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D-Tec, Video Smoke Detection Protects the worlds largest aircraft hangar

The world's largest aircraft hangar, the massive new Royal Airwing Hangar complex at the Dubai International Airport in the UAE, is now home to the Dubai ruling family's private aircraft. It is protected by a D-Tec FM [Factory Mutual] approved video smoke detection system that Malcolm Gatenby, a director of BSS-ME, D-Tec's distributor in the Middle East, describes here as offering the fastest and most reliable fire detection.

The huge open-span, eight-bay Royal Airwing Hangar is 600 metres wide and 110 metres deep, and will hold up to eight aircraft with a total value that industry experts say may well exceed £2 billion. This includes the 79.8-metre wingspan Airbus A380, the world's largest passenger aircraft. At the front, the hangar has eight sets of doors that span 584 metres, each of which is 25.8 metres high. At the front of the hangar, the floor-to ceiling height is 30 metres to accommodate the aircrafts' tail plane; this height tapers to 25 metres at the rear.



Initially, linear heat cables in the open roof void were specified as the primary means of fire detection. However, serious shortcomings were soon highlighted, primarily in relation to the hangar's height and the time that would be taken before the linear heat detectors were activated.

Consultants and Fire officers responsible for the building were concerned that serious damage to the parked aircraft would have already resulted by the time-delay before either the smoke or heat would have reached traditional detectors. Even then, there has to be a sufficient build up of smoke concentration to activate the detector. Aspirating smoke detection systems that draw sampled air into the detector are similarly challenged in high ceiling height structures as, again, smoke still has to reach the sampling position in the roof before the alarm is activated.

The inadequacy of these systems in voluminous buildings such as the Royal Airwing Hangar is further exacerbated by the high ceiling height and the possibility of smoke stratification further delaying the activation of the conventional detectors at ceiling level. Smoke rises because it is hotter than the surrounding air and as it travels through the cooler air, it cools down. Once the smoke reaches the same temperature as the air, which in Dubai can reach as high as 40 degrees C, it stops rising and will not be detected until the heat generated by the growing fire raises the stratification level. Indeed, the thermal barrier created by the high ambient temperature air rising to the hangar's ceiling, creating a hot air (thermal) barrier, will only make early detection by traditional detectors less likely.

Another consideration that encouraged the hangar's consultants and fire officers to seek a faster and more reliable solution was the fact that the hangar's huge doors would be open for most of the time. This means that there would be no reliable predictable airflow route, leading them to the conclusion that the only dependable solution was to seek an "at source" detection system. A visit to a D-Tec protected British Airway's hangar at Heathrow Airport in London persuaded them that the best solution was the D-Tec's FM-approved Video Smoke Detection system, VSD.

In the words of the British Airways Fire Protection Manager, John O'Sullivan (MBE), 'The D-Tec system showed itself to be the best for our particular needs with a proven track record and very low maintenance requirements'.

Royal Airwing Hangar Solution

The solution for the Royal Airwing Hangar was devised by BSS-ME in Dubai, working closely with colleagues from D-Tec engineers in the UK. The VSD equipment was supplied to Honeywell, which provided the CCTV equipment. The installation was carried out by BK Gulf's BCL Fire Systems division, part of the Dutco Balfour Beatty Group.

It comprised a combination of infrared flame detection and D-Tec's VSD system. The flame detectors are fitted below wing height, while the VSD CCTV cameras are installed around the perimeter of the hangar, 15 metres above floor level, just above the planes' wing height. This ensures that the VSD system will detect smoke escaping from any aircraft doors or appearing above wing level from a fire lower down. VSD provides the early warning detection of smoke to allow manual activation of the foam suppression extinguishing systems', if required. However the VSD and flame detection systems are linked together so that, should both systems detect smoke and flame, the alarm is triggered and the hangar's suppression extinguishing systems' are automatically activated.



Eight CCTV cameras are used to protect each of the eight areas of the hangar, resulting in a total of 64 cameras. Each eight-camera area is individually wired to one VSD 8 unit, and four areas - or 32 cameras - are connected to one of two 48U rack-mounted systems. Each camera has a 40-degree field-of-view and is located no further than 60 metres from the furthest detection point.

The two VSD 48U rack-mounted units are located in a central manned control room. Each rack consists of an integral monitor, keyboard and mouse.

BSS-ME Airport Expertise

The Royal Airwing Hangar in Dubai is not the first D-Tec VSD installation designed and completed by BSS-ME in a major Middle East airport. An installation was recently completed at Oman's Royal Hangar at Seeb International Airport. Here too the airport authority had originally planned to install flame and linear heat cables in the 210-metre by 110-metre by 27-metre high hangar. That was until, in 20 tests, the VSD system detected smoke that appeared above the planes' wings within 90 seconds, proving that it does not wait for smoke to rise to the roof.

Like the Royal Airwing Hangar in Dubai, the Royal Hangar at Seeb International Airport was built to house the A380 Airbus and the Boeing 747. It too was designed to have no internal support columns. BSS-ME case study for Seeb can be found on their website <http://bssme.com/case.htm>

For further information on installations in the Middle East please contact;

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