

Jane's Intelligence Review

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Commercial UAVs pose rising security challenge

Greater accessibility of commercial unmanned aerial vehicles (UAVs) has opened up new security threats. *Andrew White* surveys the insurgent and criminal groups showing the most interest in this new technology, and assesses the defence industry's response.

Rapid technological advances, miniaturisation, and falling prices have placed small and mini unmanned aerial vehicles (UAVs) and unmanned aircraft systems (UAS) at the centre of a new security threat landscape.

Terrorists and insurgents have turned to UAVs for battlefield surveillance and potentially to deploy airborne improvised explosive devices (ABIEDs), as evidenced by counter-insurgency operations in the Middle East and North Africa, and organised crime groups have appropriated the same technology to traffic drugs across international borders and to smuggle contraband over prison walls.

As a result, law enforcement agencies and other defence and security organisations are now considering how best to counter such low-visible and fast-moving threats. Many governments are paying particular attention to the issue as part of wider counter-terrorism, counter-insurgency, counter-narcotics, and law enforcement strategies designed to protect the homeland and to ensure internal security.



Screengrab from an Islamic State video uploaded to archive.org on 12 September 2014, showing UAV surveillance of part of the Syrian army base at Taqaba. The annotated insets show (left) a 120 mm cannon and (right) command buildings. (Ezzeldeen Khalil)

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Insurgent threat landscape

These examples demonstrate the utility of a single UAV in various scenarios. Yet industry sources told *IHS Jane's* that the most serious threats facing government security agencies could include "swarms" of

systems attacking a target simultaneously. One source explained how multiple small or micro UAVs, each armed with an ABIED, could converge on a target simultaneously from different directions, making them harder to neutralise.

Saab's director of marketing and sales for Western Europe, Rickard Svensson, told *IHS Jane's* that the threat environment from UAVs had changed rapidly and substantially.

"Today, UAVs are no longer just a concern for the military, but a lot about event protection such as European Union summits and the Olympic Games, for example," he said.

"We can't really say what type of threat you will encounter or what it is you'll discover and detect, but the threat is likely to comprise low, slow, and small UAV targets. Asymmetric threats [from] terrorists and non-regular forces are seeing an increase in unconventional means of attack from the air, with different types of threats being witnessed in Somalia, Syria, and the Ukraine." He described how UAVs could even be used to spray chemical weapons across a battlespace.

According to Doug Barrie, senior fellow for military aerospace at the London-based International Institute for Strategic Studies, the uptake of UAVs by terrorist bodies has so far been limited, although he said their utility and threat remained "considerable".

"Capability [for terrorists and insurgents] is dependent in part on the price-point and the nature of the attack envisaged. Single-platform capability could be traded off for cheaper air vehicles allowing for a swarming attack," said Barrie. He confirmed that UAVs had already been used for "crude" intelligence, surveillance and reconnaissance (ISR) missions on the battlefield as well as "improvised armed" UAVs for strike operations.

Describing the Middle East as an "obvious environment for early adopters" of UAV technology, Barrie cited the use of UAVs by the Lebanon-based Shia militant group Hizbullah to provide a "nuisance factor" for the Israeli Air Force. Such systems also pose a "potential genuine threat" to Israeli citizens, he added. "It is perhaps an attempt to remind the Israeli military they do not have exclusivity in terms of UAVs in this particular conflict," said Barrie. "There is the potential for the small UAV to be the insurgent's next IED."

Council on Hemispheric Affairs (COHA) research has nevertheless concluded that the likelihood of a major terrorist incident involving UAVs remains remote, said Alejandro Sanchez, a COHA senior research fellow.

Yet incidents such as the attack on the *Charlie Hebdo* magazine office in Paris on 7 January have ignited fears about the use of UAVs by terrorist organisations in the future, he added. "The idea that terrorist movements will begin to utilise drones is no longer a hypothetical scenario, but a grim reality," said Sanchez.

