

The Matador's Sword

Unmanned Aerial Vehicles Against Urban Terror

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Terrorism continues to be a major source of concern to nations as it poses a serious and evolving threat. It also constitutes a direct challenge to the national security and, more importantly, to national unity. India has been in the crosshairs of terrorism for over four decades hence it is imperative that there should be a robust technology driven anti-terror mechanism in place to effectively counter terror. Unmanned aerial vehicles would fit the bill perfectly in India's fight against terror, especially urban terror. They have numerous advantages and can provide effective intelligence, surveillance and reconnaissance (ISR) capabilities as well as enhance India's operational preparedness to safeguard its citizens and thwart any terrorism attempts.

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INTRODUCTION

From the hydrogen bomb to the human bomb, countries have witnessed a startling escalation of threats and what they earlier dreamed of avoiding is a mere speck in comparison of the truly frightening challenges they face currently. The two generations shift from Hiroshima has ushered in an era of terrorism faced with the prospect of a destructive will of a faceless enemy without borders. Terrorism continues to be a major source of concern to nations as it poses a serious and evolving threat, causing one to draw pessimistic conclusions as it constitutes a direct challenge

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to the national security and, more importantly, to national unity. It is becoming increasingly exacting for governments to protect its populace from this hydra-headed monster as terrorism focusses on creating terror, instilling a feeling of insecurity and sowing seeds of the idea that political leadership has lost its ability to protect those they lead. The net effect is a stunned populace with a significant emotional impact on their collective psyches as rage and anger become dominant sentiments. It is needless to emphasise that acts of terrorism have both a direct and an indirect impact on society. The direct impact involves an abrupt increase in loss of life and damage to property, including critical infrastructure. The indirect impact has a more negative effect, impacting the morale of the populace through fear, paranoia and panic.¹

It needs to be understood that terrorism for the most part does not emanate from a single aggressor or location. Terrorists can be lone individuals, part of a small group or even a cluster of informally aligned individuals who marshal violence with limited organisational structure or direction. It therefore becomes extremely challenging to identify and disrupt the operational capacity of a terrorist organisation hitherto known, hence the counterterrorism forces of a government may not be able to accurately assess from where or whom the next threat will emanate. Consequently, it becomes incumbent on the state to have a strong counterterror mechanism employing a multi-faceted response approach in place to sever the factors that fuel terrorism. This warrants methodical thoroughness and the enthusiastic use of actionable intelligence inputs to enforce a terrorism prevention strategy.

The acts of terror in the last couple of decades have no longer been confined to rural locales, instead these have migrated into cities as diverse communities from rural areas have assembled in cities to seek better employment opportunities and economic wellbeing. Cities instinctively accommodate differences and disagreement and use various sophisticated manifestations of accommodation and co-existence to survive. It does not require to be emphasised that the factors that make cities hubs of globalisation also expose them to terror groups and targeted disturbance. Identifying this setup and hitting it is what terrorists hope to achieve by turning communities against each other.

All things considered, looming terror threats may become a part of the new normal, taking into account the rapid expansion of urban landscape. The anti-terror mechanism needs evolution and has to be robust to ensure a speedy countervailing of threats before terrorists can

cause damage and destruction. India will need to rely heavily on the reputation of deterrence that it has worked hard to create over the years. This threat cannot be countered merely by Quick Reaction Forces but must be augmented with technical assets that will be able to provide first hand intelligence on the activities of terrorists. The solution for a system that is cost effective, less manpower intensive and provides real time quality intelligence for a proactive offensive action could be unmanned aerial vehicles (UAVs), which fit the bill perfectly.

With the use of UAVs, the state can evolve a technical blueprint to counter terrorists' persistent intent to target India's urban centres. It is an accepted fact that technology involving UAVs is changing the way counterterror operations are conducted. Such technology has obvious tactical advantages: shortening the time it takes to detect an enemy and laydown fire, otherwise known as the sensor-to-shooter cycle, offering a wider strategy of dominance.

