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Portable Drone Jammers: An Assessment

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Synopsis

The rapid proliferation of consumer drones poses a security threat. Portable drone jammers are being used to combat rogue consumer drones. Their shortcomings can be offset by deploying them together with other counter-drone systems.

Commentary

IT WAS reported recently that Venezuelan President Nicolás Maduro had escaped an assassination attempt by explosive-laden drones. If the story is true, then it is necessary to ask if there are good defences against such attacks. The answer is a qualified "yes".

When the word "drone" was mentioned in the 1990s, the Predator – an eight-metre-long unmanned aerial vehicle (UAV) flown by the United States (US) military – typically came to mind. Armed with guided missiles, the Predator was not only an extremely effective surveillance platform but also a highly controversial killing machine. Since then, drone technology has been commercialised.

Rogue Drones

Today, drones are flown by civilians for a variety of purposes. From mapping inaccessible caves to surveying crops for farmers to delivering pizzas, drones are no longer the prerogative of high-tech militaries and law enforcement agencies. Often costing no more than a few hundred dollars, drones can now be readily purchased by the public.

Rapid advances in communications and navigation technology have also made consumer drones easier to fly. Embedded features like Global Positioning System

(GPS) stabilise it in the air while a powerful receiver lets it fly high and far. This means that almost anyone can operate a drone with ease.

Even so, this 'democratisation' of drones – taking the technology out of military control and putting it into the hands of private citizens and businesses – has also given arise to a new set of security challenges.

Errant drones flying into restricted airspaces around airports and endangering aircraft are not unheard of these days. In fact, 64 near misses between errant drones and aircraft were reported in the UK from January to November 2016. In July 2014, an errant consumer drone even flew within six meters of a commercial airliner as it was about to land at London's Heathrow Airport. A drone hitting the engine of an aircraft when it is still in the air can cause it to crash due to a loss of engine thrust.

Other Cases

There were also other high-profile cases of consumer drones jeopardising the safety of those on the ground. For example, in April 2015, a drone piloted by an anti-nuclear activist landed on the rooftop of Japanese prime minister Shinzo Abe's office in Tokyo. The rogue drone was carrying radioactive sand from Fukushima at the time.

Now, it appears that explosive-laden drones are being used to carry out attacks on VIPs. Going further, one can imagine the mass hysteria that would take place if a rogue drone were to drop a toxic substance (or even just talcum powder) on a major sporting or ceremonial event.

Criminals are also using consumer drones for illicit purposes such as smuggling contrabands into prisons. Just last year, drones were used to drop packages containing cell phones, cigarettes, marijuana and razor blades into the Handlon Correctional Facility in the US state of Michigan.

To evade detection by law enforcement officers, criminals have even been known to spray paint their drones black and tape over their navigation lights. In the cover of darkness, these improvised drones are practically invisible to the naked eye from a distance.

Portable Drone Jammers

The proliferation of consumer drones and their misuse have spawned quite a few novel counter-drone systems. There are kinetic systems capable of shooting drones down. Interceptor drones that can deploy a net to catch other drones are also available. Even predatory birds are being trained to catch drones in midair. Effective at up to two kilometers, the portable drone jammer has been one of the more effective counter-drone systems thus far.

Relatively lightweight and compact, the portable drone jammer needs only one operator. Hence, it can be rapidly deployed to protect an exposed location or VIP. Looking more like a modern-day assault rifle, the drone jammer works by disrupting the radio frequencies that consumer drones operate on.

Even if a drone were pre-programmed to fly autonomously along a set of GPS coordinates, the drone jammer would still be able to disrupt its GPS signal. When shot by the drone jammer's invisible electromagnetic beam, a drone would often just land gently on its own thus reducing the risk of collateral damage.

However, the portable drone jammer is not without limitations. Foremost, it is only effective when the target drone is visible to the naked eye. If a drone were flown under the cover of darkness, then the drone jammer would not be particularly effective. Moreover, the handheld drone jammer cannot stop more than one drone at a time as it requires a constant aim to disable the target. As such, it would be ineffective against multiple hostile drones flying in from different directions.

Smarter Strategy

Although the portable drone jammer has limitations, its shortcomings can be offset by deploying it with other counter-drone systems. Every counter-drone system available in the market now has shortcomings and the drone jammer is no different. Since the portable drone jammer continues to be one of the more effective and practical countermeasures, it makes sense to deploy it with other counter-drone systems that can compensate for its limitations.

One way is to deploy it alongside a drone detection system. Able to detect targets kilometres away, the detection system works by homing in on the acoustic signatures of incoming drones. Even if a drone were flying under the cover of darkness, the system could still pick it up.

More importantly, as the drone detection system can track multiple targets at once, it lets the drone jammer operator know if more than one drones are flying in from different directions and therefore, react accordingly.

Admittedly, the proliferation of consumer drones has been beneficial to business, research and agriculture. But rogue consumer drones now pose a serious security threat. The portable drone jammer, though effective to some extent as a counter-drone system, has limitations. But by deploying it alongside other countermeasures such as a drone detection system, it is possible to improve its effectiveness. For authorities looking to combat rogue consumer drones, that would be the smarter strategy.

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