

The tags that ke

AIRPORT TECHNOLOGY

Sarah Murray on how RFID and other innovations can ease airline passengers' worries over lost luggage

In the wake of the baggage pile-up that marred the March opening of Heathrow airport's Terminal 5, accusing fingers pointed at everything from inadequate employee parking provision to insufficient training, lack of staff familiarity with roles and procedures and "baggage performance issues".

Curiously, the baggage handling technology itself escaped much of the acrimony.

As the Terminal 5 debacle shows, human involvement in luggage handling remains crucial to the smooth passage of a bag through an airport, on to an aircraft and back to its owner at the other end of the journey.

Nevertheless, forming the backbone of baggage logistics is a complex web of technologies.

IT systems, unmanned carts and automated conveyors all work together to make sure that luggage travels through the airport system at the same time as the passenger and, most importantly, arrives at the same destination as the passenger to whom it belongs.

When it fails to do so, the bills for the aviation industry start to mount. While only about 2 per cent of airborne luggage is mishandled, more than 2.2bn pieces of checked baggage move through the system every year, so at an average of \$90 per mishandled bag, that percentage costs the air transport industry dearly.

In 2007, this amounted to \$3.8bn, according to Sita, the Geneva-based IT provider that tracks passenger baggage globally for the industry.

As airlines and airports struggle to reduce the number of bags that are delayed or lost, the IT infrastructure behind baggage handling has been the focus of both research and development projects conducted by companies and broader initiatives from the International Air Transport Association (IATA).

At the centre of these

efforts is a small but crucial piece of equipment – the baggage tag.

This tag is read at various points on its journey through the airport, from the check-in desk through to the conveyor belts and the baggage reconciliation area.

There, checks are conducted using handheld scanners to confirm that the bag to which the tag is attached is the one to be loaded on to a particular flight – and that the passenger has been cleared to board the flight.

Barcoding remains the dominant bag tag technology. The barcode tag holds readable information about its owner's destination and stopover cities, as well as a 10-digit barcode identifier that is unique to each bag.

However, a growing number of airlines and airports are considering introducing radio frequency identification (RFID) technology as a means of tracking bags.

Much of the impetus for such moves has come from IATA, which in 2005 introduced a global standard for RFID baggage tags. This followed testing to ensure that the tags could operate in airports, where potential barriers were electronic interference inside and rain outside, and producing a business case showing potential savings for the industry.

"The main challenge was interoperability between continents using different frequencies," says Philippe Bruyère, director of IATA's Simplifying the Business programme. "But we proved that this technology could work in an airport environment."

Several airports have already introduced the technology, including Milan, Las Vegas and Hong Kong, where more than 40 per cent of the baggage handling is for transfer flights.

Using radio frequencies, the memory chips built into RFID tags can be read when they pass close to a scanner – unlike barcode tags, which require a direct line of sight to read. And because they can be hidden or become crumpled, the read rate of barcode tags, at about 85 per cent, is lower than the 96-98 per cent read rate of RFID tags.

Every tag that cannot be read by a scanner must be handled manually, taking more time – a key consideration as airports face growing numbers of passengers and therefore bags.



Day of the RFID: barcodes have

"It's not so much about cutting down on lost baggage. It's about handling more throughput," says David Picton, transport and logistics project manager at Motorola. The company has put RFID readers and tags in place in Heathrow Terminal 3 to track baggage on Emirates airline and which worked on RFID projects at airports in Hong Kong and Las Vegas.

"Half the problem with baggage is that systems are operating at 110 per cent of their capacity," says Mr Picton. "With RFID, you bring that back down under 100 per cent and soak up that extra travel."

Another benefit of RFID technology is that scanners can select groups of tags, rather than having to read them one at a time. This helps speed up processes such as unloading a bag from the hold of an aircraft when a passenger has not shown up for the flight.

"It's about knowing what's happening all the way through the chain," says Andrew Price, RFID project manager at IATA. "With RFID, you can put in a lot more points to know where a

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a read rate of 85 per cent, but radio frequency tags achieve 96-98 per cent

AFP/Getty

bag is, so if a bag is out of process or in a rush, you can get a warning so that it can be looked after proactively, whereas today everything is simply sequenced."

But while big changes are on the horizon for baggage tagging, the technologies that move baggage around the airport, from check-in to

security to the aircraft and off again, are relatively well established.

At the heart of these systems is the conveyor belt.

The airport version of this workhorse has junctions and sorting machines that automatically route bags to the correct gate down dozens of channels.

Along the way, lasers carry out everything from scanning the tag's information to measuring the distance between bags on a conveyor belt so that they can be separated and re-routed to the appropriate gate.

"A lot of these technologies will continue to be

used," says Graham Bolton, a director at Arup, the global design and business consulting firm. "They're repeatable, they're simple to maintain and lots of people supply them, so an airport or airline can buy the equipment easily."

The "push" equipment also includes hinged conveyor belts that lift up or lower to move a bag from one conveyor to another. Another form of automatic sorting consists of a series of trays that, at any point, can be tipped to allow the bag to be directed into a different shoot.

For lengthy journeys between terminals, destination-coded vehicles (DCVs) – unmanned carts mounted on tracks and moving at high speeds – do the job.

At Heathrow, for example, a 1.3km tunnel containing an automated conveyor system takes baggage between Terminal 1 and Terminal 4, running below one of the main runways and the Piccadilly Line underground railway tunnels.

When it comes to getting the bags on to the aircraft – packed into a container or directly into the hold – manual handling remains at the heart of the process.

However, experiments are being conducted into the potential of robotic loading. At Amsterdam's Schiphol airport, for example, IBM is providing a baggage management system that includes not only RFID but also robot-handling software.

Robots may be able to speed up the loading process – and robots do not tire or

need to take breaks. However, Mr Bolton says that robots will not necessarily mean airports can cut down on baggage handling staff since, as yet, they do not pack as efficiently as humans.

"It's load optimising that's a challenge for the robots," he says. "Robots don't perform as well as people in loading containers and the best performance from robots is when people are around them."

Given that the human factor continues to play a prominent role in baggage handling – as Heathrow's T5 muddle demonstrated – it is not surprising that the Baggage Improvement Programme of Iata's Simplifying the Business initiative has a substantial component focusing on education and training for both employees and passengers.

"Even though RFID brings lots of benefits, it can only solve 20 per cent of baggage mishandling," says Mr Bruyère. "Whenever you try to improve business processes if you're only technology-driven, it may not bring the maximum benefit."

Technology may, however, be able to improve the experience for passengers. Nick Gates, baggage portfolio manager at Sita, envisages a service whereby airlines using RFID technology to gain better visibility of a bag throughout its journey could pass that visibility on to their passengers.

"Wouldn't it be nice," he says, "to get a text message saying your bag is on the flight or on the arrival belt?"