Innovations in IATA Resolution 753 Baggage Tracking Solutions

RFID – A New Dawn for Baggage Handling
IATA Resolution 753 – Time to Get Ready
Why RFID Represents a Smart Investment for the Future
Getting the Most out of RFID
RFID Baggage Tracking and the Future of Air Travel
TRANSFORMING AVIATION WITH RFID

RFID systems enable 99.9% baggage tracking accuracy, increasing efficiencies, reducing costs and ultimately improving consumer experience. Compliant with IATA 753.
Foreword

IT’S A creeping fear that all passengers have “what’s happening to my bag”. Even though airlines have made great strides over the last ten years, the thought of losing your bags is still a major pain-point. That’s why IATA’s Resolution 753 is coming into force – as part of the industry’s ongoing drive to reduce the number of bags which go missing every year.

The benefits will be felt by everyone. Passengers will be reunited with their bags, while airlines can reduce expenses and improve operational efficiency. But to embrace the changes, operators will need to invest in new technologies.

Our opening article looks at the development of these technologies. We interview Mark Summers, Aviation Expert at Avery Dennison, who are one of the world’s leading manufacturers of UHF RFID tags. Their offering to airports has delivered highly sophisticated all the time. Earlier adopters are already seeing the benefits, but these may be only the start.

As James Butler then discovers, imaginative deployment can unlock a host of additional benefits and play an important role in future business performance. He’ll focus on Delta Airlines, which say they have pushed read rates up to nearly 100%.

Finally, we’ll look ahead at the future. The industry aims to continue reducing the number of bags it mishandles despite rapidly rising passenger numbers. RFID will be crucial to this and, as it evolves, it will play an integral role across all operations.

Tom Cropper
Editor

Tom Cropper has produced articles and reports on various aspects of global business over the past 15 years. He has also worked as a copywriter for some of the largest corporations in the world, including ING, KPMG and the World Wildlife Fund.

RFID – A New Dawn for Baggage Handling

Avery Dennison RFID

Airlines are working hard to comply with IATA Resolution 753, but if they choose the right partner they can truly revolutionise their business performance.

One area which could potentially offer tremendous strides in the past couple of years in their ongoing fight against lost luggage. Even so, it is striving to do more, and the arrival of IATA Resolution 753 next year aims to help the industry take another step forward. Most airlines will already be aware of the requirements and will be actively working to ensure their systems are compliant. However, this is an opportunity to do more than just satisfy guidelines - it can deliver enormous rewards to both an airline and an airport and provide excellent service and experience for passengers checking baggage.

One area which could potentially offer enormous gains is the use of RFID tags which are read and not scanned. For years airlines have stuck to the standard approach of barcode scanning which requires the code to be within the “line of sight” of the scanner. Bags with barcodes have to be manually checked and scanned by handlers. It takes time and runs the risk of human error. The difference with RFID reading is that handlers can use the reader to receive radio waves from a chip embedded within the bag tag. Airlines which have already made the switch have reported enormous gains in read rates and processing times. Delta, for example, which worked with Avery Dennison to overhaul their entire baggage scanning technology, has seen rates getting close to 100%. We spoke to Mark Summers, Aviation Expert at Avery Dennison, to find out more.

Satisfying Requirements

“Despite significant gains in lost baggage rates, luggage mishandling is still the second most complained about problem for travelers,” he explains. “So, this is a system which hits at a persistent pain point for airline passengers.”

The information RFID produces not only reduces the risk of losing a bag, but it also greatly increases the traceability of the bag. That ability is one of the main reasons why it is so compatible with IATA Resolution 753. When formulating the guidelines, IATA drew upon research which showed that those airlines capable of tracking bags more effectively, also had significantly reduced lost bag rates. Therefore, they introduced requirements for airlines to trace all bags up to a minimum of four key points along the bag’s journey.

