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Securing the skies – airports and the fight against terrorism

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Few people, it seems, have a good word to say about airport security. Interminable queues, brusque security staff, confusing or contradictory regulations and intrusive body searches are just some of the complaints that are often articulated. However, while airports and commercial aircraft remain targets for terrorist activity, robust security screening and the intensive surveillance of passengers, airport employees, and airline staff will remain a vital, if much maligned, part of modern air travel.

History of aerial terrorism

Airports, commercial aircraft, and airline passengers have been targets of terrorist activity since the early days of passenger flight, as the bombing or hijacking of aircraft could kill hundreds of people, generate considerable publicity, and temporarily disrupt the smooth operation of airports and airlines. One of the first recorded incidents of aerial hijack occurred in 1931, when local revolutionaries hijacked a flight to Cuba. However, it was not until the 1960s and 1970s that hijacking and other forms of terrorist activity against aircraft and airports reached epidemic proportions. In 1969 alone, over 90 cases of illegal aircraft seizure were recorded and the worrying trend of terrorist attacks against aircraft and airports continued into the 1970s.

On 6 September 1970, two aircraft, a TWA Boeing 707 and a Swissair DC-8, both bound for New York, where hijacked by members of the People's Front for the Liberation of Palestine (PFLP) and forced to land at Dawson's Field in Jordan. Three days later, a BOAC VC-10 en route from Bahrain was also hijacked by the PFLP and flown to Dawson's Field. Following lengthy negotiations, all the hostages were eventually released, but on 12 September 1970 all three aircraft were destroyed in full view the world's media. Two years later, in May 1972, the terminal at Tel Aviv's Lod International airport was the scene of a terrorist incident when three gunmen opened fire on passengers waiting in the baggage reclaim hall. 26 people, including two of the

terrorists were killed. In response to these attacks, airport defences were tightened and new airport security procedures were devised.

The United States introduced pre-flight checks on baggage and placed armed marshals on flights that were considered to be at risk of hijack, while ICAO, aviation's international governing body, established new security protocols to screen passengers and their baggage and prevent unauthorised access to aircraft and airside areas of the airport. However, these new regimes were not infallible, and loopholes soon emerged.

In June 1976, hijackers seized an Air France A300 using weapons that had been hidden inside tins of dates in their hand luggage. In an effort to prevent guns and knives being taken into the cabin, metal-detecting archways were introduced and hand luggage was routinely x-rayed and searched. However, these measures did not extend to the routine screening of hold baggage and the destruction of Air India flight 182 in 1985 over the Atlantic Ocean and the bombing of Pan Am 103 over the town of Lockerbie in Scotland in December 1988, which killed 329 and 270 people respectively, showed that bombs could be smuggled aboard aircraft in hold luggage and timed to explode in mid air. Airport security was subsequently further enhanced to ensure that all hold luggage was screened and that aircraft could not depart with unaccompanied bags on board. However, it was not until the late 1990s that Positive Passenger Bag Matching (PPBM) was introduced as a matter of course to prevent unaccompanied bags from being carried on aircraft.

Passports and identity checks

One of the most important security checks that is performed at an airport is the verification of a passenger's identity. At check-in, the check-in agent must establish that the name on the ticket matches the name on the passenger manifest and the name on the passport. They must also confirm that the passport is valid, that it contains the necessary visa or other official documentation for the journey and that the photograph is a good likeness of the passenger. At the gate, ground staff must verify that passengers are not only boarding the correct aircraft, but that the name on the boarding pass matches the that of the passport or identity document. On arrival, immigration officers again check the authenticity and validity of identity documents.

Biometrics

The development of a new generation of biometric passports, which will contain encrypted information about parts of the holder's body, such as the size and pattern of their face, fingerprints and/or iris, have been welcomed by some groups who consider them to be a huge step forward that will improve airport security. Others, meanwhile, are concerned about privacy implications and the integrity of the proposed systems. Nevertheless, some airports have been using biometric technology, albeit in a limited capacity, for several years.

The Privium system at Schiphol airport in Amsterdam allows registered users to bypass immigration and check-in queues and enjoy certain privileges in the terminal. In exchange for an annual fee, users have an iris scan and receive a smartcard that contains their biometric details. At check-in or immigration, the card is inserted into the card reader and the holder's eye scanned again to verify that the passenger is the owner of the card. Though the system is not 100% accurate, it has dramatically reduced the time most users spend queuing at immigration. A similar scheme has also been tested at Heathrow's Terminal Three where a number of frequent flyers volunteered to have their photographs, fingerprints, and iris scans taken and have their personal information uploaded onto a 'MiSense' card. The experience gained from these trials will help inform possible future larger-scale applications of biometric technologies at airports.

