

C-UAS technology crosses the divide

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Systems developed for military use could be used to protect airport infrastructure. David Inga and Barry Cross report

While civil aviation regulators grapple with the growing problem of how to integrate unmanned aircraft systems (UASs) with air traffic in controlled airspace, they must also turn their attention to ensuring security around airport terminals and runways.

The civilian market has grown rapidly in recent years to cover beyond-visual-line-of-sight (BVLOS) applications such as cargo transport, aerial mapping, search and rescue, security, infrastructure inspection (such as power lines), agriculture, and environmental monitoring. Given the range of critical applications and the market potential for UASs, most observers expect the airspace of the future to be integrated, with UASs operating effectively alongside manned aircraft.

However, in historical terms military applications have dominated UAS use – and technology developed for defence and security infrastructure protection could hold the key to defeating or deterring illicit UAS use.



DroneGun in use. (DroneShield)

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In Israel, for example, ORAD has worked on security networks (primarily perimeter protection) for key strategic sites, including military installations and Tel Aviv Ben Gurion International Airport. ORAD Vice President of Sales, Marketing and Business Development Yossi Gofer told *Jane's* that the growing risk today is from unmanned aircraft flying over the perimeter fence. Not only could UASs disrupt air traffic, but another potential hazard is the use of “terror drones carrying weapons, or used for suicide missions”, he added.

Spanish demo

The company responded in 2015 by beginning development of the DROM Drone Defence System (DDS), which was demonstrated in March 2018 at a small private aerodrome in Villanueva del Pardillo, about 30 km west of Madrid, Spain. Unfortunately, on this occasion strong winds and rain prevented full-scale tests with a UAS, but the counter-UAS (C-UAS) solution was tested in 2017 at two major public events where airport security was important: a visit to Portugal by Pope Francis, and the funeral of King Bhumibol Adulyadej in Thailand (the only airport-specific sale to date). “In Portugal we even had two air force fighters flying over to check whether the jamming system affected them in any way – and it didn’t,” Gofer said.

Ciser System, as the Spanish representative of ORAD, arranged the demonstration to follow a C-UAS security conference in Madrid, organised by the Spanish government.

Ciser CEO Santos Bayón said discussions on DROM DDS are ongoing with Aena Aeropuertos, which operates 48 airports in Spain. Other potential clients in Spain include major football clubs FC Barcelona and Real Madrid CF. Gofer believes in the market potential of DROM in regions such as Africa, where ORAD has a foothold, having sold three perimeter security systems to airports in Kenya.

ORAD claims the DROM (a name combining ‘drone’ and the safety ‘dome’ of protection it offers) can detect unmanned aerial vehicles (UAVs) at up to 3.5 km range. The 38 kg DROM unit includes a 3D pulse-Doppler all-weather radar with rotating azimuth mechanical scan and elevation electrical scan.

The radio frequency (RF) sensor on DROM detects an incoming UAV by analysing signalling channels and radio transmissions, automatically setting off an alarm to warn the operator of the C-UAS system.

An electro-optical/infrared (EO/IR) tracker, capable of operating 24 hours a day, then takes over until DROM activates its high-power jammer (aligned with the EO system’s line of sight). Using the jammer, the DROM operator can block the GPS system on the suspect UAV, and safely land it at distances of up to 2 km.

“Not long ago, nobody thought about something so small that could come from above [or over the airport perimeter],” Gofer commented. “But these small remote-controlled devices have already been involved in causing various [cases of] airborne chaos. The next threat could be arming them with a sophisticated bomb.”

Other C-UAS solutions use acoustics to ‘listen’ for the sound of UAVs against normal background noise, which is then compared with signature settings in a database. Examples of this technology include FarAlert and WideAlert from DroneShield. The former is about 1 m in diameter, while the far more compact WideAlert unit is designed to detect targets out to 200 m.

“We also have a countermeasure device, which is called DroneGun,” said DroneShield CEO Oleg Vornik. “This jams the frequencies that are used to control drones, although [it] is harmless to aircraft. We trigger the drone to either land vertically or go back to where it came from, thereby allowing you to track the location of the pilot, who can then be picked up by the authorities.”

DroneGun (like DROM) has an effective neutralisation range of 2 km; allied with a network of DroneShield sensors, it could provide an airport with perimeter coverage. DroneGun is only used by military operators (in the Middle East, for instance) but changes in legislation would permit civil use.

In May 2018 DroneShield announced it had cleared an obstacle preventing deployment of its C-UAS technology at airports in the United States, after 360°RF, an independent testing laboratory, deemed that the technology does not interfere with civil aviation communications and navigation systems.

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