British Airways RFID Trials: *London Heathrow*

In an attempt to increase the read rate of bar codes on baggage tags and thereby improve the tracking ability of passengers luggage, British Airways has been conducting trials using Radio Frequency Identification (RFID) tags at London Heathrow Terminal 1 over the past few months. **Philip Baum** and **Bill Halkett** were invited by British Airways, Ultra Electronics and Texas Instruments to attend the trials

The project is being overseen by Andrew Price who is responsible for project managing the trial for British Airways. Price explained that "with 35 minute connection times, we wish to reduce to an absolute minimum the number of misreads". The current technology, whereby bar codes are scanned, runs into problems when a label is poorly printed, gets stuck to an adjoining label or where it has become crumpled due to being attached to a handle. RFID technology should dramatically reduce the misread rate and thereby ensure a higher percentage of bags make it to their designated flight. With each bag having a unique number, the aim is also to have a system that allows a bag to be tracked in order that at any given time an operator can tap into the system and find the point at which the bag was last recorded as passing. Heathrow Airport Limited have identified some 60 points at London Heathrow at which they would like to be able to trace bags. London Heathrow, due to its size and number of flight and more importantly, in this case, passenger movements (a high percentage of whom are transfer passengers), presents an enormous challenge. Yet it is in airports the size of Heathrow that the technology is most needed; therefore, any approved system must prove itself to be reliable in Heathrow-size environments.

British Airways have agreed to carry out this non-competitive project for the benefit of all; other IATA member airlines have been invited to spectate, as the ultimate aim is to develop a universal system that operates on the same radio frequency and to the same standard specifications world-wide.

Before the Heathrow trials began, potential suppliers had to show compliance with an extensive and detailed British Airways specification including confirmation that their RFID tags could be used in conjunction with existing bar code printing technology. Thereafter off-line trials were conducted at Crisplant in Denmark where read rate accuracy was tested using different bag types and a wide variety of tag orientations – underneath bags, on metal cases, in close proximity to other baggage etc.

The Heathrow trials commenced on December 4th 1998 and were completed on May 17th. By this time one of the potential suppliers, Omron Electronics, had withdrawn from the Stage 2 trials, despite having a successful Stage 1, leaving a Texas Instrument/Ultra Electronics

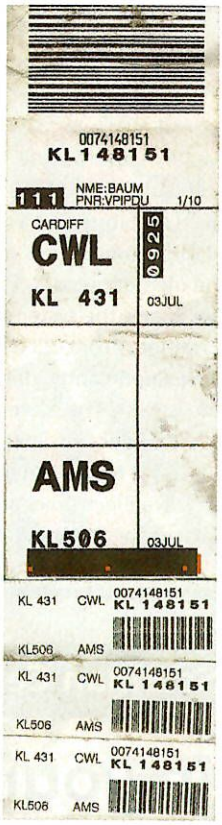
Straight forward bar code tag

team and a Philips consortium to take the tests a stage further. 75,000 tags, for each Stage 2 trial, were issued by British Airways check-in staff at Munich and Manchester airports. Of the 75,000 tags issued, about 20,000 will have been transfer baggage passing through Heathrow.

In the United States, the FAA is carrying out similar trials. The Heathrow trials, after careful consideration, concentrated on using the 13.56MHz frequency. The FAA are also investigating the potential to operate at 125KHz or 2.45GHz – primarily 2.65GHz because of local (U.S.) pressure, as well as the 13.56MHz frequency.

British Airways hopes to present an update at this years Airports Services Conference and that IATA may agree a recommended practice in the near future. Any recommended practice must be voted upon at both this years Airports Services Conference and Passenger Services Conference. In the meantime, British Airways is looking at costs and implementation issues.

Texas Instruments is an $8.3bn electronics company with considerable experience in RF technology. In 4000 petrol (gas) stations around the United States they have installed "Speed Pass" which recognises drivers who have signed up to the programme and automatically debits their credit card for any fuel taken. They have supplied some 16 million tags for integration into car key fobs as part of the car immobiliser thereby increasing the level of security; the project started with Ford, yet companies such as Rolls Royce, Toyota, Nissan and Mitsubishi have now recognised the potential too. And, their technology has also been used in marathon races whereby runners are clocked as they pass the start line of the race as well as the finish line in order to get a true race time.



Transfer bag tag for travel

The technology Texas Instruments proposes for baggage is based on Tag-it™, an ultra-thin, bendable, expendable tag operating at 13.56MHz, a frequency available world-wide. They can be read from a distance of 1.2 metres and can be given a unique address, providing the 16 billion combinations are not used up! The memory is contained in 8 x 32 bit blocks and the system will operate in conditions from -25 degrees up to 70°C. More importantly, the first time read rate is 99%. The current costs works out at just under US$ 0.50 in quantity, but the aim is to get the price much lower.

Ultra Electronics are the prime contractors for the Heathrow trial attended. As a major United Kingdom systems integrator, Ultra became involved in the Texas Instruments bag tag programme due to their extensive air transport environment experience. The company was formed in 1920 and their airport experience includes their Tag Trak Baggage Reconciliation and Management System installations in Hong Kong, Gatwick, Birmingham, Glasgow, Paris CDG, Helsinki, Vienna and San Francisco.

They have also developed a mobile check-in system operated by Virgin Atlantic and are participating in the bag tracking trials with the FAA and in Los Angeles as well as at Heathrow.

The trials themselves are taking place in the baggage sortation system which is owned by BAA and operated by Alstom Automation. Both BAA and Alstom have been very supportive of the trials according to Price, as both see the benefits that RF technology can bring in increasing the current automatic barcode read rates, which vary considerably between different applications. Advantages include both much faster baggage processing times, leading to a reduction in conveying and bag storage costs and expenses incurred by flight delays, and the possibility of increased tracking.

It's not only baggage tracking that stands to be improved by the introduction of RFID technology to the airline industry; British Airways' Engineering Division is also interested in tagging component parts.

Like all things, price is a major consideration, as the key to the success of this project is the overall cost saving by the reduction in the number of misdirected bags and the number of disgruntled passengers who own them. It is believed that, although not confirmed by any airline source, around 250,000 bags were misdirected at London Heathrow in the year 1996/7, at an average cost of $100 to $150 per bag. The potential savings are, therefore, considerable. At this stage the technology is still considered quite expensive, yet twenty years ago so were pocket calculators.

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