- Handover to the airline (check-in)
- Loading onto the aircraft
- Baggage handling
- Offloading onto the aircraft
- Receiving at the airport

Both Avery and Delta share this common goal. Avery’s RFID system is a powerful investment for airports who aim to meet the challenge of Resolution 753. Avery has been at the forefront of the industry since the introduction of RFID technology. Avery has demonstrated the system’s ability to help airports bring back lost luggage.

Aviation experts believe that IATA Resolution 753 is coming into force as part of the industry’s ongoing drive to reduce the number of bags which go missing every year. The benefits will be felt by everyone. Passengers will be reunited with their bags, while airlines can reduce expenses and improve operational efficiency. But to embrace the changes, operators will need to invest in new technologies.

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While airlines might have their eye on the minimum requirements, pushing above and beyond can have a much higher return on investment.

Improved Performance

Beyond that it delivers improvements which may be more indirect, through faster bag processing speeds, lower ongoing costs and improved efficiencies.

“RFID readers have the capability to read multiple bags at the same time,” Summers explains. “There’s no need for singulation – in which bags have to go through one at a time and with a gap between each bag in order to be read correctly.”

Speed will become increasingly important as airports seek to improve their capacity. IATA’s long-term passenger forecasts predict passenger numbers to double over the next 20 years6. If those predictions are even close to being accurate, airports will have to invest heavily in improved infrastructure to meet these challenges.

In an environment in which more and more airports are struggling to run a profit, that creates a major headache.

Because RFID increases speed and throughput, it can potentially increase the number of bags passing through an airport each day and push back the moment at which an airport has to increase capacity.

At the same time, that higher throughput will have an impact on turnaround times. Taken together with other improvements elsewhere in the process, it could lead to more slots opening up and an increase in the number of flights an airport can handle each day.

It is a technology which makes the remarkable promise of increasing capacity without necessarily expanding physical infrastructure. This, and other systems which make the same promise, will be crucial to airlines in the future.

In addition, ongoing costs are lower which produces a much faster return on investment than might be expected.

“Capex and maintenance costs are lower than with barcode scanners,” Summers explains. “So, the message we convey is that: yes, there is an initial incremental outlay, but the ongoing costs are so much lower that you start to see a return on investment quickly.”

Added Value

The data RFID produces is also extremely valuable. Airlines can gain a much clearer view of how bags are moving through the terminal. That allows them to flag up potential inefficiencies, identify problems and optimise processes. They are also taking that data and packaging it into services which help the customer.

Delta, for example, push bag data from the RFID reads to customers through their app.

A passenger can receive an alert when the bag passes a checkpoint. It’s a great source of comfort, and one that Summers has direct experience of.

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It’s a great way of taking a process which sits invisibly in the background and pushing important data to the forefront. Passengers can see the benefits of the technology first hand.

It deepens the connection with the passenger and demonstrates the lengths the airline is going to improve their experience.
**Beyond Baggage**

The value extends far beyond baggage. Avery Dennison’s RFID solutions can also be used to track all sorts of different pieces of equipment. Lost equipment represents a significant and continuous drain on the funds of airlines.

“As a company we are – and we have to be – very focused on our end customer and what the KPIs are that they need to hit. We understand the nature of their business and the challenges they face, and what they need to do in order to be successful,” Summers explains. “For us to be successful, we need our customers to be successful as well.”

That sums up one of the key lessons about implementation. Much has been written about the technology, and it can be important to focus only on the devices themselves. For real value, though, buyers should focus on the end goals. By understanding what RFID can achieve and how it can drive improvements across the board, substantial gains can be unlocked. Already RFID solutions have succeeded in driving tremendous improvements. However, as the technology advances and understanding evolves, there is much more to come. Just how much will depend on the attitude companies take. Beyond the bare minimums, they quickly find that this can create a host of direct and indirect benefits which could be crucial in helping airlines and airports achieve their ambitious goals for the future.