Unmanned aerial vehicles or drones have an almost endless list of advantages, which makes them extremely appealing for counterterror forces. Unmanned aerial vehicles can successfully carryout "3D" missions—dull, dirty and dangerous—in which a human operator would be found wanting in performance. The term "dull" refers to routine, mundane missions such as patrolling over designated target areas. Such missions are not only physically demanding but are also extremely exhausting and monotonous. While humans tend to tire out after 10–12 hours of demanding surveillance, UAVs can continue to remain airborne for over 50 hours. The term "dirty" involves entering airspace infected with chemical or biological agents, which includes nuclear reactors and chemical factories. While a human operator in the vicinity would have to wear cumbersome protective gear, drones can operate risk free, making them more versatile. "Dangerous" basically involves missions that can be done by a UAV instead of a pilot who could be injured or killed. In addition, UAVs provide commanders on the field with quick on-the-spot intelligence and hence can become an invaluable part of counterterror machinery. The paper proposes to suggest use of UAVs to counter terror in an urban scenario. The pros and cons of such a suggestion would be discussed in the paper.

DANGEROUS PORTENDS

The attention of policy maker's the world over has largely remained focused on Afghanistan, Pakistan, Syria, Nigeria, Mali and Somalia as

the principal theatres for 'war on terror', but it needs to be borne in mind that terrorist violence can, in principle, occur anywhere. In the not-so-distant past, terrorists who were termed as combatant non-state actors were viewed by the authorities as a smaller threat and hence a "lesser included case".² The general opinion then was that non-state actors were less threatening to national security than the well-funded, well organised and much more militarily potent armed forces of an enemy nation-state. A series of big-ticket terrorist attacks involving the World Trade Centre and the Indian Parliament in 2001, Beslan in Russia in 2004, London bombings in 2005, the Mumbai attack in 2008 and the Easter attacks in Colombo in 2019 to name a few made the comity of nations sit up and take notice of this singular menace manifesting through multiple means.

Terrorists are gaining the power to strike anywhere, in any way and at a time of their choosing, spreading their hatred and threat across the world. As they are invisible, they remain unpredictable, clandestine and thus untraceable. One can safely assume that in addition to having access to funds, foot-soldiers, safe-houses, weapons and sympathisers, terrorist groups possess good organisational abilities. These factors constitute a finite set of resources and with these at their command, terrorist organisations choose activities that maximise the likelihood of success. Terrorists aspire to accomplish their goals through terrorising a large audience, using media attention as an essential tool in achieving these goals. Rural targets do not offer the same kind of publicity as urban targets.³

If one considers that terrorism is advertising by deed, then the attention-seeking intention of a terrorist is well-served in an urban environment, especially in cities, which are singularly targeted since they are densely populated; urban spaces are invariably characterised by proximate contact. Cities also hold cultural significance and compelling economic, political and symbolic value. Tourists and businessmen attending conventions residing in hotels become targets of opportunity. Tourism and conventions feature prominently in terrorists' crosshairs, and any damage is quickly and deeply felt. Consumers cancel reservations and avoid travel, leading to multiplier effects. Most cities are connected both regionally and internationally and a terrorist strike can have a significant effect as well as could sow the seeds for an epidemic of chaos. Further, attacks on monuments and religious places can carry a huge psychological impact. Terrorists resort to wanton mass killings and

indiscriminate bombings, violating the sanctity of holy places with the intent of causing mayhem and maximum destruction. Furthermore, as representatives of both the print and electronic media are abundantly available in cities, the ensuing reporting is bound to create ripples, highlighting the significant degradation of operational readiness of the state to counter terror threats. This would place the government in an embarrassing situation as the life of the citizen becomes unpredictable despite the best of official strategies.⁴

A WORD TO THE WISE

India's population is expected to be around 1.72 billion in 2060, and it has to be accepted that young Indians from rural areas will continue to flock cities in search of livelihood. This exodus will compel cities to bulge at their seams, making them highly vulnerable to terrorists who intend on making waves through mass casualties. Acts of terror on cities or in urban areas invariably destroy the development achieved by governments on both the physical and social coherence thus forcibly diverting resources away from investment, causing cities to regress.⁵

