qaeda operatives in Pakistan had commissioned an avionics engineer to build small attack drones.[9] The Islamic State has also posted online propaganda videos advertising its drones along with detailed tutorials explaining how to arm them.[10] Warrick further describes, in some detail, the use of drones by the IS: 'Since 2014, Islamic State has been using drones to gather battlefield intelligence and to document the effects of suicide bombings, often broadcasting the videos online. Occasionally, the group would strap an explosive onto a small drone and try to land it near a military outpost, as happened in October when a booby-trapped toy aircraft exploded as Kurdish fighters were examining it near the northern Iraqi city of Irbil.'[11]

All the instances cited above indicate the seriousness of the issue, that technology has the potential to be misused to a far greater degree than imagined. Moreover, as advances in technology and economies of scale balance out, the potential for misuse will only increase exponentially. The next section looks at the challenge posed by the wider dissemination of such technology.

CHALLENGES OF DRONES PROLIFERATION

The issue has assumed worrisome proportions because of the increase in the easy availability of cheap remote-controlled flying drones. According to some estimates, a 'commercial off-the-shelf micro drone can be bought for as little $600.'[12] The market volume for consumer drones was over 6 million units in 2015, and is projected to increase tenfold to 67.9 million by 2021.[13] 'In the US alone, over 1 million civilian drones were sold in 2015; and on a global level multiple millions of drones, ranging from small toy drones to larger commercial models, are sold and purchased.'[14] Remote-controlled quadcopter and aero models are a part of children's toy inventories these days and are available at corner gift shops and through online shopping stores. Even a moderately technically inclined terrorist can use the electronics from these or use these themselves as a striking device. Even small-size commercial drones are often quite sophisticated and can autonomously follow a predesignated flight path and perform programmed functions like delivering goods. Many companies are using drones as delivery platforms for their items. For example, in 2014, pizza delivery done using a drone in south Mumbai created a sensation of sorts. The company used a remote-controlled, Global Positioning System (GPS)-enabled, four-rotor drone to deliver a pizza to the rooftop of the 21-story apartment building.

Some drones are designed with intelligent electronics to negotiate obstacles. On 16 May 2017, 10 Chinese-made DJI Phantom-4 Pro drones were seized at Bengaluru which could fly up to 6,000 metres altitude and carry up to half a kilogram payload. This drone is capable of acting by itself upon finding obstacles, has an intelligent battery system and an advanced satellite navigation system compatible with GPS as well as the Russian Global Navigation Satellite System (GLONASS).[15] Thus, all that a terrorist would need to do in order to can bomb a target or place an explosive anywhere is by launching a pre-programmed drone from a secluded place at a set time and disappear. The programmed drone would thus do the job.

Do-it-yourself (DIY) kits for constructing drones and aero models are also easily available online and in shops. Terrorists invariably have amongst their supporters a few malevolently inclined and talented individuals who are ready to help them with required innovations. There has not been an act of terrorism using drones in India as yet, but the manner and pace at which the use of drones by terrorist groups elsewhere is proliferating indicates that it may only be a matter of time before these would be used here as well. Some organisations are also reportedly obtaining outside help in such matters, regardless of global opinions or pressures. For example, a Hezbollah fighter interviewed by the website Middle East Eye claimed: 'We are definitely learning a lot by working with Russians and Iranians in the Syria war and more specifically when it comes to UAVs.'[16] Beginning with the use of drones for reconnaissance around 2004, Hezbollah has used the war in Syria to showcase its knowledge of and use of drones in war fighting.

Global Scenario

In April 2016, the International Air Transport Association (IATA), a global airline body, revealed that aviation safety authorities worldwide have reported a significant number of near collisions with unmanned objects.[17] Such drone flying has a huge potential to become a weapon in the hands of the terrorists. There is no unanimity of opinion, as also surety, whether some of the near misses with drones in reported incidents the world over were part of terror plots. This is one of the easier ways for a terrorist to achieve his aim of creating mass terror. A GPS-mounted and programmable drone could easily be placed in the flight path of aeroplanes coming in for landing at night. It would be very difficult to detect, especially if placed at a distance from the airfield. Nowadays, even toy drones with television cameras doing a live broadcast are available easily. A terrorist can see the target through the camera and fly his explosive-laden drone into its target, which could be an airliner in the air or any target on the ground.

