Executive Summary

PCTEL’s network engineering services recently boosted the performance of a major airline's luggage tracking system. When luggage doesn’t reach its destination on time, both travelers and airlines suffer. To further reduce luggage delays, a major airline implemented a new luggage tracking system. In this system, luggage scanners relay information about bag location to a central database via existing wireless networks. In some cases, the wireless network was the weakest link in the system. The airline hired PCTEL to test wireless networks at more than 300 domestic and international airports. PCTEL completed the project on time and within budget. The airline used PCTEL’s reports to choose the most reliable network, ask the carriers for further coverage improvements, and deliver better service for its customers.

The Goal: Reducing Lost and Delayed Luggage

Airlines work hard to ensure that every piece of luggage reaches its destination as expected. Still, luggage handling errors continue to frustrate travelers and cost airlines money. In 2014, U.S. domestic airlines reported 3.62 luggage errors per 1,000 travelers. Frustrated customers are likely to choose another airline for their next flight. Negative word of mouth comments from lost luggage can damage an airline’s reputation for years to come. SITA estimates luggage errors cost airlines $2.4 billion globally in 2014. The majority of these errors could be eliminated with better luggage tracking. Transfer mishandling accounted for 49 percent and failure to load accounted for 15 percent. Together, these mishandling errors make up almost two-thirds of errors. A tracking system that eliminated these errors could save airlines well over $1 billion per year.

3 SITA, 2015 Air Transport Industry Insights, 8.
The Method: Wireless Communications

Beginning in 2015, a major airline initiated a luggage tracking program to reduce mishandling errors and improve customer satisfaction. This system uses handheld luggage scanners that relay baggage location information in real-time using existing commercial wireless networks. Employees scan bags at each step in their journey, including luggage check in, holding, sorting, claims, loading, unloading, and delivery. When the system is functioning properly, the airline knows where every bag is at all times.

The Problem: Choosing a Reliable Wireless Network

The luggage scanners need a reliable wireless signal to transmit location information. Poor coverage anywhere – from check-in-desk to sorting rooms to the tarmac – breaks the chain of accurate, up-to-date tracking information. The luggage scanners use the same wireless cellular networks that we use to make a phone call or upload a video. These networks weren’t built with the luggage tracking system’s needs in mind. Choose the wrong network, and the tracking system could fail.

To get reliable network performance, the airline needed its luggage scanners to connect to the best-performing wireless network at each airport. However, the airline couldn’t get this information simply from glancing at the bars on a cell phone. Cell phones measure the performance of only a single network at a time. Cell phone measurements are also slow and inaccurate, as anyone who has seen their cell coverage drop suddenly from four bars to zero can attest. The airline needed professional wireless network engineering services that could deliver comprehensive, accurate, and actionable coverage information.

The Solution: PCTEL Network Engineering Services

The airline commissioned PCTEL to test and compare two carriers’ network service at more than 300 airports around the world.

PCTEL engineers collected detailed RF measurements on both 3G and 4G networks for multiple network carriers at each site. Their walk test routes shadowed the same trail a bag would take through the airport and on the tarmac. After collecting and analyzing the test data, PCTEL compiled and submitted concise recommendation reports for each site, including links to detailed coverage maps. These reports provided the airline with accurate, objective information about signal strength and reliability.
The Results: Successful, On-Time Deployment at Each Airport

PCTEL's reports made it easy for the airline to select the best network at each airport. Armed with this information, the airline programmed the luggage scanners at each airport to connect to the chosen carrier’s wireless network. In the case of SAN, Carrier 1’s 3G network was selected.

PCTEL completed testing on time and within budget, and the airline was satisfied with the results. The airline programmed and deployed their luggage scanners on schedule. They also used the reports to encourage the carriers to further improve coverage. The new system is now a successful part of the airline's ongoing efforts to reduce mishandled luggage and improve customer satisfaction.

Dear Customer:

Based upon the site survey recently completed by PCTEL at San Diego International Airport (SAN) in San Diego CA, here are the network selection recommendations.

3G recommendation: Carrier 1

4G recommendation: Carrier 2

3G recommendation summary: Carrier 1 has good signal levels at baggage claim, bag room, baggage office and parts of cargo areas but excellent signal levels at majority of the remaining areas. Signal quality is excellent at all indoor areas and majority of outdoor areas. Data transfer throughput and FTP connect times are acceptable.

4G recommendation summary: Carrier 2 has low and less than desirable signal levels at all areas except some parts of pads where signal levels are excellent or good. Signal quality is excellent at bag room, baggage office and some parts of pads close to bag room but low and unstable at all other areas surveyed. Data UL transfer throughput and FTP DL connect times are acceptable.

Recommended Coverage Enhancements for Winner:

3G: Carrier 1 should enhance their network to boost signal power, in order to achieve consistent and excellent signal levels and high quality at all areas.

4G: Carrier 2 should enhance their network to boost signal power, both indoor and outdoor areas, in order to achieve consistent and excellent signal levels and high quality at all areas. Data DL transfer throughput and FTP UL connect times should be improved as well.

All: Additional small cells and/or DAS solutions may be used to accomplish this enhancement.

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<tr>
<th>3G: Carrier 1 Recommended</th>
<th>3G: Carrier 2</th>
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<td>4G: Carrier 2 Recommended</td>
<td>4G: Carrier 1</td>
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Above: Sample PCTEL Report

CONTACT PCTEL AT 321.674.9010 OR SERVICES@PCTEL.COM FOR DETAILS ON WIRELESS TESTING SOLUTIONS