India has been a victim of urban terrorist violence for close to four decades. Multiple blasts in various cities of India highlighted the growing vulnerability of these areas. Pakistan-based pan-Islamic terrorist organisations have been consistent in their pursuit of their long-term strategy against India. This strategy keeps the Indian security forces and civilians bleeding without the Pakistani security forces suffering any casualties. The terror tactics that plagued India were largely concentrated in the urban areas, and have predominantly involved the use of improvised explosive devices, as witnessed in Delhi, Mumbai, Calcutta, Varanasi and Chennai, to name a few. There have also been some major attacks by suicide squads: the 2008 Mumbai attack by an Islamist group, assault on the Akshardham temple in Ahmedabad and on military bases in Pathankot, Nagrota and Uri demonstrate persistent conventional vulnerabilities. The Mumbai attack of 2008 is testimony to the terrorists' elaborate planning, defeating all existing security mechanisms in place. The terror attacks on the military installations are a stark reminder that military installations in cities would be on the crosshairs of a terrorist's scheme of heinous planning and can be prone to copycat attacks. An attack on military installations in cities would severely undermine the confidence of the populace and seed doubts of

the efficacy of the protection that security forces can offer when they themselves are prone to attacks.

India fortunately till date has not witnessed many lone-wolf attacks, which are attacks by an individual without any guidance, operational or organisational support from terrorist organisations. The mowing down of people in large numbers with the use of a gun or ploughing a vehicle through a crowd cannot be discounted as was witnessed in the killing of a Hindu tailor in Udaipur for posting his views on the internet. These terrorists nurse a high degree of ideological hatred, and as their roots are well covered they cannot be easily traced to a single source.⁶ A list of likely terror targets would include high-rise apartment buildings and places where a large number of people gather, including marriage halls, religious, festival and political meeting venues and processions. Major transportation hubs, including railways stations, airports, bus terminals and cinema halls are also prone due to the high footfalls these places attract. This category places water systems, through which contaminated drinking water could be widely distributed in one or more locations, the postal system (mass or targeted delivery of potentially dangerous mail or freight), atomic and chemical industries, research centres that operate nuclear reactors or use dangerous radioactive materials and petroleum storage facilities under risk, and where the after-effects of an attack would be devastating.

Terrorists have been relying on using timer device bombs in densely populated environments as their primary tactic as this facilitates the easy escape of the perpetrators while maximising public attention on the event. Bomb attacks are effectively used by these inimical groups, as seen in Afghanistan, to summon emergency response personnel including paramedics to the scene, whereupon they detonate a second more deadly device, causing further casualties. It should be acknowledged that the new terrorist, which India presently confronts, is more lethal, more audacious, more innovative and more diabolical. Countering this complex nature of terrorism effectively requires a new set of counterterrorism policies and mere mechanisms such as construction of defensive cordons, 'security zones' or 'rings of steel' where access is restricted and surveillance is significantly enhanced are largely inadequate. Instead it warrants a systematic assessment of counterterrorism technologies such as deployment of UAVs to flag up capability needs.⁷ Unmanned aerial vehicles are a favoured weapon system because of their information accumulation capacities and assurance of human life.

COUNTERING THE SHADOWY BATTLEFIELD

It is essential to analyse what shape can one expect the future terrorist activities to take. The possibility that it will be a deadly concoction of what we already see around us, supplemented with some surprises we are afraid to think of and comprehend cannot be discounted. In counterterrorism, prevention is far more desirable than cure. A question that looms large is how prepared is India to prevent or respond to a possible terror attack? While it is a definite fact that India with a significant increase in both organisational and technical capabilities is better prepared than ever before, but there is still some distance to cover before claiming that there exists a perfect threat decomposition against the invisible enemy. India needs to develop a concept of deterrence to counter this threat. It must be borne that urban terrorism is definitely a long-term threat and hence would require a “long-term strategy” to combat it successfully.⁸

Such counterterrorism measures range from the least physically invasive to the most physically invasive. These techniques include the adoption of the *animated presence* (informal surveillance with people and extra eyes on the street), *panoptic devices* (CCTV, covert surveillance, metal detectors, entry-exit screening, bio-metric tools, jammers), *regulatory measures* (temporal and spatial restrictions and rules, visible police patrols, closures, portable partitions) and *fortress construction* (permanent partitions, fences, walls, gates, and target hardening).