Passenger profiling and 'pre-clearance'

In addition to checking the identity of passengers at the airport, increasingly sophisticated passenger profiling techniques are now routinely used to predict the security risk each individual passenger poses before they even reach the airport. In the United States, a form of passenger profiling called CAPPS (Computer Assisted Passenger Pre-Screening) was introduced on the recommendation of the White House Commission for Aviation Safety and Security in the latter half of the 1990s. CAPPS was designed to enable US security agencies to assess the threat level that individual passengers posed by allowing them to identify and filter out any passenger whose pattern of behaviour was considered suspicious. While the profiling of airline passengers was not a new idea (El Al had been undertaking similar profiling for years), the CAPPS scheme was designed to operate on a much larger scale.

In 2001, the United States passed the Aviation and Transportation Security Act. This Act required airlines flying to the USA provide information about all their passengers in advance of their arrival into US territory and obliged American carriers to increase security on their aircraft. The Act prompted considerable debate among politicians, airlines, consumer groups, and privacy watchdogs on both sides of the Atlantic, with the European Commission in particular arguing the Act may contravene the European Union's privacy directive. A formal agreement was eventually signed in May 2004.

Following America's lead, other countries have begun to introduce their own versions of passenger profiling and pre-clearance. In Europe, Spain became the first country to collect Advanced Passenger Information (API) about all passengers who are intending to fly to the country. As with the US's ESTA system, passengers are required to submit the required information online via their airline's website. From 12 January 2009, citizens of all 27 countries that currently participate in the visa waiver scheme who wish to travel to the United States will have to submit details about themselves online at least three days before they travel. It is claimed that the Electronic System for Travel Authorization (ESTA) will increase security on flights to the US by enabling the American security services to identify and refuse travel to any person who is classified as representing a possible security threat.

Inside the airport
In addition to the more visible aspects of modern security, other facets of the security regime, including staff screening and access control, maintaining the integrity of the perimeter fence and guarding airfield hangers, fuel depots, cargo sheds, and baggage handling facilities, though often invisible to travellers, are equally important.

The introduction of larger aircraft, the pressure to reduce turnarounds, and the rise in subcontracting, has resulted in more companies and more personnel needing access to aircraft and airside areas. All airside staff should be subject to comprehensive background security checks, while alarmed doors, dedicated staff search areas, remote access entry points, pin numbers, and swipe card systems should ensure that only authorised personnel can access sensitive areas of the airport. Patrols are also conducted of land outside the perimeter fence that is nevertheless adjacent to the

runway. However despite all these precautions, security breaches, though uncommon, do still occur.

New restrictions

Despite the introduction of more rigorous security checks, aircraft and airports remain targets of terrorist activity. Since the beginning of the new millennium, we have experienced the horror of the 9/11 attacks, learnt of the attempt by the 'shoe bomber' Richard Reid to blow up an aircraft using an explosive device contained in his shoe, witnessed the aftermath of an alleged plot to blow up transatlantic aircraft leaving the UK with liquid explosives, seen terrorists attempt to drive a car filled with explosives into the terminal building at Glasgow airport, and read numerous other stories about security incidents at airports around the world. Many of the security directives that have been instigated as a result of these attacks have involved the active defence of aircraft and airports such as retrofitting flightdeck doors with bulletproof material and CCTV cameras, deploying armed sky marshals, and protecting terminal buildings from car bomb attacks by closing approach roads and placing concrete roadblocks across their forecourts.

In the UK, one of the most serious incidents occurred on 10 August 2006 when the Police acted to stop an alleged terrorist attack to blow up seven transatlantic flights leaving the United Kingdom, possibly using liquid explosives contained in items in their hand luggage. As a result, immediate restrictions on hand luggage were introduced and passengers were only allowed to carry a limited number of essential items, including travel documents and medication, into the cabin. The new rules resulted in chaotic scenes at airports in the UK and around the world as passengers were forced to repack their luggage in order to comply with the new restrictions. At Heathrow, more than 610 flights were cancelled and a number of countries, including Germany, Belgium, Spain, France, Israel, and Greece, halted all flights to the UK for a time.

On 14 August, the threat level was downgraded and passengers were allowed to carry one small piece of hand luggage into the cabin, though liquids, gels, and creams were still prohibited. In an effort to beat the ban, some passengers apparently resorted to rather inventive measures. At Manchester Airport, one frustrated traveller reportedly

froze bottles of water in an effort circumnavigate the ban on liquids, while another drank a 750ml bottle of vodka after learning that he could not take it with him. Perhaps unsurprisingly, given the quantity of alcohol he had imbibed, the passenger was later removed from his flight.

Over the following weeks and months, the restrictions on hand baggage were progressively relaxed. On 3 November 2006, the total ban on carrying liquids into the cabin ended and passengers were permitted to carry small quantities of liquid (under 100ml) in their hand luggage. However, the new regulations stipulated that these items had to be placed in a single, transparent, re-sealable plastic bag, which was not allowed to exceed one litre in capacity (approximately 20cm x 20 cm). This bag then had to be presented separately to staff at the security checkpoints for further examination.

