Leveraging IoT

HOK's in-house information technology and communication engineering experts work as part of the company's aviation and transportation design teams to incorporate smart building systems that enhance the passenger experience in airport terminals.

Today, Internet of Things (IoT) technologies can be installed at the start of a project, before heavy construction activities begin, to provide airport terminal operators and airlines with real-time information about the impact of construction on the passenger experience.

HOK's technology specialists enable operators to use IoT to measure and report on traffic dwell times and queue lengths at arrivals, departures, roadways and curbsides; passenger dwell times and queue lengths at check-in, baggage drop, security screening and customs areas; dwell times at shops and restaurants; and key performance indicators that can be measured during construction and throughout the terminal's life.

This real-time information about the impact of construction on specific parts of the passenger experience allows terminal operators to make on-the-fly adjustments that keep their passengers happy.

Airport operators can also use IoT to track wheelchairs, baggage carts and other equipment so that they can study their use and quickly locate their mobile assets. IoT apps, beacons and connected sensors can also help passengers find their way to the locations and services they need.

HOK's design teams are leveraging passive optical network (PON) technology, previously used by the service-provider market but now available in improved commercial applications such as Verizon Fios, in airport terminals. These PONs rely on fiber optic cables that transmit high-bandwidth signals while using much less power, space and cable than conventional copper cable based networks.

With this PON technology, the maximum cable length between the active equipment and the outlet or user is up to 20km (12.4 miles) – 200 times longer than the 100m (330ft) limit of conventional copper networks. This makes PON technology ideal for airport terminal projects where space is at a premium. In addition to their long reach, PONs offer high reliability, so airports can expect less than 32 seconds of annual downtime.

Integrating IoT technology and PONs into airport terminal design, as the team is doing for LaGuardia Airport's Central Terminal B replacement project in New York, generates substantial first-cost and long-term operational savings for airports, and benefits airlines and tenants – all while helping to create a better travel experience for guests.

Perfect understanding

Ever since commercial aviation took off in 1914, the number of air travelers has more or less doubled every 20 years. This trend looks set to continue after IATA predicted that 7.2 billion people would travel by air in 2035, almost double the 3.8 billion travelers in 2016.

Finding solutions to the challenges that accompany this growth will not be easy. Some airports still have space available and can build new terminals or extend existing ones to expand their capacity. Others, however, do not have this luxury and need to find clever solutions to improve their efficiency.

Key to coping with this growth will be self-service border control gates and bag drop solutions that enable passengers to undertake several airport processes without staff intervention. Nowadays the boarding process starts at home, when passengers book their flights and check-in long before they arrive at the airport. Because of this, airports are steadily phasing out staff-operated check-in counters. A completely automated end-to-end boarding experience is not far away and represents the next step in optimizing the operational chain.

But what happens when passengers need guidance? With the decrease in staff numbers due to new technologies and operational innovations, it is essential that airports use intelligent communication systems, not only to support the speed of passenger throughputs, but also to satisfy the passengers' feelings of 'being noticed'.

AviaVox, a Netherlands-based company that specializes in intelligent automatic announcement systems for airports and airlines, has examined how it can help improve this personal guidance, and has developed software that can predict the nationality of passengers in certain congestion-sensitive areas. The AviaVox systems continuously monitor the data from the airport operational database, and decide in which languages announcements are to be made, helping to improve process efficiency and address passengers on a more personal level.

At London Luton Airport for example, Polish passengers are automatically addressed in their native language during security checks. This not only makes them feel more at ease,

but also generates a much better response to safety instructions, which greatly speeds up the security process. This only occurs within a certain timeframe when a high percentage of travelers are expected to be Polish. When this is no longer the case, the system automatically falls back to its default values. And Polish is just one example; AviaVox already has over 30 modern languages available.

PRM Assistance

As the world's population ages, airports and airlines have an increased responsibility to offer passengers with reduced mobility (PRMs) equal access to travel opportunities.

Hundreds of airlines, airports and service providers around the world, including London Heathrow Airport in the UK, Hartsfield-Jackson Atlanta International Airport in the USA, and Changi Airport in Singapore, trust Staxi transport chairs to ensure that travel is easy and safe for this growing market segment. Millions of passengers every year are kept safe and comfortable in Staxi chairs, and that number is expected to grow substantially as more airports turn to Staxi's nestable transport chair system.

Staxi chairs deliver safety, comfort, reliability and low cost of operation. Every aspect of the chair is designed for safety, with a fail-safe brake, a side entry system that makes getting into and out of the chair easier, and an anti-microbial seat cover.

Staxi chairs also deliver comfort for both the passenger and the attendant. Passengers appreciate the comfortable seating and the ability to keep their carry-on luggage stowed safely below their seat, while the ergonomic design of the frame provides proper hand alignment for attendants pushing the chair.

Reliability begins with a welded steel frame that has absolutely no break points, cables or tension brakes to fail. The one-piece footrest is sturdy, and you can count on Staxi to carry the largest of passengers (up to 600lbs) with ease. Staxi chairs have a proven track record of years of continuous service with very low cost and easily performed maintenance and repairs. The chairs also nest together, requiring less storage space.

In addition, Staxi offers one of the best aisle transfer chairs on the market today at a competitive price. It incorporates the Staxi steel frame, fail-safe braking system and a four-point harness system for excellent safety.

Measuring performance

Passengers arrive at an airport and expect a comfortable and pleasant travel experience from the moment they enter the terminal until their departure. It is no different when they arrive at their destination or transfer to another flight during their journey.

The flow of these passengers through the terminal can be broken down into processes such as check-in, security and baggage reclaim. ArcPORT, from Transoft Solutions, is advanced simulation software that provides a platform to analyze and visualize the flow of passengers, aircraft and vehicles through the airport system. The flexible modular structure of the software allows users to analyze selected areas of interest in detail, as well as conduct a complete system evaluation of the entire airport environment.

The performance of terminal facilities is often measured against IATA levels of service or selected key performance indicators such as waiting times at security. Based on the input of detailed flight schedules and with the definition of passenger behavior and facility characteristics in the ArcPORT terminal model, simulations clearly visualize and report where capacity problems and passenger experience issues are likely to arise. What-if scenarios can be easily studied and the combination of numerical and graphical output provides managers with an excellent basis for their decisions.

Recently released, ArcPORT 2.0 features several new functions including the analysis of complex baggage handling systems. In the 3D visualization and animation function, imported buildings can be prioritized over model components to enhance non-technical presentations. With the new network licensing capability, management can access the software to view reports of simulations created by their analysts without the need to add extra licenses.

ArcPORT is part of the Transoft Solutions portfolio of aviation software solutions that has become the trusted de facto standard for more than 90% of the world's top 50 busiest airports. Several license options are on offer and an expert team of engineers and planners is also available to provide project services including model building, continuous model updates and specialized simulation studies.