However, there are pitfalls when countering urban terrorists. It is essential in urban warfare against terrorism that the security forces not only adopt methods to ensure the safety of civilians but also prevent unacceptable losses while doing so. One of the terrorists' goals is to provoke the authorities to respond in ways that will cause chain reactions that could further their goals. Overreaction by security forces are more common, with authoritarian displays of force such as initiating punitive action or engaging in excessive repression, thereby causing radicalisation among segments of the population affected by such overreactions. While such action in the presence of full media glare and a large number of the populace invariably sets off alarm bells, a lack of response invariably brands governments as weak and incapable of providing protection. Either way the terrorists score brownie points.⁹

RAPID RISK ASSESSMENTS

Locations where high-rise buildings, broad roads and congested lanes jostle for space with slums, narrow streets with houses very closely built

are a counterterror operatives' nightmare as the problem of identifying "foe or friend" remains the centrepiece of the offensive orientation. The necessity to differentiate between the civilians and the combatants is both a moral and professional obligation that needs definite addressal. When differentiating enemy from friend is achievable, civilians and non-combatants become less vulnerable during urban-conflict and this can be achieved through accurate intelligence, which probably human intelligence operatives may not be able to provide and hence necessitates technical measures involving the UAVs for intelligence, surveillance and reconnaissance (ISR) duties. During counterterror operations, street vendors, occupied pavements, chaotic traffic and haphazard, intentional illegal parking create major hurdles for response teams trying to stealthily reach crisis areas. Terrorists can easily become invisible and melt in overcrowded neighbourhoods, hide a cache of weapons in obscure places and freely hide themselves in a maze of twisting streets. Further, to discourage the entry of security forces at specific locations these terror proxies dig roads and erect tall barricades on all entry points that lead to their hideouts just to keep the security forces from entering the area unnoticed, thus completely losing the element of surprise.¹⁰

Barricades once erected can start housing thousands of men, women and children, as witnessed during protests in Kashmir, posing a number of challenges. On every occasion when the security forces managed to breach the barricades in the Kashmir protests, without exception it led to violent confrontations between the stone-throwing youth and the retaliating forces trying to apprehend the aggressors. There are operational difficulties in engaging in direct combat with terrorists as they generally strive to integrate themselves into the local civilian population, thus making target identification extremely challenging. These terrorists rarely mass into easily recognisable formations and once identified, are often difficult to engage due to concerns over collateral damage. These concerns get aggravated when terrorists try to shield themselves behind non-combatants, as was witnessed in 2009 in the Sri Lankans' final war with the LTTE, which caused enormous civilian casualties. Hence, delivering weapons effects with extreme precision takes on increased importance as highly effective intelligence inputs are required to neutralise terrorists without collateral damage.¹¹

If the area is inaccessible due to roadblocks, drones or UAVs can provide real time intelligence to ascertain the way or which route terrorists are likely to take so that necessary actions can be initiated

accordingly. Ground operations get hindered and any stealth approach to the target area by the forces are rendered difficult in a crowded area as they tend to stand out in their tactical gear and invariably the terrorists by prepositioning innocuous assets would get an early warning and can effectively vanish in the labyrinth of the urban area. Further accentuating the problems, mainstream media's emphasis on the instant airing of news has invariably led to media crews and their vehicles reaching the hot spots well before security responders or law enforcement agencies, thus undermining the credibility of the government's response to a crisis. It is essential that retaliatory actions be severe enough to show strength and deter an anti-terror response, but these should not be so muscular as to inspire excessive, counterproductive escalation.

The state should have the capability to retaliate promptly with measured intensity. Modern remotely piloted aircraft can be the ideal platform, providing for successful engagement and the effective use and integration of different elements of support, including UAVs, which can be game-changers. The ability to provide near-real-time video feeds around the clock can reduce the risk of civilian casualties by significantly improving overall situational awareness. The ability of drones to loiter and gather intelligence for long periods before a raid would provide vital real time intelligence for an effective response. Thus, UAVs can function like the Matador's Sword in a state's fight against this urban menace.

