

Medical technology could shorten the queues at terror-alert airports

The travel chaos has highlighted a need for faster checks on passengers and bags

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The ongoing terrorist alert has given fresh impetus to the development of new technologies that could be used in airports to quickly and reliably check passengers and luggage for explosives.



Photograph: Scott Barbour/Getty Images

While security checks on baggage stored in the hold have advanced, particularly by using three-dimensional scanners, manual checks are still used for passengers and their hand baggage. When threat levels are elevated - as they have been since Thursday's alert - they cause long delays and travel chaos.

Chris Yates, an aviation security analyst with Jane's Airport Review, said: "We've known for 15 years that checkpoints are the achilles heel of airport security."

Last Friday, the Department for Transport's national aviation security committee, which includes ministers and representatives of airlines and airports, discussed the possibility of introducing new technology to improve checks on passengers and hand baggage.

Since the Lockerbie bombing in 1988, airports in the UK have used computed tomography (CT) scanners, similar to those used in hospitals, to generate a three-dimensional image of baggage checked in by passengers. CT machines were also introduced for international and domestic flights in the US after 9/11.

But the minivan-sized machines, costing about \$1.5m (£795,000), are too expensive to use for in-flight luggage, which instead pass through x-ray machines. Bags with unidentifiable objects are checked by hand. Because the x-ray images are two-dimensional, staff often have difficulty even locating the object, so searches take longer.

Passengers are checked using low-tech and labour-intensive methods. All passengers walk through metal detectors, and about 1 in 10 undergo random checks using hand-held detectors of explosives.

Promising

Since last Thursday, passengers on all flights from UK airports have also been searched by hand and asked to remove their shoes to be x-rayed, as they have been in the US since 9/11. However, if these checks remain in place, it will slow the flow of passengers to a snail's pace.

Several companies are now working to automate the procedure, which would save money and speed up the process. "Technology is really the only way to go," said Mr Yates. Probably the most promising technology for hand luggage is quadrupole resonance (QR), which bombards objects with low-frequency radio waves. Explosive materials - including liquid explosives - emit their own unique "QR return" in response, which is automatically picked up by a receiver, removing the need for an operator to watch a monitor.

The technology is also accurate, with only 3% of results wrongly coming up positive - significantly lower than the CT technology used for checked-in luggage. "QR is the technology that is best suited for the 100% screening of carry-on bags," says Mr Yates.

The US transportation security administration has already certified machines that combine x-rays with QR at several US airports. The machines, developed jointly by the Los Angeles-based Rapiscan and the Australian company QR Sciences, cost \$160,000. Rapiscan is owned by the Californian group OSI Systems, whose shares leapt more than 9% on Nasdaq last Thursday.

Several companies, including QR Sciences, are also developing hand-held wands that use QR technology to scan passengers. In the short term, however, the challenge is to automate checks using existing explosive trace technology.

The British group Smiths - one of the leading manufacturers of airport x-ray machines - has developed an explosives detection portal that fires a puff of air at passengers as they walk through, which is then scanned for traces of explosives. It is being tested at several UK airports.

GE Security, part of General Electric, has developed a similar "puffer" called EntryScan, which it is testing as part of its "checkpoint of the future" at San Francisco airport. This also uses two other new technologies - backscatter x-ray and millimetre wave - and includes a "shoe scanner" that uses QR to find hidden explosives without requiring passengers to remove their footwear. GE says the machine can process a passenger in 20 seconds.

GE is also developing smaller CT machines to scan carry-on bags. CT scans can identify the density as well as the shape of objects, so, for example, passengers would not have to remove laptops from their bags, as they are required to do at American airports.

However, CT technology is likely to remain prohibitively expensive. As a cheaper alternative to CT scanning, a British company, Image Scan Holdings, is working on developing 3-D x-rays. The technology, which has been licensed to Rapiscan and Scanlogic, another American company, is being tested at Prestwick airport in Scotland.

Footnotes

Computed tomography - a technology often used in medical scanning - generates a three-dimensional image of the inside of an object by rotating around it and taking a series of two-dimensional x-ray images or "slices".

Quadrupole resonance is closely related to magnetic resonance imaging (MRI), also used for medical scanning. It uses low-frequency radio waves to stimulate atoms in a scanned object. The object then sends back a unique radio signal of its own that can be used to identify it.

Backscatter x-ray creates a two-dimensional photo-like image by detecting the radiation that bounces off an object when it is x-rayed. It can be used to see through clothing to reveal concealed weapons.

Millimetre wave detects energy naturally emitted or reflected from objects. It can reveal objects hidden under clothes and is also used in astronomy and navigation.

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