

THE PROBLEM OF ROGUE DRONES

The unauthorised and dangerous use of drones in the vicinity of airports has become a recent hazard to airline safety, not just in Ireland, but in Europe and further afield. Indeed, there is empirical evidence that the problem is underreported in certain parts of the world for fear of inspiring copycat incidents, writes Kevin Byrne, Airport Safety and Security Auditor.

There can be no doubt that in Irish skies, at least, the sight of a drone is no longer an unusual phenomenon. Indeed, current estimates would indicate that as many as 20,000 drones have been purchased in recent times in this country, mostly for recreational purposes. There is no extant CSO figure in respect of drone ownership, but the regulator, the Irish Aviation Authority, has recorded some 11,000 voluntary registrations to date.

As regards the commercial drone entities, these are employed in a host of innovative operations, such as pipeline and electrical network inspections, property photography, television and film productions, search and rescue tasks, delivery services, ship hull inspections, security and perimeter patrols and many other tasks that lessen the human effort and improve efficiency in some way.

Apropos of low-level hazards to airport safety, top of the list was, for many years, the problems of local bird populations which could result in bird strikes and damage to aircraft.

This particular challenge was largely minimised by the establishment of the National Bird Hazard Committee to which all Irish commercial and military airports contribute.

A more recent hazard to airline safety has emerged by the unauthorised use of drones in the vicinity of airports, not just in Ireland, but in Europe and further afield. Indeed, there is empirical evidence that the problem is actually underreported in certain parts of the world for fear of inspiring copycat incidents.

IRELAND'S 5KM NO-DRONE ZONE

In European skies, the safe operation of civil drones has been addressed in EU Regulations 2019/947 and 2019/945 which adopt a risk-based approach but do not distinguish between leisure or commercial civil drone activities.

In Ireland, the Irish Aviation Authority (IAA) supervises and implements the regulations while also providing guidance for operating and flying drones so that public safety is assured.

In the main, it is illegal to fly drones within five kilometres of any airport in the State and all drones that weigh more than 1kg must be registered with the IAA. It may be that not all drone operators are aware of these rules, which is unlikely, so there is, perhaps, an assumption that there are malign drone actors who choose to endanger airport users.

Airports having to cease operations after drone sightings is not acceptable nowadays. Therefore, methods of efficient drone control have been sought by many state actors. Firstly, we must discount the sniper rifle technique, which was touted by some in the tabloid press, particularly in the UK after Gatwick Airport was forced to cease operations on a few occasions.





DUBLIN AIRPORT CLEARED TO USE NEW ANTI-DRONE TECHNOLOGY

Clearance to use anti-drone technology was recently given by the communications regulator ComReg to DAA, giving the airport authority the legal right to jam their frequencies or even take down the drones.

Following several incidents of illegal drone activity at Dublin Airport which disrupted flights and delayed thousands of passengers earlier this year, DAA purchased drone-disabling equipment and has since then trained firefighters in its use.

A DAA spokesperson said: "Dublin Airport has purchased additional operationally proven counter-drone technology and members of the fire service at Dublin Airport have been trained in its use."

However, DAA needed approval from ComReg, before it could deploy the technology. A spokesman for the regulator said: "Following

amendments to the legislation by the Government earlier this summer, ComReg provided DAA, in June, with a licence to operate the device."

Furthermore, a subsection had been added by Communications Minister Eamon Ryan thereby making it lawful for the DAA or its agents to work or use a radio frequency jammer at Dublin Airport to interfere with the working of, or otherwise injuriously affect, any unmanned aircraft system, where it believes this is necessary to ensure public safety.

A DAA spokesperson said: "We acted quickly in response to the Government's direction on this matter and, following the purchase of counter-drone equipment, the training of relevant personnel and having recently received the necessary approvals, the anti-drone technology is now fully operational and available for use as and when required."



It's illegal to fly drones within 5km of any airport in the State.