The semi-permissive environments in urban areas bind the states by placing substantial pressures to protect civilians in war. To enhance the operational security and attenuate the ramification of terrorism, there is an urgent need to develop techniques for a relentless pursuit by recognising the indicators of impending future attacks and for quick reassessment of own responsive capabilities. The fight to counter terrorism should commence with a strong and determined counterterrorism community. Additionally, it is necessary to operationalise a community of interest that is single-minded and solutions oriented. This organisation needs an efficient internal communication system that speaks a common language, and a sense of trust and responsibility among members of the community.

The war against terror should continue, but it should be refocused. The state should resort to effective measures solely designed to destroy key threat capabilities and reduce an adversary's willingness to attack by playing mind-games. There is an absolute necessity to draw some attention in the direction of additional tools necessary in the fight against terrorism.

There is a realistic need to assess our own Technology Readiness Level (TRL) and incorporate the use of technical aids including unmanned aerial systems to effectively enhance the threat management capability and provide enhanced operational pictures.¹²

There are a number of countries including France, UK and Australia that use UAVs for ISR missions but only a few countries such as USA and Israel that have been able to effectively deploy them in the physical neutralisation of threats. The recent killing of Ayman al-Zawahri, the Al-Qaeda leader, is a classical illustration of an effective offensive deployment of a UAV in counterterror operations. There have been a host of Taliban, ISIS and Hamas commanders who have been neutralised by both these countries, and these operations have seriously dented the operational efficiency of these organisations, leaving a leadership vacuum.

EYES IN THE SKY

The usage of air borne assets to find, fix and finish a terrorist's node of networks through airborne Intelligence, Surveillance & Reconnaissance (ISR) is a part of the over-the-horizon strategy to obtain precise intelligence and the conservation of resources. These assets are an indispensable tool as they effectively illuminate the terrorists' network topography, their operational geographic location and identify key leaders for necessary targeting. One of the vital air borne assets are drones or UAVs, which primarily are aircrafts that do not carry any crew and are operated either remotely by human operators or autonomously via preprogrammed software or robots and use aerodynamic forces to provide lift. They vary in size, possessing multiple levels of sophistication and can be both recoverable and expendable. They are generally operated in dangerous or hostile territories and are used to monitor developing situations, without endangering the operators. The use of these UAVs in counterterror ops has made it possible for countries to effectively counter two of the terrorists' principal operational advantages hitherto enjoyed where the operational situation was uncongenial to military operations. It defeats the terrorist's ability to hide among the civilian population and use neutral or even friendly territory as a base for operations. Unmanned aerial vehicles are both weaponised and non-weaponised and their utility can be target based.

Unmanned aerial vehicles further possess the capacity to operate even in narrow and confined spaces, produce minimal noise as their humming noise blends into the city traffic, cover large areas of interest and are

equipped with night-vision cameras and thermal sensors, thus providing imagery that the human eye is unable to detect. Unmanned aerial vehicles can be put to use to carry out surveillance and can effectively counter human camouflage to conduct successful operations. This tactical advantage has proved to be more flexible than fixed cameras. Further, they are also equipped with electro-optic, infrared and high-resolution video cameras that can track both stationary and moving targets and provide a 360-degree coverage and intelligent analysing capacity that helps detect, locate and identify potential threats and provide rapid data capture to track terrorists. Its ability to collect intelligence helps the security forces to build “target bank” in the event of an offensive operation. It facilitates verifiable data and evidence preservation. Modern UAVs are constructed using high-quality extremely light fibres and composite materials and are equipped with autonomous flight controller boards, which allow them to be successfully utilised for anti-terror operations in an urban scenario.¹³

Unmanned aerial vehicles can quickly cover large and difficult-to-reach areas, with a capability to operate in all weather conditions, have flexible manoeuvring capabilities and can hover more easily. In addition, UAVs can provide live streaming of detailed data to monitor a terrorist’s plan of action. They can follow objects or intruders identified from a safe distance and quickly cover a large area, providing vital data to the waiting forces. Additionally, these can fly for more than 30 hours without having to refuel, compared with a helicopter’s average flight time of just over 2 hours.¹⁴ Unmanned aerial vehicles also facilitate a rapid response and fast eyes on to the target area, minimising time wastage. This is due to their capability to identify and recognise suspects from their height, size and facial recognition, thus making it very difficult for suspects to hide in public. This leads to a firmer response with a more enhanced plan due to the ability to identify suspects while locating and tracking them down before arresting them. There are also mini drones that are designed for quick deployment and easy mobility, making them ideal for reconnaissance, surveillance and target acquisition. These systems are launched by hand and powered by an electric motor and have the capability to be operated remotely or operated autonomously using global positioning system (GPS) navigation. Unmanned aerial vehicles such as drones armed with tear gas and pepper sprays can be used in counter-protest efforts by inimical elements as part of crowd control tactic. The Heron (MALE) Medium Altitude High Endurance drones available with India would be ideally suited for this purpose.