The targets for such terrorist attacks need not only be military but can also be those that would create mass panic, for example, an airliner parked in front of the passenger terminal at a busy airport. Such an incident would not only create considerable chaos on-the-spot, but would also have a highly adverse effect on the commercial airline industry. Such drones could easily be launched from moving vehicles on isolated roads. Besides being difficult to spot, these can be easily mistaken for birds due

to their small size and slow speed. Their flight path could be programmed to deceive or avoid lookouts and guard checkpoints. Other targets could be anything from mass gatherings, fuel tankers and dumps, high-tension power lines, aircraft parked on the tarmac, embassies and even important individuals. Such a scenario has never been implausible: 'In July 2015, both British and American intelligence services reported evidence that terrorist organisations are planning to use drones, or even swarms of drones, to carry out attacks against heavily populated installations such as football matches or festivals.'[18] The emerging drone threat has led some experts to question whether even developed and militarily advanced countries such as the US are adequately prepared to defend themselves against possible drone terrorist attacks.

The Washington Post's Warrick opines in a video interview that the weapons that the terrorists have been seen to use are not anything sophisticated. As of now, these are just mortar shells or something similar, that can be easily dropped from drones.[19] So far, terrorists have been observed to be using only small calibre weapons. However, it needs only a figment of imagination to foresee that as time passes, it would not be very difficult for terrorists to use higher payload-carrying drones. Sooner or later, modular drones may also be innovated or developed, which would be bigger, with higher payload capacity, and could be easily concealed in a vehicle as separate parts and assembled in minutes just before launch. Such drones are likely to give a considerable capability to lone wolves to function discreetly. Large drones are, however, likely to be rare due to concealment issues.

Weapons that can possibly be delivered by drones include explosives, chemical agents such as gases and aerosols, radioactive substances, and biological contaminants. In the early 1990s, the Japanese apocalyptic cult Aum Shinrikyo attempted (but failed) to release the nerve agent Sarin using remote-controlled helicopters equipped with aerial spray systems[20] (the gas was later released in 1995 on the Tokyo subway system). A pre-programmed drone can release cyanide or a biological agent into a public overhead tank; this could probably be done at night to avoid detection. Drones can be used to place bare wires or explosives over high voltage or railway grids in unpopulated areas to disrupt the grid supply. Narcotics trade across the borders using drones is also an option with the terrorists for generating funds. There have been reports of a Mexican drug cartel using drones to get illicit drugs across the border; however, they are probably unable at present to carry more than small amounts of

goods.[21] Drones can also be used for the supply of small weapons (guns, for example) to their strike locations. The Joint Air Power Competence Centre (JAPCC) of the North Atlantic Treaty Organization (NATO) lists a few additional threats, including tapping into cellphone networks, hacking wireless networks, and tracking the movement of potential victims.[22] The options that drones tethnology will provide terrorists in the future are unimaginably large and the enormity of the threat is only being realised.

Though some security organisations are sceptical and downplay the threat, including the US Pentagon, most have accepted that the threat is real and are taking it seriously.[23] In 2014, France's General Secretariat for Defence and National Security (SGDSN) and the National Research Agency (ANR) launched a programme to find ways to counter drones without resorting to spoofing—which is a technique to replace the signal being sent by the remotely piloted aircraft system (RPAS) pilot with another one—which is illegal in France.[24] There are many other such issues. Most nations have already started work to address some of the problems, especially the regulatory aspect. The widespread and grass-roots proliferation of small drones in the civil sphere, which is largely unmonitored at present, is also very difficult to keep a tab on. The proliferation and complications of the drone threat are likely to make it one of the most brain-wracking exercises for government organisations to undertake.

Scenario in India

In the last few years in India, cases have been reported of occasional quadcopters or aero models flying very close to airliners. The frequency is once every few weeks. On 29 January 2017, a white four-rotor drone was spotted as high as 12,000 feet by a pilot of a commercial GoAir plane.[25] The white drone reportedly had four rotors and was flying at a horizontal distance of about 2 km from the aircraft. This was certainly not a military drone as the Indian Air Force (IAF) does not have these. In another reported incident, a Jet Airways pilot saw a drone flying dangerously over the approach to runway at the Indira Gandhi International Airport in New Delhi. Around 1pm on Saturday, the air traffic control at Indira Gandhi International Airport was informed by the pilot of a Jet Airways aircraft preparing to land that he had sighted a drone flying dangerously over the approach to runway 29.[26] Occurrences of this kind were neither seen nor reported till about a decade ago. Such incidents are now being

reported far more frequently from all over the world. Indeed, the news of flying being held up at international airports due to possible drone sightings is heard far more often now.