Drones are small, making range estimation difficult, while their agility makes shooting them all the more problematic, especially in conditions of poor light. In the case of a high-velocity bullet missing the target, its kinetic energy results in a travel distance of two or more kilometres. There is no way of calculating the danger to people or property in the area behind the drone, so it is not worth pursuing as a serious control measure.

ANTI-DRONE TECHNIQUES

We must concentrate on more practical anti-drone techniques to prevent or mitigate the threat posed by these aerial devices. Let us examine the four most effective anti-drone techniques which are, in no order of efficiency – Radio Frequency (RF) Jamming, Global Positioning System (GPS), laser systems and drone-catching nets. Other systems that have proven useful include Acoustic Sensors (Microphones), Optical Sensors (Cameras) and Radar.

As its name implies, the RF jammer will jam the frequency (either 2.4 GHz or 5.8 GHz) with which a drone communicates with its ground station. This happens when the drone jammer transmits its own electromagnetic signal at the same frequency, thus overwhelming the drone's communication systems. Usually, this results in the drone

activating its 'Return to Home' function, through which the drone pilot may be identified if the ground resources are put in place, such as a local security or law enforcement team of some kind.

In respect of the operator of the new technology at Dublin Airport, there has been speculation as to what organisation should be in charge of actually deploying it on a daily basis. As a safety and security element is involved, it might appear that the best force to be engaged might be the Defence Forces, or the Garda Síochána or even the Airport Police Service.

However, what is required adjacent to the airport's manoeuvring area, where airliners are parked, taxi and take off and land, is a disciplined body of professionals on site. What springs to mind is the Airport Police Service, which is manned by highly trained personnel who are intimately familiar with all parts of the newly expanded campus.

APPROPRIATE STAFF TRAINING

With the appropriate training, the staff would be ideally suited to an immediate response by day or by night, should the need arise, as the service is provided on a 24/7 basis. At the major London airports of Heathrow, Gatwick and Stansted, it is understood that the anti-drone equipment is manned by their

respective airport police personnel.

However, what of regulations concerning the merging drone control technologies? Certain nations permit mitigation such as jamming whereas in other jurisdictions, including our own, it is considered a serious offence to interfere in any way with radio communications.

This explains why the Minister for Transport Eamon Ryan was obliged to move slowly on his approval for the anti-drone system to be employed at Dublin Airport. It was noted that the new, necessary legislation could not contradict or undermine existing legislation in any way; it was never explicitly stated that the jamming equipment is what was ordered for Dublin, but it was assumed to be so. The relevant legislation is S.I. No. 103/2023 – Irish Aviation Authority (Unmanned Aircraft Systems (Drones)) (Amendment) (No. 2) Order 2023.

LIABILITY OF DRONE JAMMERS

In other countries, such as the United States, it is not permitted to use mitigation technology due to potential collateral damage. Indeed, a Section of the Communications Act of 1934 prohibits the act of wilful or malicious interference of any form of radio communications.

Moreover, drone jamming can also be considered a form of hacking, which is another act prohibited by the US Criminal Code. Of course, wherever and whenever any kind of drone jamming is employed, there remains the potential of drone control being lost and then crashing,



This sign is now visible on perimeter fencing around Dublin Airport

resulting in damage to property or, worse, personal injury.

So, we must be aware of potential liability while using a drone jammer, even by personnel authorised and trained by a state agency. Therefore, the use of drone jammers by private facilities, such as utility companies or even airports, may remain problematic in some places.

It would be interesting to compare and contrast the various anti-drone methodologies in use in assorted airports, but such research is not straightforward for one understandable reason: the subject is considered a sensitive one, akin to the security features of each respective airport, and therefore public comments are rarely given.

HOLOGRAPHIC RADAR SYSTEM

However, much information can be gleaned by the press statements of successful companies bidding for the installation rights of anti-drone technologies. For example, the UK-based Aveillant company has supplied its holographic radar system to JFK Airport in New York, in addition to fitting it in Paris Charles de Gaulle Airport.