INCREASING LETHALITY

The armed version of UAVs would be extremely useful in identifying high value terror leaders and neutralising them, which is referred to as leadership targeting or decapitation strategy in counterterror parlance.¹⁵ The neutralisation of a leader leads to organisations either breaking apart or pro tempore weakened and experience a decline in operational efficacy. Continued elimination of the leadership can disrupt the routine processes by deterring other members from assuming leadership roles under the fear of being aurally assassinated. Further, no two leaders are the same, so eliminating the main leader significantly changes the strategy of the organisation, making it less lethal, highly vulnerable to defeat while simultaneously increasing its mortality rate, leading to its disintegration compared to organisations that did not suffer leadership decapitation. Replacements from within the organisation may not be of the same quality and there is a high degree of probability of intra-organisational turmoil, further leading to chaos within the organisation. The cases of Osama bin Laden of Al Qaeda and Velupillai Prabhakaran of the LTTE amply illustrate that the headless hydra loses its efficacy to survive as an organisation. The Al Qaeda exists only on paper as its leader Ayman Mohammed Rabie al-Zawahiri has been assassinated in a drone strike and its potency has been largely diminished; the LTTE has been decimated and is nowhere near recouping. By targeting leaders, therefore, drones not only eliminate rhetorical fuel for terrorist fire, but also disrupt strategic focus and operations. Unmanned aerial vehicles get to fix targets through a laser designation application that guides a missile onto a target.¹⁶

The urban environment is an extremely challenging combat field due to narrow spaces and the presence of a lot of hiding places for terrorists. For this reason, the indigenous development of small, low altitude, autonomous UAVs that can amalgamate and enhance the ability to coordinate their actions will be a useful tool in the urban combat field. Further, the integration of unmanned aviation into the national airspace should be mandatory to avoid any disruption in the air traffic and to prevent any collisions. This can be achieved through a close coordination between the drone operating authorities and the civil aviation authorities.¹⁷

The most important aspect is the utilisation of UAVs by the involved agency on the field and not by the armed forces. This has been successfully implemented in the Jammu & Kashmir (J&K) sector and is fully operational under the auspices of the J&K police. The state police

designated for these duties needs to be trained on the operational aspects of UAVs, including surveillance and drone forensics. This will boost their effectiveness in countering terror threats. The usage of UAVs by the state police would definitely improve operational efficiency as it is easy to be in sync with other personnel of the same organisation and language barriers can also be easily set aside.

Unmanned aerial vehicles in the hands of terrorists can create a huge problem for security forces as it is difficult to be definitive as these UAVs can be put to deadly use depending upon the ingenuity of the terrorist. The usage of drones carrying explosives by Yemeni terrorists against the Saudi Arabian pumping stations belonging to Aramco in 2019, which forced the shutdown of pipelines, laid bare the vulnerabilities of even larger nations. The Indian border district of Punjab has been witnessing regular arms and drugs drop by UAVs from across the border. The use of UAVs to deliver weapons of mass destructions (WMDs), a dirty bomb, a biological agent or a chemical weapon is an achievable task for terrorists and can cause considerable damage even if they carry conventional ordinance and detonate it over urban spreads. Through intelligence consolidation and the gathering of the mechanism on the ground, it is therefore necessary for the security forces to be in relentless pursuit of these inimical forces and be the vanguard to avert a crisis. Unmanned aerial vehicles have their own unique characteristics and are bestowed with both advantages and concerns.

ADVANTAGES OF UAVS

Some key advantages that UAVs offer are enumerated below.