Civil drone flying is, incidentally, banned in India under Director General of Civil Aviation (DGCA) regulations,[27] but it is obvious that this ban is hardly enforced or is not fully effective. While the provision exists for such clearance on a case-to-case basis, there has also been an exponential growth in illegitimate drone flying activity in India. Most of these are toy or hobby aero models that are remotely piloted. Of these, some have powerful motors and a capacity to fly quite high. It is important to note that, in India, there is currently no prescribed set of regulations that governs the design specifications of drones or UAVs.

Countering the Threat of Drones

Shoring up intelligence gathering and analysis capabilities would probably be the most effective counter-measure to tackle this new chapter of terrorism. However, the first step that needs to be taken is to put in place effective rules, regulations and drone design restrictions—that is, the policy aspect. Many countries have either formulated or are in the process of formulating rules and regulations to control drone flying. In June 2017, the British government introduced a compulsory registration scheme for drones weighing more than 250 grams, after more than 3,400 incidents involving the devices—including the smuggling of drugs and weapons into prisons—were reported to police in 2016.[28] These nascent laws are still evolving.

In India, the DGCA has called for a ban on drones till relevant rules are put in place. In 2016, DGCA released draft guidelines[29] that laid down that all unmanned aircraft intended to be operated in India will require a 'unique identification number' issued by the body. It also mandates a minimum 18 years age for UAV pilots along with ground training requirements. The guidelines further emphasise that irrespective of weight category, intimation to various agencies, such as local administration, air traffic services, and Civil Aviation Security before and after the flight, including cancellation, would be compulsory. Also, a record of all flights has to be maintained.[30] The rules and guidelines are expected to be put in place in the first half of 2018. However, these would address only a part of the threat from drones by restricting and monitoring some of drone flying. The larger, and more real, threat with potential for great damage would actually emanate from illegal or

discreet drone activity. 'Irrespective of weight category, the unmanned aircraft systems operator shall intimate local administration, air traffic service unit, airport operator and the Bureau of Civil Aviation Security before commencement and after termination of operation. In the event of cancellation of operations, the operator shall notify the same to all appropriate authorities as soon as possible.'

There is nothing better than foreknowledge of a terrorist activity in order to prevent it. Homeland security organisations and intelligence services in the country will have a major role to play in this regard. Cultivating some individuals in every locality among the masses to report any unusual drone activities can be one measure. Keeping a check on shops which sell toy drones and aero models by mandating them to report details of all such sales to the monitoring agencies through a website can be another step.

Policy and Technology Solutions

Until now, countering the threat of drones has been generally considered to be the responsibility of the military, police or homeland security organisations. A large number of personnel of even these bodies are not fully aware of the nuances and intricacies of the threat. Considering that the use of drones is going to become more widespread in the future, it would probably be impractical for only a few forces and organisations to tackle the threat in addition to their defined responsibilities. This is mainly because time would be a critical factor after a drone is spotted and tackling it would need a timely and speedy response. All security organisations and departments would probably their own specialized drone-countering groups to be set up. In fact, the time to start gearing up for this emerging threat is now. According to Brian Llenas, the '[d]rone threat has fuelled a counter-drone industry, made up of dozens of drone defence startups, which have experienced a substantial uptick in inquiries from prospective buyers in the last six months—coinciding with ISIS's growing use of the unmanned gadgets. According to the chief executive officer (CEO) of Droneshield, a company started three years ago, prisons, stadiums, local law enforcement and foreign governments have all expressed renewed interest in this technology that detects and mitigates unwanted drones.'[31]

Due to their small size, drones usually cast a small signature on radars and their speed is also slow, matching that of birds. Thus, they can be mistaken for birds by an untrained eye. Some companies have now

come up with drone-specific radar and jammer systems to identify and distinguish drones from birds. These systems can be quickly deployed anywhere. Reliable acoustic drone detection devices are also being developed with low false positive rates, as the sound pattern of drones is distinctive. Multi-microphone arrays that will have a detection range of over 700 metres are also being tested commercially.[32] Shape recognition and flying pattern recognition imaging systems, and also Infra-Red radiation detection and imaging systems with high zoom-in capability to identify the shape of a small drone, will not be very difficult to develop in this era of technological advancement. These can be coupled with radars or acoustic devices for automatic homing on to the drones.

Artificial intelligence (AI) is another technology that is already on the horizon and has both promising and potentially problematic aspects. The advancements made in AI are already being successfully employed in many fields to resolve complex problems. This technology can also be used to tackle the misuse of drones, especially where sensory inputs from various sensors can be processed through an AI system for threat identification, pattern recognition of drone flying, frequency usage, among others, to activate most appropriate response or shooter against it. It is thus possible that using AI drones could prove to be a very effective countering mechanism against any illegal drone activity.

