



CASE STUDY

## Transportation & Logistics

### BAA Terminal 5 - Britain's Front Door Goes Wireless With Aruba Networks

Over the next few years, London's Heathrow Airport will be completely rebuilt, refurbished or redesigned. The airport, owned and operated by BAA, opened in 1946, and through the 20th century developed facilities designed to handle 45 million people annually. However, due to growth in airline travel, Heathrow now handles 68 million people making it the world's busiest international airport.

As part of the airport rebuilding, Terminal 5 was opened in March 2008 to accommodate the increase in passenger traffic. Located in an area of land equivalent to London's Hyde Park, and housing 83 retail outlets, it is the home of British Airways and handles 30 million passengers a year. By itself it would be one of the largest airports in Europe, and it needed a WLAN to match.

#### Identified Need

In 2004, BAA and their consultants, Arup, approached WLAN vendors to source a wireless network that could deliver hotspot Internet services to passengers, act as a common platform for retail services, and allow staff to access key applications while mobile.

Having performed a detailed analysis of the WLAN deployed in other terminals, BAA realized that the existing network would not meet their developing needs that included ease of management, scalability and the ability to support multiple SSIDs. "The range of services that we wished to offer at Terminal 5 and the technological challenge presented by the site meant that there was unlikely to be an existing solution," said Alan Newbold at consultants Arup. "We had to ask the question 'who could deliver what we wanted and who was willing to work with us?'"

In 2005 BAA issued a tender for WLAN infrastructure and after extensive testing, selected Aruba.

#### Planning and Building

The construction of Terminal 5 commenced in 2002, but above-ground construction of the building's structure did not become evident until 2005,

with which the layout of an extensive wireless network had to be planned. The construction materials were known – 30,000 sq metres of heat and RF reflective glass on the outside, 24,000sq metres of internal glazing, and 22 pairs of steel legs to support the roof. Internal walls would be constructed from Durasteel – a sandwich of steel and cement, and highly RF reflective.

To make the RF environment even more challenging, T5 would not only consist of the vast open atria of the main hall, baggage reclaim and passport control through which 80,000 people would pass each day, but also the staff offices, executive lounges and baggage conveyor area. A complex arrangement of reflective and leaky RF environments constantly changing throughout the day.

Consequently, Terminal 5 would become a very difficult environment to manage the WLAN coverage - if it were not for the Aruba Adaptive Radio Management that manages the access points channel and power settings automatically.

At the Interoperability Test Facility – a \$2m facility specially commissioned to deal with the testing of the components of Terminal 5 – BAA, Arup and the prime contractors NTL worked to evaluate the proposed WLAN solutions. They



#### Requirements:

- Secure separation of public and internal service traffic, on the same network
- Meet the needs of resilience, scalability and flexibility of a large infrastructure deployment.
- A vendor that would be flexible and prepared to work closely with BAA and its contractors.

#### Solution:

- 6x Aruba 6000 mobility controllers equipped with M3 modules
- 800 x AP70 Access Points
- PEF license
- WIDS license

#### Benefits:

- Single WLAN infrastructure for all wireless data traffic
- Secure separation of hotspot traffic from BAA traffic
- Adaptive Radio Management automatically compensates for changing RF environment
- Single point of management

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particularly looked in detail at:

- RF Management, believing that the RF environment would change continuously with the flow of passengers
- Voice and roaming performance, although voice communication is not a feature currently used on the WLAN
- Data throughput and network segmentation, for example to provide location specific bandwidth limits for hotspot throughput
- Redundancy and failover.



“We selected Aruba as the corporate standard for BAA because it met the security, resilience, scalability and flexibility needs of large infrastructure deployments,” said Kevin Fallon, Commercial Leader, T5 Systems at BAA. “Terminal 5 is enormous - it would be one of the largest airports in Europe in its own right. Terminal 5 will deliver one of the finest passenger experiences of any airport, and the infrastructure must be able to support the demands placed upon it.”

### Network Operations

The WLAN in Terminal 5 extends throughout the terminal and satellite buildings, provides connectivity to landside services as well as secure airside, and delivers both hotspot, ‘front office’ and ‘back office’ services over a single infrastructure – multiple separate networks are provisioned. These include;

- BAA Corporate Access – to allow BAA employees access to corporate information systems,
- British Airways Lounge Access – providing free Internet access to business / first class and executive club members over BT Openzone,
- General hotspot service – delivered throughout the terminal, the WLAN carries services for BT Openzone, The Cloud, T-Mobile, Surf&Sip
- Point of Sale – BAA acts as a service provider to the retail establishments, and some use the WLAN to ensure timeliness of order taking using mobile handsets, and well as PoS and stocktaking
- Baggage Handling Systems Project – the WLAN was extensively used during the commissioning of the advanced baggage handling system, dramatically reducing the commissioning time, and has remained in place to assist with operations.
- Baggage Reconciliation System – on the aprons around the terminal baggage handlers use wireless handsets to reconcile and track loaded luggage
- Taxi Operations – the WLAN is used to facilitate the control of ‘black cab’ taxis around the terminal building.

Deployed over a Cisco Systems MPLS / Ethernet wired infrastructure, each of the 800 or more Aruba AP70 access points has power over Ethernet delivered from a Cisco 3750 switch, and is dual homed from the switch to one of two series 6000 mobility controllers. A variety of external aerial types are used on site to deliver the required signal coverage.

### Security; No Compromise

Delivering a network that is simultaneously available for 80,000 members of the public every day, is used by staff for key functions such as baggage reconciliation, and used by retail establishments for PoS and other services requires the highest confidence in the security of the solution.

“... a secure and resilient wireless network was a crucial requirement for BAA, and only Aruba was able to deliver the traffic control, central management and overall flexibility that was needed without compromising security,” said Alan Newbold, IP Design Leader for Terminal 5 at Arup.

### Organization Overview:

BAA, owned by Spanish construction company Ferrovial, is the world’s leading airport company. It owns seven UK airports, and has operations in Italy and the United States. Employing a total of around 15,000 staff, BAA airports in the UK are responsible for nearly 150million airport passenger movements per year.

Terminal 5 provides arrival, departure and transit services for nearly half of all passenger movements through London Heathrow airport, the world’s busiest international airport.

***“In our view, Aruba had the only architecture that could guarantee the level of security we required”***

**Kevin Fallon**  
Commercial Leader  
T5 Systems at BAA

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### The Future

Terminal 5 currently consists of two buildings, T5A, the main building and T5B, the satellite, with over 800 access points currently deployed. A second satellite building, T5C, is currently under construction and the wireless network will be extended into this facility once completed in 2011.

The refit and refurbishment of Terminal 4 is underway, and more than 110 Aruba Access points have already been deployed as the original WLAN is replaced. In addition, Aruba WLAN solutions are being retrofitted at other BAA airports, including all of the expansion works being carried out within the Central Terminal Area (T1-3) of London Heathrow Airport.

In choosing Aruba, BAA has enabled several additional applications that can be deployed in the future. Although

voice communication within Terminal 5 is currently delivered using a cellular system, the WLAN has been designed to allow voice coverage to be enabled along certain routes with guaranteed coverage. Although there are no immediate plans to enable this functionality, it has been built in as an option.

A ground to aircraft information system known as "Gatelink" is also a potential future application enabled by the WLAN. Used to transmit data from aircraft on the apron to the terminal it allows information to be shared between aircraft and passenger terminals, maintenance operations, baggage handling and ground support. This helps airlines increase operational efficiency and improve their on-time performance.



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