

# Jane's AIRPORT Intelligence and Insight You Can Trust REVIEW



**FOD squad: FAA recognises four solutions**

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# FOD remedies inspire FAA faith

Systems to detect foreign object debris are becoming widely accepted

The United States Federal Aviation Administration (FAA) issued its long-awaited Advisory Circular on automatic foreign object debris (FOD) detection systems in late September. This marks the first step towards the adoption of these systems by US airports – a small advance because the 12-page document was not as comprehensive as many had expected or hoped.

FOD can be virtually anything that lies on the runway and can be struck by aircraft during takeoff or landing. Mechanics' tools, aircraft chocks, broken pieces of runway pavement and even airframe or engine parts have been found on runways. All of these have the potential to cause damage, as made clear by the loss in 2000 of an Air France Concorde. During its take-off run at Paris Charles de Gaulle, one of its tyres struck a 16-inch titanium strip that had fallen from a previously departing aircraft. A piece of the bursting tyre penetrated one of the Concorde's fuel tanks, creating a massive fire from which recovery was impossible.

How serious a problem is FOD? Although no Concorde-like accidents have occurred since, FOD damage remains a serious problem, with annual worldwide costs to civil airline aircraft estimated to be as high as USD12 billion when all factors are considered, including repair of damaged tyres, fuselages and, most expensively, engines – the GE90 engines in the B-777 cost USD19 million apiece – plus flight delays and aircraft out-of-service costs.

## Risk of accidents

Could there be another Concorde-like accident? Regrettably, the answer is yes. The method of detecting and removing FOD from runways has not changed since the Concorde crash because, with a few notable exceptions outside the US, airports follow the International Civil Aviation Organization (ICAO) recommendation that a visual inspection of runways from a vehicle be performed every six hours. But the metal strip that downed the Concorde fell from a preceding aircraft just minutes earlier and was therefore unlikely to have been seen by a patrol vehicle. Statistically, the crash was highly improbable but it could happen again.



FODetect from Xsight Systems of Israel employs high-resolution cameras and millimetre-wave radars, mounted on runway edge lights. It has been tested at Boston Logan International Airport.

It is this probability, however unlikely, that has been a constant concern for safety authorities and was the impetus behind the FAA's investigation into unmanned systems that could continually monitor a runway's surface by day and night under all weather conditions, and immediately alert airport staff when FOD was detected. Four candidate systems have been evaluated in a demanding test programme conducted by the FAA-supported Center of Excellence for Airport Technology (CEAT) at the University of Illinois. (More details on the manufacturers of the systems under evaluation are in the table below.)

The tests required the systems to detect a variety of small objects of different shapes. These included cylinders measuring no larger than 1.2 inches by 1.5 inches; spherical objects about the size of a golf ball; and various other items generally less than four inches in one dimension.

All four systems passed the tests, often detecting much smaller items. Consequently, they are listed as 'acceptable' in the FAA Advisory Circular, although, curiously, they are described by their characteristics, rather than their manufacturer or trade names. Having achieved FAA acceptance, the four units now qualify for federal funding under the US Airport Improvement Program (AIP). Alternatively, their cost may be recovered as a component of the

Passenger Facility Charge (PFC) added by most US airports to passengers' air fares. QinetiQ claims that AIP funding can cover up to 95 per cent of the costs of systems that meet the performance requirements set out in the circular.

The Advisory Circular does not mandate the installation of FOD detection systems. Yet in the rather litigious US, some observers feel that such an investment – said to range between USD3 million and USD5 million per runway – would be useful insurance against damage claims by airlines and, in a worst case situation, by passengers should there be a serious accident. Some airlines regard FOD damage in essence as a cost of doing business, and most have their own policies to cover it. Carriers are reluctant to reveal their individual FOD costs, although for the larger airlines it is felt to be on the order of several millions per year, given the potential of engines to suck up broken pieces of runway concrete and similar items during a full power take-off.

While the Advisory Circular recognises the four detection systems, airport operators had expected that it would include guidance material covering recommended reporting procedures, data handling, risk assessment and risk management processes, along with a variety of other considerations – including recognition in the airport's safety management protocols – that are implicit to the introduction of a new safety system. In fact, an early 40-page draft of the document did include this information but it was subsequently removed to the disappointment of the US airport and aviation safety community, as well as European officials.

In 2008, Eurocontrol decided that since the FAA's evaluation programme was already under way, it made more sense to wait on the US work than to launch an identical effort in Europe, which means that Eurocontrol is also without the guidance material. *Jane's* understands that the FAA is responding to these concerns but no date has been announced as to when the material will be published.

Nevertheless, on 8 October Stratech Systems announced it had received a purchase order for deployment of an iFerret system at an undisclosed European airport. The FOD detector will be installed to monitor the apron at the airport, as opposed to the runway.

FOD may never be totally defeated, but the growing number of automatic detection systems now in service at international airports such as Vancouver, Singapore, Heathrow, Dubai and Doha, mark encouraging progress in a significant area of aviation safety. **Wes Carleton**

## The four FAA-recognised FOD detection systems

Manufacturer/Country	Product	Test location	Brief description
QinetiQ/UK	Tarsier	Providence, Rhode Island	Millimetre-wave radars and high-resolution cameras, mounted on rigid towers
Stratech Systems/Singapore	iFerret	Chicago O'Hare	High-resolution cameras, mounted on rigid towers
Xsight Systems, Israel	FODetect	Boston Logan	High-resolution cameras and millimetre-wave radars, mounted on runway edge lights
Trex Enterprises, US	FOD Finder	Chicago Midway, Chicago O'Hare	Millimetre-wave radar and infrared camera, roof-mounted on an airport vehicle

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