Being able to handle large aircraft is essential

GROUND SIMULATION

IN AIRPORT PLANNING, STAYING ON TOP OF AVIATION TECHNOLOGY IS THE NAME OF THE GAME

With more flights, greater passenger numbers and larger aircraft, airport planners have their hands full dealing with the airport's day-to-day operations while planning for future airside expansions and long-term capital projects.

Salt Lake City International Airport ranks as the 25th busiest in North America in terms of passenger numbers, and in 2010 the airport served 20.5 million passengers, a 2.86% increase on 2009.

When it comes to day-to-day airport operations, no two days are ever exactly the same, as Salt Lake City airport planner Brady Fredrickson can confirm. Fredrickson recalls an event in the spring of 2011 that stands out in his mind…

Problem solving

One morning, Fredrickson got what he thought was a routine call from an airline scheduler. After some chit-chat, the scheduler casually asked him whether the airport's gates could accommodate a Boeing 777 parked next to an Airbus A330-200.

By way of background, Fredrickson explains that when the airport's facilities were built, 30 to 50 years ago, it was designed to accommodate Boeing 727s and 737s. A majority of the airport's gates are still designed to accommodate these narrow-body aircraft; there are a limited number of gates designed to accommodate larger wide-body aircraft, such as Boeing 767s, with the largest gates designed to accommodate the Airbus A330.

So when Fredrickson was asked whether a Boeing 777, with a wingspan of 213ft, could fit into a space that was designed for a narrower A330-200, one that has a wingspan of 198ft, it was an interesting problem to consider.

Fredrickson told the airline scheduler that he would figure it out, and was told that an answer was needed quickly because there had been an equipment change and the 777 would be arriving within a couple of hours.

As soon as Fredrickson got off the phone, he switched on his AeroTURN software and started plotting the position of the incoming aircraft onto the terminal layout drawings.

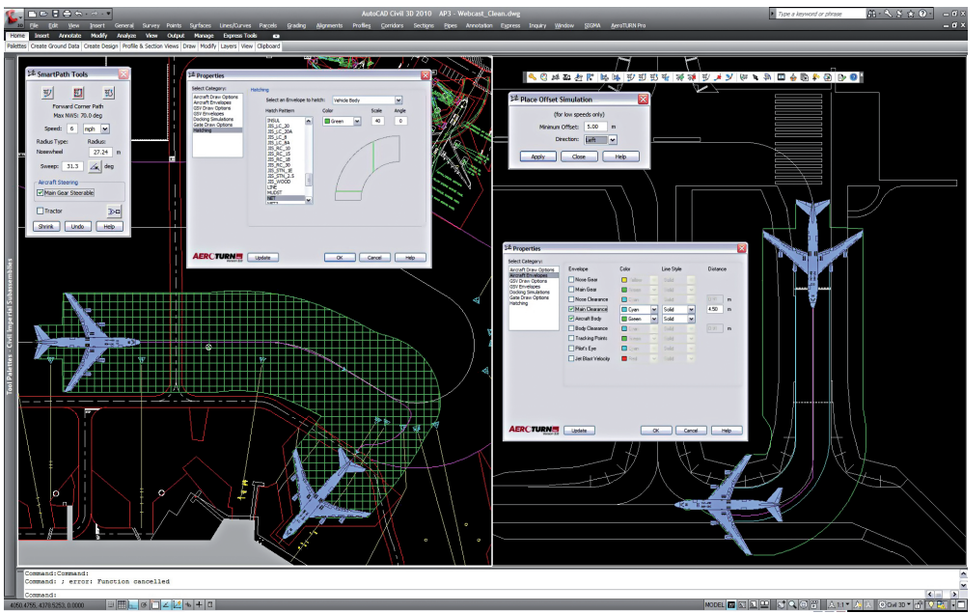
AeroTURN, developed by Transoft Solutions in Vancouver, Canada, provides specialised computer simulation of the ground movements of both aircraft and airport vehicles. Using the application, planners and engineers can simulate aircraft turning manoeuvres for clearance and safety requirements at runways, taxiways and aprons.