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A UAV carries a submachine gun during a demonstration at the Russian Ministry of Defence in Kubinka outside Moscow on 5 October. Insurgents have yet to weaponise UAVs effectively, but some commercially available airframes have high payloads. (PA)

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Islamist militants' UAV use

On 17 March, US Central Command (CENTCOM) acknowledged that the Islamic State was in possession of UAV technology, reporting that an Islamic State "remotely piloted aircraft" (RPA) had been destroyed in an airstrike near Fallujah, Iraq. It also reported the destruction of an Islamic State "drone" near Ramadi on 3 August. Sources associated with CENTCOM told *IHS Jane's* that this was the coalition air campaign's third attack on Islamic State RPAs. A CENTCOM spokesperson confirmed that the COTS UAS destroyed in March was designed for surveillance not attack.

Earlier, on 24 August 2014, video-sharing website LiveLeak.com obtained a video from the Islamic State that purported to show UAV imagery of the base of the Syrian Army's 93rd Brigade near Raqqa.

During an attack on the facility on 7 August, the unidentified VTOL UAV had hovered directly over the base at about 800-1,000 feet to generate high-resolution video and stills imagery of the base and its surrounding area. This imagery intelligence (IMINT) allowed Islamic State combatants to plan and execute the attack on the facility. In the video, a text overlay read, 'From the Drone of the Army of the Islamic State'.

Hizbullah is also believed to be using UAVs in Syria, in operations against the Islamic State. On 10 June 2014, the Shia group announced that it had begun combat operations against the Islamic State along the Syria-Lebanon border. Intelligence sources suggested to *IHS Jane's* that Hizbullah was using a variety of UAVs for battlefield ISR to aid kinetic strike operations against Islamic State combatants, operating many of its fixed-wing tactical UAVs from a specially constructed airfield in the Bekaa Valley.

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Organised crime operations

UAVs have also made an appearance in the hands of organised crime gangs. In this sphere, their primary use has been by international drug-trafficking organisations (DTOs) to carry shipments and perform surveillance ahead of trafficking operations across sensitive areas such as the Mexico-United States border.

With a particular focus on DTOs beginning to conduct operations across the Mexico-US border, COHA has dubbed 2015 the 'Year of the Drone in Latin America'. The substantial financial resources of drug cartels in Central and South America is increasing UAV deployment as DTOs look to establish tactical advantages over law enforcement authorities.

"Revolutionary and organised criminal groups are commonplace throughout Latin American countries and it would be unreasonable not to consider the potential for new groups to emerge," said Sanchez.

"The use of UAVs by illicit and non-state actors is already occurring and will likely expand in the near future to aid in drug smuggling, intelligence gathering, or committing violence. Terror drones and UAVs used for more conventional illegal purposes may prove to be a new security threat in the future and sooner rather than later they may fly over Latin American airspace."

Lower-level criminal structures are also responding to the availability of affordable platforms that can carry small- to medium-sized narcotics payloads. COHA believes UAVs have been used to smuggle narcotics across the Mexico-US border since 2010, although Sanchez admitted that few incidents had been reported.

On 23 January 2015, news outlets reported that a UAV laden with narcotics had crash-landed on the Mexican side of the border near San Ysidro, California. The DJI Spreading Wings S900 hexacopter was carrying more than 6 lb (2.7 kg) of crystal methamphetamine. Officials from the Tijuana Municipal Police claimed that DTOs were now using UAVs in place of underground tunnels created for transporting drugs and migrants.



Ukrainian soldiers test a UAV during an exercise near Kiev in February 2015 to prepare for observing pro-Russian separatist forces. Groups such as the Islamic State have already used UAVs for battlefield surveillance. (PA)

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US Customs and Border Protection (CBP) subsequently confirmed that no further UAVs carrying narcotics had been recovered on the US side of the border. "CBP remains vigilant against emerging trends and ever-changing tactics employed by transnational criminal organisations behind illegal attempts to smuggle narcotics into the US," said the force in a statement on 24 January.