- (a) UAVs can accelerate and manoeuvre beyond the limits envisaged and permitted by human biology, thus ensuring the effective neutralisation of emerging high value, time-sensitive targets through site exploitation.
- (b) UAVs' processing speed is much faster than that of humans. This difference is a product of physical differences: a human's nervous system is relatively slower and is limited by slower chemical transmission within synapses, whereas a UAVs "nervous system" is strictly governed by near speed-of-light electronic signal transmission. Differences in perceptual capabilities exist because UAVs can detect and manipulate stimuli in ways that the human brain is not equipped to handle and thereby facilitating taking on targets of opportunity.

- (c) UAVs offer an unrestricted ability to collect imagery and provide a local operational picture. The imagery collected is ideally suited for carrying out reconnaissance or for evolving rapid situation awareness. Further, its autonomous flight system enables operators to easily insert a designated flight route and the return to a premeditated landing point prior to take off. This enables operators to focus on the mission instead of concentrating on flying the plane.
- (d) UAVs are well equipped to keep a moving target of interest at the centre of the image, thereby not losing sight of the target at any time. In addition, there is a Region-of-Interest (ROI) that encloses the target's image, which is generated through the combination of a visual object detector and a visual object tracker, to effectively keep the entire area under observation.
- (e) Thermal imagers in UAVs facilitate listing out the exact number of persons hiding in a building or a house, helping security forces in carrying out precise checks to apprehend terrorists and prevent counterproductive escalation. This unique feature experienced in the crowded neighbourhoods of Srinagar in Kashmir where the people, houses and terrain offer favourable ground to terrorists to either conceal themselves or their belongings in a manner that challenges the judgement of the security forces. Terrorists have extensively used basements of houses, false ceilings, cowsheds, bathrooms, etc., for obscuring men, arms and ammunition. To further baffle search parties, the entrances to such places are camouflaged with common household utility items. If the security forces do not have specific information, such places normally go unnoticed, and terrorists continue to escape the dragnet.¹⁸
- (f) The sensor fusion offered by UAVs and their ability to be directly overhead a location gives a live picture of the field for security forces to prepare and execute operations accordingly.¹⁹ As the Mumbai experience of 2008 has shown, a group of well-armed terrorists are not easy to fight in urban terrain as tall buildings, narrow lanes and crowded alleys provide inherent protection to them and render the security forces as easy targets. The presence of hostages further complicates security operations when offensive action is underway.
- (g) UAVs can effectively reduce reliance on human intelligence to track high value targets thereby decreasing their risk through exposure. Terrorists thrive on fear and have zero tolerance for any acts of disloyalty; they deter civilians through coercion to prevent cooperation and provision of human intelligence.

- (h) UAVs are the most preferred mode of support for counterterror operations because in stark comparison to their manned counterparts they require relatively minimal maintenance, operating personnel and transportation assets for deployment.
- (i) UAVs' operational capabilities enable all day flying including night operations even under adverse weather conditions; they can survive hostile fire and have secure radio links. They thus are able to provide round the clock intelligence, reconnaissance, surveillance and target acquisition (RSTA), rapid operation damage assessment (BDA) and near-real-time information.
- (j) UAVs can also provide advance operational field management feedback in high-threat zones where manned aircrafts can be exposed to high degrees of danger because of possible hostile action by Man Portable Air Defence Systems (MANPADS).
- (k) UAVs have the capability to immediately participate and adapt to any revision in the operation, unanticipated due to a rapid shift in the tactical situation.
- (l) UAVs' live streaming feature enables ground force units to detect and monitor potential threats from a safe distance.
- (m) Armed versions of UAVs can provide effective fire support from much greater distances, thus minimising the use of forward observers or snipers so as to reduce the risk of such assets.
- (n) UAVs' specific targeting ability can greatly minimise civilian casualties, thus ensuring zero collateral damage.
- (o) Intelligent use of UAVs can offset the shortage in the police to population ratio as the boots on the ground can be effectively reduced.
- (p) UAVs have the unique ability of multiple homing wherein a single weapon system or projectile can select, focus and simultaneously engage multiple targets.
- (q) UAVs effectively offer final protective fire to advancing counterterror troops and ensure that they are not frontally assaulted.
- (r) UAVs have an inbuilt sense-and-avoid technology that allow them to detect other airborne objects including drones and provide early warning.