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b. Delta Launches Baggage Tracker [http://fortune.com/2016/10/06/delta-app-luggage-tracker/]

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According to the Airport IT Trends Survey in 2016, the majority of carriers intend to have business intelligence solutions in place by 2019.

into a system. They differ from barcode scanning in that baggage handlers do not have to manually scan each bag. This has been used in airports around the world such as Hong Kong, Orlando, Prague and many others, and has been shown to improve read rates and processing times significantly. RFID has been around for many years but, despite demonstrable success, has not become the universal standard operation.

Assessing Return on Investment

The sticking point, as with any other piece of technology, is price, which is where altitude comes in. Operators will be tempted to look at the available technology and choose that which promises compliance with minimal costs. Technology which is perceived to be more expensive, such as RFID, may have a difficult time in gaining acceptance, even if performance metrics are superior.

The calculation will be muddied by bold claims made by producers of new technology. Buyers in all walks of life tend to believe what they want. If an operator’s horizons are near with a focus on cost and minimal compliance, they will be swayed by marketing which promises the ability to fully Resolution 753 with the least possible capital outlay. However, evidence suggests that they may be missing out. First, there is the obvious question of whether a provider can match the claims of their marketing department. Minimal investment could see tracking capabilities fall below expectations, forcing operators to make hurried investments to bring themselves up to scratch.

Evidence also suggests that a proactive approach can unlock real and lasting benefits for airlines and airports. It delivers enhanced tracking capabilities, improved performance, reduced lost bag rates, and operational savings which help drive up profit margins. Many technologies, such as RFID, are also proving to be less expensive to implement than buyers might expect. Depending on your viewpoint, therefore, Resolution 753 represents either an obstacle to be overcome or an opportunity. Technology has the potential to help the aviation industry make great strides in their performance. However, to get the most out of it, operators will need to develop clear metrics which demonstrate a full cost versus reward calculation. Getting this right can give operators a clear competitive advantage in a highly challenging market.

Why RFID Represents a Smart Investment for the Future

Jo Roth, Staff Writer

Next generation RFID scanning technologies can improve dramatically the efficiency and accuracy of baggage handling.

At SCHIPHOL Airport in Amsterdam, a robotic arm loads passenger baggage onto the ramp. The human staff are left to take life easier and concentrate on other tasks. Elsewhere, at London’s Luton Airport, the world’s first touchless bag drop is making the business of check-in faster and more convenient for passengers. They’re all examples of how baggage handling is going high tech. But for all these improvements, it’s impossible to guarantee the safe arrival of every single bag.

That can be a problem because customer expectations are rising. Today’s airline passenger is more demanding and less forgiving, which makes lost baggage a bigger issue than ever. To combat this, operators are turning their attention to one particular piece of technology – RFID scanners.

Radio Frequencies

RFID technology is not new. It’s been used for many years in all sorts of industries including logistics, retail, finance and much more. It uses electromagnetic tags which can be embedded in objects and can be picked up by specially designed readers. Each tag has its own unique signature, which means that data for that object can be stored and analysed. Complete data can be read and the tags most recent location pinpointed.

The global RFID market has grown rapidly in recent years. A report from IDTechEx states that the market will reach $11.2bn in 2017, up from $10.5bn in 2016. By 2022 they expect the market to hit $14.8bn. The technology had been integral to the Internet of Things (IoT) since the phrase was first coined back in 1999. Back then, the term referred to objects which were linked by RFID tags but, ever since, RFID has taken a back seat in the IoT revolution. Now, though, it’s moving to the forefront again thanks to innovations in the technology.

Technical Innovation

A key change has been the development of readers. Previously tags would have had to go through a gateway which restricted their use. Today, they are becoming more portable and affordable, which is extending the range of applications where RFID can go. It’s a major bonus for baggage handlers where RFID scanners are now offering a viable alternative to the standard method of operation - barcode scanners. These have been the standard in aviation ever since the nineties. At the time they were revolutionary – just as they were in retail where the ability to quickly scan a barcode was a major advance for stocktaking. Now, though, RFID is taking over in retail where the ability to register tags without having to physically scan each and every package is saving enormous amounts of time, and increasing the traceability of products. Airports and airlines have been slower to embrace the technology, but the potential benefits are just as transformative.