Militaries have been using guns, missiles and fighter aircraft to shoot down drones in various war zones. This may be successful in battlefields, but would be an impractical counter to small drones that are likely to be used by terrorists in civil areas. This is because these drones would be rather small in size, and therefore may be difficult to target with guns. Instead, small calibre and short-range missiles, including shoulder-fired missiles, would probably be more effective in taking down such drones. Similarly, small calibre guns coupled with short-range gun control radar could also be designed, but given the cost factor, these might be considered only for highly sensitive and vital installations. As with drones, the counter technology to them would bring its own set of problems. In civil areas, such devices could prove to be a nuisance for public order and spawn fear; in places such as busy airports, where there is an almost continuous flow of aeroplanes, the risk of using guns and missiles would be far too high to be acceptable to the civil or military aviation authorities.

An out-of-the-box solution which some countries have started working on is training birds of prey, such as eagles, to catch drones in mid-air and bring them down. France has formed its squad of eagles at

Mont-de-Marsan in the country's south-western region.[33] This option would, however, have to be used with caution near airports as these could themselves become a hazard to the aircraft. An American company is also developing a drone interception system in which a drone fires a net on the target to bring it down.[34] Electronic jammers, of course, are devices which can be used safely at most places. Transportable or mobile jammers can be used for VIP security and at large gatherings of people. These would, however, be effective only against RC models. The GPS/ GLONASS jammers will probably be effective against autonomous pre-programmed flight path models to a certain extent. One such electronic jamming gun has been supplied to a West Asian government in response to the creation of UAV Mujahideen squad by the ISIS:

> The company says it '*is an affordable product whose cost is in the tens of thousands of dollars rather than hundreds of thousands or millions of dollars, per unit*.'…The 5 kg or so DroneGun is apparently effective against a wide range of drones up to 2 km away. It functions by blocking the video transmission to the operator using the 2.4 and 5.8 GHz frequencies and leaves the drone intact and available for forensic investigation. It can also jam GPS and GLONASS…the gun was used by Swiss police at the World Economic Forum in Davos.[35]

Many other companies are developing such electronic drone guns. If, however, terrorists use other non-standard frequency bands then those drones could become difficult to counter. Terrorists can also use other radio frequencies like those over cellphone networks. The use of a built-in cellphone camera by placing such a device on the drone could enable the drone operator to see live streaming at mobile frequencies which are different from the ones normally used for such purposes. Similarly, drone cameras could be used to livestream via cellphones or on cellular frequencies after tweaking some cellphone electronics. The cellphone circuits could be tweaked and cellular frequencies used for flying the aero model, somewhat akin to the way cellphones are used to detonate improvised explosive devices (IEDs). The use of mobile jammers can counter these a certain extent. The places where these counter measures can be used will be limited to a few because of widespread use of mobile devices like smartphones. Besides, the drones are supposed to be used as a surprise weapon and therefore prior knowledge about the frequency band which would be employed in a drone attack may not be available. Small and portable electromagnetic pulse (EMP) devices can also be developed

to counter both remotely piloted and autonomously flying drones, but these will have to be kept limited in range; and the places these can be deployed in civil areas and airports will also be limited as these can cause collateral damage to other electronic devices within range.

Summing up, the innovativeness of the terrorists in using the drones will, in fact, be the biggest challenge. At present, there appears to be no foolproof solution for completely eliminating the varied types of threats posed by drones.

Conclusion

Since the 11 September 2001 attacks on the United States, terrorism from the air moved from the realm of fiction and possibility to reality. While planes have been used a few times in the past by non-state, terror organisations—another example of which are the series of air strikes undertaken by Liberation Tigers of Tamil Eelam [LTTE] in 2007–08 in Sri Lanka—they are difficult to acquire or build, and even more difficult to conceal. The development and advancement of drones technology has provided an alternate method for terrorists and presented them a near-perfect solution to carry out their malicious intent. The growing sophistication of technology has enabled drones to operate autonomously and carry out an entire spectrum of tasks without human intervention. Not only singly, drones can also be used in swarms which only adds to their lethality potential. Modern drones, in the hands of terrorists, could cause considerable panic and damage if not countered adequately. As the technology advances, security architects and countries have taken cognizance of this fact and are working on the technological as well as policy fronts to counter it. Given the easy availability of advanced technology to common man at reduced cost, and the proliferation of information via the Internet, this threat will invariably grow. It is essential to ensure that the security measures are set up in time so as to avoid any untoward occurrence or a major catastrophe.

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