The situation today

Despite complaints that the rules and restrictions are not clear and consistent between airports and airline operators, passengers can do much to facilitate their smooth passage through the airport and help minimise delays at security checkpoints by checking the security requirements of both the airline they are flying with and the airport from which they are due to depart. When packing for a trip, they should ensure that the dimensions of their luggage do not exceed those stipulated and they should be careful not to place any prohibited items, or items that might be construed as a danger, in their luggage. Battery-operated items, especially laptops, portable gaming consoles, and music devices tend to raise concern and many airports still require passengers to remove laptops from their bags before they go through the x-ray scanner. Very often, screeners will individually examine digital cameras and other electronic items to ensure that they are working as they should and have not been tampered with. Irrespective of the content of some bags, some passengers' luggage will be subject to additional hand searches. This could be because the owner fits a particular passenger profile that the authorities wish to target, or it could be totally random. In addition to a hand search, electron or chemical analysis may be used to identify banned substances. This procedure should act as a deterrent to those who think they could pack items in such a way as to 'beat' the scanners.

In addition to luggage, passengers are also subject to more intensive security surveillance. Metal detecting archways and hand-held wands can be calibrated according to the threat level that is believed to exist at a particular facility and their sensitivity increased to the point where even the smallest quantity of metal can trigger an alarm. This often results in passengers having to divest themselves of shoes, belts, and jewellery, but as items such as clasps on underwear or medical prostheses can also trigger alarms, manual 'frisking' is frequently performed to ensure the passenger does not pose a threat. This has led to some female travellers, in particular, to complain that they have been subject to particularly embarrassing body searches in front of other passengers.

Implications for enthusiasts

In addition to changing the airport experience for passengers, the post-9/11 and post-August 2006 security regimes have had serious implications for aircraft enthusiasts. The development of passenger aviation during the twentieth century generated considerable interest in aircraft activity, and airports quickly became spaces where people gathered to watch aircraft and experience the excitement of take-offs and landings in ever increasing numbers. Indeed, airports were promoted as places for a curious population to visit and non-flying members of the public were actively encouraged. At Heathrow, the Queen's Building (currently part of Terminal 2) was designated as a place for enthusiasts to gather. Facilities included a viewing balcony that could accommodate up to 10,000 spectators, as well as catering facilities, a news cinema, exhibition hall, playgrounds, pleasure gardens, and a souvenir shop. Uniformed guides were employed to show people around and a live commentator described scenes of interest to the crowds. By the mid 1950s, around one million people every year were visiting Heathrow just to watch the aircraft.

Today, 'security reasons' have resulted in the closure of many viewing terraces and, at many airports, the practice of aircraft spotting is now discouraged. Sadly, the rules and regulations regarding what is and is not acceptable are not consistent within or between countries and what is prohibited at one facility may well be allowed at another. This has led to incidents in which aircraft enthusiasts have been arrested for pursuing their hobby. Fortunately, a number of airport authorities have now realised that aircraft enthusiasts can improve airport security as their knowledge of the airline

industry and airport operations means they can identify anything that is unusual. Trial registration schemes for enthusiasts at some larger airports now allow spotters to pursue their hobby with the full approval of the airport operator and the police.

The future

In November 2007, the Director-General of the International Air Transport Association was quoted as saying that modern airport security measures are often inconsistent, often represent more hassle than they are worth, and are devised to protect the public against "improbable threats". One criticism that is frequently levelled at airport security is that it is largely reactive rather than proactive and thus can only protect passengers and aircraft against known terrorist threats and techniques. In an effort to prepare for and prevent future incidents, counter terrorism experts and security organisations are developing an array of new security technologies for use in airports. New behavioural recognition systems, based on a network of video cameras, eye-tracking software, infrared cameras, and audio recordings, will continually monitor crowds for unusual or suspicious patterns of behaviour. These devices are designed to identify facial micro-expressions that often betray particular emotions such as fear or anxiety. Other developments include new 3D colour x-ray machines that will be able to detect tiny quantities of explosives and discriminate between different types of material in luggage, full body scanners, and machines that will analyse the chemical composition of the air around a passenger and identify the presence of particular compounds that may indicate the passenger has been in contact with explosives.

Crucially however, the barriers that are preventing the introduction of these new technologies are arguably not so much practical as ethical, moral, and financial. While the technology undoubtedly exists to improve security, the level of surveillance and screening that passengers will accept is debatable. Already, the developer of one full body scanner has had to incorporate 'fig-leaf' technology into their system to avoid accusations of voyeurism and privacy rights campaigners have been alarmed by the implications of some of the proposed new systems. Furthermore, the question of who will finance the installation of the new systems and who will bear the costs associated with training staff to use and maintain them have yet to be resolved. What is beyond doubt, however, is that our airports must be kept secure, not only for the safety of

individual travellers, but also for the security of the global airline industry and global society as a whole.