The technology has been promoted by both IATA and SATS as being hugely beneficial in the move towards Resolution 753. They believe the technology has the potential to save the industry $1bn over the next seven years and reduce the number of mishandled bags by 25%. It will be particularly important in addressing the mishandling of bags during the transfer from one flight to another – an area which SATS and IATA have identified as one of the key risk points.

“The airline industry is on the brink of a revolution in baggage tracking. Deploying RFID globally will increase accuracy and reduce mishandling rates. This is a win-win situation – passengers will be happier, operations will run smoother and airlines will save billions of dollars,” said SATS Chief Technology Officer, Jim Peters.
The technology has the potential to save the industry $3bn over the next seven years and reduce the number of mishandled bags by 25%.

Cost versus Return
The technology is being used by a growing number of airports around the world, but not all of them see RFID as being the best option. A key sticking point has always been the perceived cost. While the cost of the RFID tags themselves is minimal, scanning gateways have traditionally cost thousands. However, the move to smaller, handheld scanners and the adoption of new technology is helping to bring down the cost of scanners and make the system more affordable. As adoption becomes more widespread, the cost is coming down continually and is much lower than many of its critics believe. IATA considers RFID capabilities could be introduced for as little as $0.1 per passenger while the cost savings could be $0.2 per customer².

These savings come in many forms. The first and most obvious is reducing the cost to airlines of lost bags. IATA currently estimates this figure at just over $2bn a year worldwide. Technology, it says, has reduced that figure by 12.25% in a single year³. Evidence suggests that, by improving the ability to track bags, airlines are reducing the number of bags they lose.

Wider Benefits
This saving, however, represents just the start. RFID technology also enables baggage handlers to process more bags within the same amount of space. While barcode scanners need each bag’s tag to be scanned individually, with RFID these can be done in bulk. This means that bags do not need to be spaced out individually on a conveyor belt, which promises to increase the throughput of bags each hour.

Given the rapid rise of airport traffic, this will enable operators to expand the capacity of existing infrastructure, which can postpone costly renovation expenditure. The data it produces can also provide an enhanced view of how bags are moving through the terminal, which allows operators to identify where problems are arising and to put measures in place to solve them. A more sensitive issue is the impact on staffing requirements. The technology requires fewer individual baggage handlers to operate, which can reduce the headcount in the baggage area. Operators may find themselves in a position to reallocate staff to more productive areas.

The technology has room to develop and expand its reach. It can be combined with data analytics to improve the visibility of data, and it can be used to track other equipment used by aviation companies. At each point it is identifying new ways to save money. This is only part of the gain. A game changer for RFID technology will be when it becomes more widespread among airlines rather than just airports. Their greater emphasis on customer service is enabling them to use the technology to produce more services to their passengers. In doing so, the technology moves from a cost-saving exercise and becomes a way of improving revenue and enhancing the relationship between passengers and airlines.

Getting the Most out of RFID

James Butler, Staff Writer

RFID Baggage Scanning is seen as a key technology in fulfilling IATA Resolution 753, but if used imaginatively, it can do so much more.

RFID BAGGAGE tracking is still at a relatively early stage, but initial results have been remarkable. As good as those figures are, though, they represent the tip of the iceberg. By becoming imaginative in how the technology is incorporated into operations, airlines and airports can achieve performance metrics that, previously, they might only have dreamed about.

Major Gains
Those initial figures are certainly remarkable. SITA’s white paper into RFID technology states that early adopters have seen a bag read success rate of 99.9%—translating to a 25% improvement over conventional approaches⁴. Their report identifies savings in three key areas.

- **Improvements in end to end tracking:** A greater success rate of bags tracked means fewer errors.
- **Improved loading/offloading:** Efficiency gains in baggage handling lead to faster turnaround times. This could potentially open new slots and increase the capacity of an airport.
- **Ease of adoption of Resolution 753:** The ability to track bags at four key points along their journey facilitates the adoption of Resolution 753 requirements, with minimal operational costs or changes.