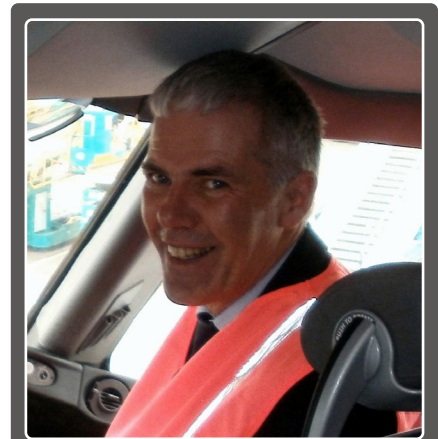
This is reputed to be capable of detecting small drones at a distance of five kilometres and alert the airport operator. In addition, it can identify the ground location of the drone

controller, essentially enabling law enforcement officials to execute an arrest. It is presumed, but not proven, that a jamming device can be employed in addition to the radar, thus improving the anti-drone armour as it were.

Counter-Unmanned Air Systems, (C-UAS) as anti-drone technology is known, must distinguish drones from other moving objects at airports, for example flocks of birds, operational vehicles, or even helicopters. Furthermore, they must distinguish between a variety of drone types which are on the market in a myriad of shapes, sizes and capabilities; the task is not a simple one.

Results from various aviation agencies, in particular after prolonged testing involving 15 German airports, indicate that there is no universal solution that can be assured to work in all circumstances at all airports.

The answer is most likely to be a combination of different sensor technologies, where the individual strength of each system offsets the weaknesses of the others. If there is good news, it is that the public acknowledgement of the installation of C-UAS at an airport, and the willingness of the authorities to prosecute rogue drone operators, may be a sufficient deterrence to those who may seek to disrupt routine commercial airport operations.



ABOUT THE AUTHOR: Kevin Byrne is an Airport Safety and Security Auditor and a regular contributor to radio and television programmes on aviation topics, both at home and overseas. He has directly examined many air accident investigation reports within the last decade.

He took early retirement from the Air Corps in 2012 having served in many command and staff appointments at Baldonnel, Co. Dublin. He holds a BA degree, an MSc in Airport Planning and Management and is a Chartered Fellow of the Chartered Institute of Logistics and Transport. After retirement he spent seven years lecturing part-time in Dublin City University and Coventry University.

LOCAL RESIDENTS CALLED ON TO REPORT ILLEGAL DRONE ACTIVITY

An Garda Síochána, Dublin Airport Authority (DAA) and the Irish Aviation Authority (IAA) urged people who witnessed the illegal use of drones near the airport to report them to the Gardaí immediately, following several incidents which caused major disruption earlier this year.

As part of an ongoing safety campaign to highlight the dangers of unauthorised flying of drones within 5km of the airport, the authorities issued an information leaflet to residential, commercial and retail outlets located around the airport.

“The unauthorised operation of a drone in this area is reckless and dangerous and potentially puts the lives of passengers and aircraft crews at risk. The illegal use of drones may result in prosecution resulting in a prison sentence,” noted Peter Kearney, CEO of the Irish Aviation Authority.

Kenny Jacobs, CEO of DAA (the operator of Dublin and Cork Airports), added: “We strongly urge drone owners to follow strict regulations on the operation of drones to avoid any disruption to our passengers and airline partners.

“The drone detection system at Dublin Airport is allied with new counter drone technology now in place and allows us to focus on our top priorities in aviation, namely safety and security.”

Assistant Commissioner for the Dublin Metropolitan Region, Angela Willis, said the force is committed to supporting the IAA and the DAA to highlight the significant risk to public safety posed by the unauthorised use of drones in the vicinity of Dublin Airport.

“We ask drone operators to ensure they’re aware of the relevant regulations and legislation governing the use of drones around Dublin Airport. Any

sightings of unauthorised drones around the airport should be reported to the Gardaí, who will fully investigate all incidents.”