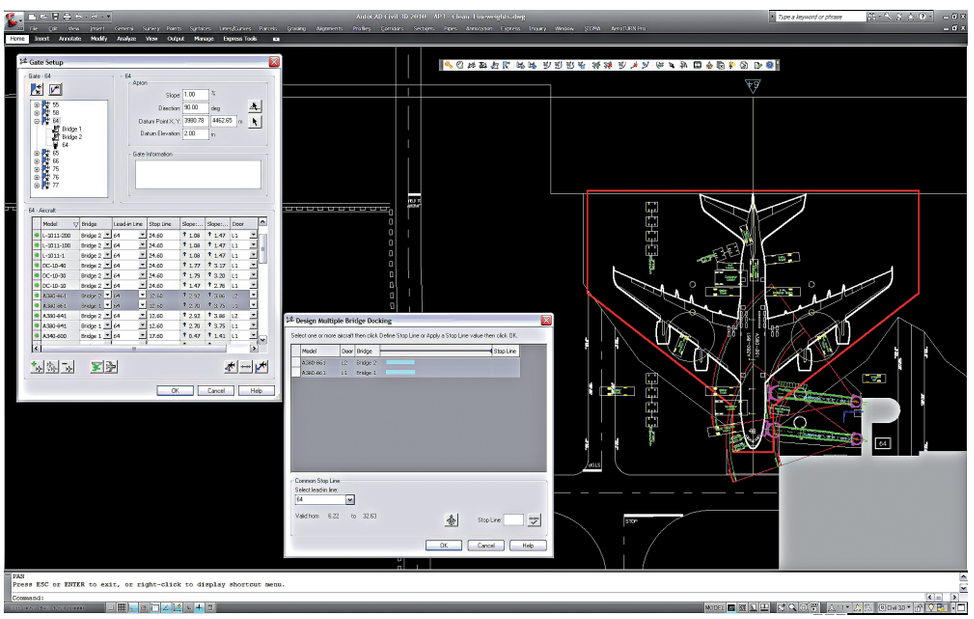
Accessing the software's library of aircraft specifications, Fredrickson positioned a 777 visual rendering next to an A330-200, creating a space of exactly 15ft between the wingtips of the two aircraft. He then marked a new stop-line onto the software drawings of the airport gate.

Satisfied with his calculations, Fredrickson printed out his drawings, got into his car, and proceeded out to the gate. "I surveyed the measurements on the ground, and with a can of bright-orange spray-paint, I marked a new stop-line and placed dots on the ground where the wings and nose of the aircraft would line up, based on my calculations using AeroTURN," says Fredrickson.

The plane landed 30 minutes later, taxied and parked at the gate without a hitch.

"It was pretty cool," says Fredrickson, "the 777's wings and nose were right over the dots I surveyed on the ground. Without AeroTURN, making the same set of calculations would have taken a few hours, instead of minutes."





Using simulation technology allows airport planners to understand how difficult manoeuvres will work

Visual simulation

Four years ago, before Fredrickson started using AeroTURN, he would have used CAD aircraft templates and estimations to calculate where the wings would track when it taxied and where the bridge would meet the aircraft. It would be a time-consuming process, involving a lot of manual work.

Another plus with AeroTURN is its visual simulation capability. One of Fredrickson's challenges is to take a problem, create a set of solutions, and make it comprehensible to technical and non-technical people. By using AeroTURN, planners are able to visually communicate design solutions that airport executives can easily conceptualise and understand; something words or static diagrams alone cannot do.

Asked how Fredrickson would have managed without using AeroTURN software on that spring day, he says, "I don't think they'd have asked me. They knew I had the capability to deliver a solution, which is why they presented the problem to me in the first place."

According to Michael Frost, Transoft Solutions business development manager, this is consistent with the experience of many AeroTURN users: "Often, the sentiment is that the visibility and value of the planning group within their organisation has increased to the point where they become the 'go to' people before any changes or improvements are considered."

> "Planners and engineers can simulate aircraft turning manoeuvres for clearance and safety requirements at runways, taxiways and aprons"

Technology changes

A larger challenge Fredrickson faces is dealing with changes in aviation technology. As previously mentioned, the Salt Lake City International Airport facilities were built at a time when narrower, smaller aircraft were the norm. Today, with larger airplanes being used to carry more passengers, and with aircraft equipped with winglets to save on fuel, airport planners across the world are thinking of ways to modify their facilities to accommodate these advances without disrupting operations.

Fredrickson recalls an airport operations officer asking him whether Boeing 737s now equipped with winglets would pose a safety hazard for vehicles using a particular service road. It was a question that Fredrickson had not considered; the aircraft that had used the taxi-lane next to that service road previously did not have winglets.

After studying the taxi-lane, Fredrickson discovered that the new winglets on Boeing 737s did extend over the service road, which posed a hazard to any service vehicle that drove alongside the 737.

Fredrickson went quickly into AeroTURN, plotted in the position of a 737 with winglets onto the existing taxi-lane diagram and made some calculations. With a few keyboard strokes, he offset the existing lead-in line by several feet – enough to eliminate the overhang, and remove any possibility that a service vehicle might be clipped by a 737 travelling down the taxi-lane. The entire process had taken minutes.

Fredrickson's fast-thinking solutions support his main objective, which is to help ensure that aircraft operations run safely and smoothly. Using AeroTURN, he is able to clearly communicate and execute myriad design solutions that help keep the airport fully operational and responsive to advances in aviation technology.

Of course, it always helps to keep a can of orange spray-paint in your car. As a busy airport planner, you never know when you might need it. ■