RFID technology comes in many forms and at various frequency levels. The best solution for airports, according to SITA’s report, is ultra-high frequency with passive tracking of bags. These have a high transmission rate allowing multiple bags to be read at the same time, the UHF band is regulated by a simple worldwide standard and the passive UHF tags are cheap to manufacture.

Addressing Challenges
However, for all the benefits of RFID, adoption is still far from uniform and many airports see it as an expensive luxury. The report acknowledges this. Cost, it says, is the major barrier preventing adoption. The cost of the tags is based on volume and may not seem to be cost-effective for smaller operations. However, as the technology gains widespread acceptance, SITA believes the cost will come down. Technological innovation is also driving down the cost by addressing the biggest source of the expense—the reader. As these become more sophisticated, they are also becoming more affordable.

Another downside of UHF is that it can be susceptible to interference and this is a factor that operators must consider. A modern airport is an extremely busy environment in terms of radio signals and these could interfere with the operation of the tags. Manufacturers of UHF bag tags have developed ways to design the tags to maintain high performance even in the most difficult of environments.

They must also be robust enough to withstand the demanding environment of airport baggage handling. A unit may be subjected to all weather conditions, fluctuating temperatures, and the risk of impact damage. Devices must maintain long-term reliability in a host of different working conditions. Those which require additional maintenance, repair or replacement will push operational costs up and negate the return on investment.

The choice of manufacturer will also be important. The RFID market has considerable potential for growth and this is attracting a wave of new companies offering a range of solutions. Some will have developed specifically designed products to cater to the varying demands of different airports; others may have simply adapted technology from other industries, such as retail. A more specialised approach will offer improved performance and reliability in all conditions.

An Evolving Market
RFID has already been deployed at airports around the world, but the big change will come when airlines start to embrace the technology. As they do, they are finding new uses for the technology, which improves the ROI still further. Step forward Delta airlines who in 2016 became the first airline to deploy RFID scanners globally.
RFID Baggage Tracking and the Future of Air Travel

Tom Croppen, Editor

RFID Baggage tracking has enormous potential to improve the passenger experience. And the best news is that the technology is only just getting started.

WHEN THEY look towards the future, anyone involved in aviation logistics can be forgiven for feeling a little nervous. With demand outstripping airport expansion, it’s reasonable to ask if they can cope. It’s a problem for everyone, especially those tasked with handling baggage.

Keeping up with Demand

In 2017 approximately 4 billion people will have flown according to IATA’s long-term passenger forecast. Over the next 20 years, according to IATA’s future air travel predictions, passenger numbers could almost double, which means that by 2036 there could be some 7.8bn people travelling by air.

All indicators lead to growing demand for global connectivity. The world needs to prepare for a doubling of passengers in the next 20 years. It’s fantastic news for innovation and prosperity, which is driven by air links. It is also a huge challenge for governments and industry to ensure we can successfully meet this essential demand,” said Alexandre de Juniac, IATA’s Director General and CEO.

The challenge for the baggage handling industry will be to maintain the recent trend which has seen the number of lost bags fall during a time of rapid growth in passenger numbers. Doing so will require investment and innovation.

The inescapable truth is that baggage handling is a delicate matter and operators have created a trusted flyer system, giving them faster access to the data it captures. The immediate aim is to use this data to provide information about the location of bags, but it can do so much more, if it can be adequately analysed.

Potentially, the data can provide information about how baggage passes through a system. It can log speed of loading, instances of mistakes and daily patterns which drive development. For example, if the data is transformed into an effective software management system, it can provide clear graphical representations of bag flow, busy times, areas of bottlenecks and areas of inefficiency. Operators can use this data to inform process and infrastructure redesigns and further accelerate the handling process. Not only can this cut down on the number of mistakes and make it easier for handlers to locate a bag if a problem does occur, but it can also reduce loading times and an aircraft’s overall turnaround time.

To meet its demanding targets, airports must achieve a sizeable increase in capacity. For that to happen, they will need incremental improvements across the process to accelerate turnaround and open up slots for new aircraft. Baggage handling will be just one of many areas of potential improvement.