In April 2015, however, a 28 lb haul of heroin was discovered after being smuggled across the US border near Calexico, California, onboard a VTOL UAV. Two defendants pleaded guilty to charges of retrieving the drugs at the Imperial County Superior Court on 11 August, with US law enforcement authorities describing the threat as an "emerging" method of smuggling.

"It is likely that drones will continue to be utilised for moving small quantities of drugs or other contraband within Mexican territory or over the US border," Sanchez told *IHS Jane's*. "Given the fact that Mexican cartels have significant wealth stemming from an almost endless supply of drugs, ranging from cocaine to meth to marijuana, it is not shocking to assume that these DTOs may continue to resort to drones in the future as cheap vehicles to thwart border security measures."

Yet despite Latin American DTOs' profit-driven environment, no sizeable impact is yet discernible from any shift towards smuggling with UAVs. Indeed, the threat from UAVs in narcotics smuggling appears far less mature than that from specially fabricated submersible and semi-submersible vessels. Narco-submarines have been used since the mid-1990s as a lucrative alternative method of transporting narcotics worldwide, according to a US Foreign Military Studies Office report published in May 2014.

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Defence industry countermeasures

Military operations will in future be largely conducted in urban environments, according to Future Character of Conflict (FCOC), a 2010 report from the UK Ministry of Defence into the operating environment out to 2029. More traditional concepts of operation (CONOPS) for countering ABIEDs through using kinetic weapon systems such as Counter-Rocket, Artillery and Mortar (C-RAM) technology may therefore lose their effectiveness.

Governments globally are struggling to counter the ABIED threat, with national authorities taking steps to raise awareness of regulations about using UAVs in public spaces.

On 21 July 2015, the UK's Civil Aviation Authority (CAA) released a 'DroneAware' strategy describing the legal liability of UAV operators. Germany has banned UAVs from flying within 1.5 km of airport perimeters. The New York Police Department has employed a microwave-based radar system to track COTS UAVs in the vicinity of Times Square in an attempt to trace operators' locations, while enforcing similar rules to the CAA in prohibiting UAV from flying higher than 50 m.

In response to growing requirements from homeland security agencies, military customers, and civil authorities, the defence and security industry has begun to offer a significant variety of counter-UAV solutions. For example, Saab Defence & Security's solution is based around its family of VSHORAD (very-short-range air defence) and long-range defence/surveillance radar systems, which can detect small UAVs down to 0.01 m³ in size.

To counter ABIEDs and other UAV threats, Saab has developed an expeditionary radar solution in the form of the Giraffe 1X, which weighs 200 kg and can be mounted on an armoured vehicle or even a more discreet civilian vehicle. With a ground range of 75 km and altitude range of 15 km, the Giraffe 1X is capable of identifying small and micro UAS at a range of 13 km, according to the company.

Thales is considering how best to detect, track, and classify stealthy and fast-moving UAVs as well as slow and low-moving targets. According to Dr William Hol, technical director for sensors at Thales Netherlands, there is potential for confusion when it comes to detecting and distinguishing between small UAVs, neutral objects such as birds, and larger platforms. "Our [UAV] classification process is based on micro-Doppler analysis, and in order to identify a UAS in and amongst birds, you need an ability to pick out the targets of interest," he explained to *IHS Jane's* on 26 August.

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Outlook

A viable ABIED weapon system has yet to be successfully launched, although a trend of increasing terrorist attacks by "lone wolves" suggests that the use of such a cheap and effective terrorism weapon is a distinct possibility. Indeed, the threat of an ABIED-facilitated UAV has been illustrated online, as hobbyists and enthusiasts have posted videos showing DJI's Phantom 1 comfortably lifting a 600 g model aeroplane - half of the UAV's own weight - which is then remotely dropped from altitude.

CONOPS for deploying UAVs, particularly in the area of terrorism and insurgencies, will almost certainly be increasingly developed as awareness and availability of such systems expand exponentially. In response, the future emphasis for government research bodies, military and security organisations, and supporting

industries will be on UAVs operating in the urban environment and 'de-clutterising' suspicious UAVs from phenomena such as flocks of low-flying birds.

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