CHALLENGES ENVISAGED

Unmanned aerial vehicles also pose own unique challenges that can hinder the conduct of a successful operation.

- (a) The success of a UAV operation depends on the availability of more than one vehicle to ensure tactical readiness for simultaneous missions during the same operation. The lack of available UAVs can create conflicting priorities, thus compromising the success of a specific part of the operation or, even, of the entire operation.
- (b) The number of frequency channels available plays a vital role in ensuring the success of an operation involving UAVs. When there is a requirement to use multiple UAVs simultaneously in the same operation but at differing locations and with different operational parameters, the lack of adequate free frequency channels can seriously compromise the near real time data transmission, thus possibly threatening the success of the entire operation.
- (c) Though UAVs possess the capability to operate under all weather conditions, high wind speeds can cause turbulence and a high concentration of atmospheric particles, such as rain droplets, ice crystals or dust, can compromise the mission by reducing the flight capabilities of the UAV and the efficiency of its sensors.
- (d) To efficiently exploit the gathered information there is a requirement for a comprehensive and integrated dissemination architecture that is coupled with an optimised bandwidth usage. To provide situational awareness to all participants, a net-centric approach to unmanned airborne system integration/interoperability is needed. Situational awareness can be totally useless if not continuously refreshed.
- (e) When confronted by a tech savvy adversary who is adept in spoofing, information from the UAV can be easily captured, modified or injected. This vulnerability that exists in the data link enables interception and spoofing, giving hackers complete control of the UAV and the ability to alter flight paths.
- (f) UAVs are prone to operational issues such as the skill of the flight controller whose lack of flying skills can bring the UAV down, causing death and destruction to property.
- (g) UAVs are also prone to Wi-Fi jamming. It is possible to jam the intended drone frequency and lure it to connect to a hacker's Wi-Fi, rendering it operationally unusable.
- (h) In case of urban combat, high bandwidth wireless data communications are not suitable. Additionally, loss of connectivity can result, even at short distances. This adverse effect is compounded by short Line-Of-Sight (LOS) distances, making visual reconnaissance difficult.

- (i) UAVs are prone to breach of data confidentiality due to weak or missed cryptographic suites. Since the transmitted traffic at times is unencrypted, the connection should be protected to ensure data confidentiality and authentication. Thus, using strong cryptographic suites is recommended to prevent data breaches.²⁰
- (j) On identifying a HVT, a non-armed UAV will have to request a weaponised drone or aircraft thereby the target can lose the tail before armed deployment.
- (k) Too much dependence on a single source such as UAVs can lead to a “confirmation bias,” which is often the result of an over-reliance on one source of intelligence at the expense of integrating multiple channels of information that can affect the operational outcome of an operation.

Unmanned aerial vehicles have both pros and cons, but it is evident that the pros outweigh the cons by a large margin. Therefore, it is imperative to bring UAVs into service to counter urban terror and to ensure that the personnel handling UAVs are adequately trained, skilled and motivated to ensure successful operations.

CONCLUSION

Urban terrorism has taken its root in India and poses a vicious threat to the Indian well-being. India will have to build its deterrence operations concept to address the unique challenges posed by urban terrorism. Merely depending upon the foot soldiers to investigate, collect and deliver intelligence may not yield the desired results. Instead, a concept of support should be developed. The support envisaged includes ushering in technological solutions to address this looming danger. Unmanned aerial vehicles can offer a unique set of solutions to a myriad of problems and ensure minimal loss of lives to the aggressor, the aggressed and the innocent onlookers. Unmanned aerial vehicles have become extremely effective tools for both risk assessment and risk mitigation. The applications of aerial surveillance are limitless. Preventive strategies assumed on accurate and timely intelligence acquisition can effectively cage potential suspects inside drone spheres. Specially equipped and trained central and state forces employed on counterterrorism operations would be able to tackle the urban terror threat more effectively. The speed of decision-making by tactical commanders depends on the speed of receiving intelligence, and this, in turn, facilitates taking initiative on

the battlefield. Hence, UAVs would prove to be an invaluable asset in countering urban terror.

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