Personalisation of Data

Increasing data flows can also add to the personalisation of information. Data privacy is rapidly growing, airlines are taking a delicate matter and operators have created a trusted flyer system, giving them faster access to the data it captures. The immediate aim is to use this data to provide information about the location of bags, but it can do so much more, if it can be adequately analysed.

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The 120 million bags it handles every year will all be scanned and tracked, with details of their location delivered to passengers via an app. The scanners use radio waves to capture information about the bag and store detailed information on the chip on the bag. Initial deployment of the bag showed a 99.9% success rate, significantly higher than traditional barcode scanning and making it easier and more cost-effective for airlines to locate bags if they are missed.

“With a $50 million investment in RFID at 344 stations around the globe, we aim to reliably deliver every bag on every flight,” said Bill Lentsch, Delta’s Senior Vice President – Airport Customer Service and Cargo Operations. “This innovative application of technology gives us greater data and more precise information throughout the bag’s journey.”

Satisfied Customers

By adding the feature to their app, Delta are catering to passenger demand for more information and transparency. Passengers use the app to receive information about the status of their bag. Although it can’t quite provide real-time location information, it can show where it was last checked in – whether that’s baggage drop, loading onto an aircraft or being returned to the passenger at the destination.

It provides a sense of reassurance to the passenger and removes an element of stress in the journey. You are less likely to worry about where your bags are because you can see the status of their progress at every point.

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Self-service drops can be used with either barcode or RFID tags, but the latter makes bags much easier to track, while self-service kiosks bring down the cost and improve the business case for RFID tags.

but the ability to generate increased information about each passenger helps both from security and commercial perspectives.

Refining the Technology

RFID has had a presence in the aviation industry for some time now but, even so, this feels like a technology in development. Numerous pilots in airports around the world from London Heathrow to Hong Kong have demonstrated the advantages of RFID, but it can still benefit from refinement for use in aviation.

One area will be in the hardware. Tags will be developed to become both lighter and more durable to withstand the severe wear and tear they can expect over the course of their journey.

Improvements in usability and access can also be made to address the one area in which RFID still lags behind barcode scanning – cost. As it becomes more widespread, the price will come down, making it more affordable for airports of all sizes.

RFID can also be combined with another innovation: self-service bag drops. These are playing an increasingly important role in the customer experience for airports. In 2016, easyJet opened the world’s largest self-service bag drop at Gatwick. There are 48 self-drop kiosks, which aim to ensure that 90% of passengers spend less than five minutes dropping off their bags.

“The whole concept is about getting rid of queues and having big, open spaces. This is now our blueprint, our flagships,” said Sophie Drekkers, easyJet’s UK Director. Internally, easyJet employees have been referring to this as an ‘airport of the future’ – one in which queues are a thing of the past and various technologies combine to automate processes which were previously time consuming and onerous. Self-service drops can be used with either barcode or RFID tags, but the latter makes bags much easier to track, while self-service kiosks bring down the cost and improve the business case for RFID tags.

That case is already compelling. Back in 2005, when IATA identified RFID tags as one of its key areas for improving baggage handling processes, RFID tracking technologies could save airlines $760m14. As the technology becomes more effective, those savings are likely to improve. The estimate has already been revised up to $3bn by SITA and that figure is likely to climb even higher. There is every reason to be excited about what the future can bring. Existing technology already provides a significant step-forward against traditional systems, but it is still developing. In the future it can deliver savings, improved performance and flexibility – all while reducing the overall cost of doing business.

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TRANSFORMING AVIATION WITH RFID

1. Baggage tags printed and encoded using RFID enabled printer
2. RFID enables baggage to be scanned with no line of sight, even while moving
3. RFID readers improve load accuracy and reduce lost baggage
4. Reduced aircraft load times and improved on-time departures
5. On arrival, baggage is scanned and directed to the correct location
6. Updating the consumer with real time notifications
7. Significantly improving consumer experience

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