CASE STUDY

Barcelona’s Airport manages its baggage trolleys more efficiently with a pioneering real-time management system by Indra

Indra has recently deployed and commissioned an innovative solution to manage baggage trolleys in Barcelona-El Prat Airport, Spain.

The solution allows the real time management of 5,000 baggage carts distributed all over the terminal.

In any airport, passengers always expect to find baggage trolleys. Arriving at the airport by car, bus, train or disembarking aircraft, passengers usually find hundreds of them dispersed in different spaces in and around the terminals. Users generally don’t tend to care much about trolleys, dumping them in often peculiar places when they are no longer needed.

Even in a new terminal, it is not uncommon to see a lone traveler struggling to find a baggage trolley. If this occurs too often, the airport operator will soon feel the pressure to purchase new trolleys. But how can the initial calculation on the number of required trolleys have gone wrong? On occasion, even after the airport has increased the number of trolleys, users’ perceptions don’t improve, yet the trolleys become increasingly difficult to manage.

In this situation, a lot of baggage trolleys may become idle in the terminal away from trolley pick-up points. The actual problem is not in the number of trolleys, but rather in their proper alignment with the travellers’ needs.

The majority of trolleys are easy to find, concentrated in certain logical locations, such as check-in zones or before security filters. Although these trolleys may be easily located it is very important to maintain prompt collection to prevent cluttering and congestion, which can interfere with the passenger experience.

However, outside of these common locations, trolleys can become much more difficult to locate. Sometimes they are scattered around roads or car-parks, constituting a safety concern. Lost and scattered trolleys result in a loss of time and resources, which translates to the bottom line, as well as a degradation of the quality of service perceived.

Indra’s new Trolley Management System

That’s where the new Trolley Management System by Indra comes to the rescue, as seen in Barcelona’s Terminal T1. It identifies where each and every trolley is whilst devising the necessary tactics in order to match their locations with the passenger’s demand. Trolley optimisation is facilitated in real-time, covering last minute changes in flights, seasonal peaks and troughs and general passenger throughput fluctuations.

Abnormal usage is also identified with the detection of trolleys in wrong or strange places. Unauthorised movements are promptly detected. The system ensures that carts do not leave the authorised areas and that no trolley is left in a hazardous situation.

In a simple and intuitive graphical user interface the system displays all the information related to baggage trolleys in real-time. Advanced algorithms present in the application (Real Time Location Systems) make it possible to map every trolley to a ‘real’ specific location that is then represented by means of a Geographic Information System. This is a fundamental

Barcelona-El Prat Airport (Spain)

commissioned a new 544,000 m² terminal, the sixth biggest in the world, in 2009. Approximately 5,000 baggage trolleys were acquired for the new terminal.
It’s not only a pioneering project because of its airport application: it’s also the first ever large-scale implementation with 5,000 active WiFi tags being dynamically located.

difference with RFID tags, which only allow trolley detection once a predefined specific point is crossed (detection arches).

in Barcelona’s airport, the different zones have been mapped according to their operational usage, so the system is able to identify which trolleys are stacked in the proper location, their number, which trolleys are abandoned, and as the system functions in real-time, which trolleys are currently being used and how.

Alarms can be configured to trigger on specific events such as the stack of trolleys reaching a threshold, the entrance of a trolley in a forbidden zone or a trolley about to cross the perimeter.

Further historical analysis can also be displayed by graphics, charts and diagrams allowing trolley statistics to be analysed in order to improve passenger flows.

Additionally, the supporting software records the last time a specific trolley was serviced, and identifies the trolleys that should to be checked based on their operational time. Maintenance periods can, thus, be measured, controlled and optimised resulting in improved return on investment for the airport.

An administration module is also provided, enabling the configuration of indicators and constraints, users, data available and maintenance scheduling.

**Using the existing WiFi network**

In Barcelona, the system was based on the existing corporate WiFi network, also installed by Indra. In this sense costs were able to be kept to a minimum by piggybacking on existing IT infrastructure.

Industrial grade active WiFi tags were attached to each and every trolley with a unique identifier code. Small-sized and easily serviceable they are the active elements being tracked by the network.

**Integrating with IT systems**

The application was integrated with the rest of the airport IT systems using an Enterprise Application Integrator (middleware). This way, relevant information is able to flow in and out of the system in a standardised fashion.

The purpose of this integration in Barcelona’s airport was two-fold. Firstly, the important amount of data gathered can now be exploited in order to know more about the users and improve the service. And secondly, it was the responsibility of the airport managers to track the performance of the concessionaire that had been awarded trolley management. Fed into a business application, the airport operator is capable of monitoring the compliance with service level agreements (SLAs).

**Indra’s broad experience - cross pollination**

Being a leading IT systems company that spans a wide range of industries, allows Indra to share solutions from one industry to meet challenges in another. Indra’s WiFi trolley network is a prime example of this cross pollination.

Originally designed for the medical sector to identify and monitor the precise location of sophisticated medical equipment and personnel, Indra was able to use its previous expertise to successfully roll out a similar solution in the airport trolley environment.

For Terminal T1’s implementation, standardised industrial components were chosen with their durability and resilience in mind.

It’s the first time that a large scale implementation like this is achieved.*

**Benefits for the airport operator:**

- Getting the most out of the existing baggage trolleys.
- Allows instant visibility and accountability of baggage trolleys status, whether managed by the airport operator or a third party.
- Ability to identify bottlenecks and plan for capacity. Accurate forecasting of future needs.
- Reducing subtractions and misplacements of trolleys.
- Totally customisable to fit the customers’ requirements.
- Different visualisations for different user profiles.
- Open system with easy integration with third parties via APIs.
- No need to deploy a specific infrastructure for this service as it used the existing WiFi network.
- Scalable. Can grow with the airports.
- Providing relevant information on trolley usage and passenger flows.
- Ultimately, improving service to the airport’s customers.