

Design Tools for Airports – Leading Software Applications

The world of aviation is about to make a dramatic change – again.

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Airports in general are ever-evolving places, growing to keep pace with the increased travelling public. But a new landmark occurrence is about to take flight in the aviation world.

In September, the first new large aircraft (NLA), Airbus A380, will take to the air. And in early 2006 Singapore Airlines will be the first to receive their A380 with more airlines putting the aircraft into service by the end of 2007. To date, Airbus has received 129 orders from 11 customers for the giant passenger jet. Before 2010 it is estimated that the plane will service up to 60 airports worldwide. It is also thought that up to 25% of all international gates will need to be NLA compliant then.

Each triple-decker aircraft, depending upon configuration, can accommodate from 555 to a whopping 840 passengers, with all three decks running the full length of the aircraft's almost 73m. The lowest deck will normally be used for cargo and luggage, although it can be modified for specified use such as business centres or sleeper cabins. Using technological advances, the aircraft will be able to fly longer, quieter, and more fuel efficiently than its smaller, rival passenger liners, such as the Boeing 747. In addition, it will be able to take off and land in shorter distances.

Many airline companies are growing increasingly concerned that too many airports around the world are lagging in their preparation to facilitate the A380. They express concern around passenger embarkation and disembarkation speeds, and airplane size and handling issues.

The sheer size and weight of the aircraft is a marvel of modern aviation technology. Yet, it's also a challenge for many airports wanting to accommodate it. Even though the aircraft was technically designed to fit into international terminals' airport-docking plans, significant structural and infrastructure problems still need to be addressed.

The near 80m wingspan fits the allowed space, but with no room to spare. And, movement in restricted space posing a safety and airplane damage issue. The 45m wide runways of most airports are too narrow for the aircraft's required 60m. And the tarmac at many airports may need enhancements to support the increased aircraft weight. In addition, taxiways and aprons may need shoulder widening and obstacles removed for ease of aircraft and ground vehicle movement.

Senior airport executives are concerned with accommodating the A380 in time for its arrival. They see a need for airport facility planners and designers to actively plan and strategize design changes, pavement improvements, airport terminal layout remodelling and building programs.

Their teams must review and revamp taxiways and airplane parking spaces and allow for increased aircraft clearances that the A380 presents, and find a way to monitor the new jet blast exhaust contours near terminals.

With the increased potential volume, passenger-parking facilities may also need enhancements or overhauls. Ease of exiting the parking lot after a long flight improves the passenger's overall experience, whereas congestion and delays detract from it.

Therefore, finding the correct software tools to aid in airport and parking design is critical in order to meet the demands the A380 will bring. There are few top-notch software manufacturers that produce the kinds of tools designers require for this market. The only software manufacturer that was consistently mentioned by those interviewed for this article was Transoft Solutions at www.transoftsolutions.com.

Only Transoft Solutions offers software for parking design. A quick visit to its site reveals their worldwide reach and diversity of product line. The company develops, markets, and supports many innovative, productivity-oriented software tools for engineering and professionals around the world. Their products are user friendly, compatible with most operating systems, and they save time.

They offer two state-of-the-art software products that exactly meet the demands for the upcoming A380 preparation. They are AutoTURN Aircraft and ParkCAD.

AutoTURN Aircraft

AutoTURN Aircraft 4.2 is a comprehensive CAD-based simulation tool used to evaluate aircraft and vehicle movement at airport facilities. It enables users to quickly and easily apply innovative solutions to the complex airport design challenges that the A380 and other NLA bring.

Hundreds of users worldwide use this product to help in gate planning and design, adjust apron space, monitor jet blast exhaust contours at terminal areas, analyse taxiway traffic, plan airport terminal layouts, and check aircraft clearances. Users or license holders include Airbus, the Port Authority of NY & NJ, New Tokyo Airport and Hong Kong Airport.

Peter Bianconi, President of P.D.K. Airport Planning Inc (PAPI) and former engineer with YVR said that, "We use AutoTURN Aircraft a lot in our international consulting. It helps us evaluate our set-ups to determine the best approach. It allows us to determine which paths should be avoided by certain planes, when to re-route, and which alternate taxi routes to suggest."

He goes on to say that the aspect he likes best about the program is, "The user defined vehicle option. When we initially heard about the new Airbus A380 we were eager to see

how it would fit into our gates at YVR.” They used the software to track baggage tractors and four trolleys around the plane to plot its paths within existing drawings.

Other major consulting firms, such as URS Corp., Parsons Brinckerhoff Inc., Stantec Inc., and Dewberry, use AutoTURN Aircraft to plan and design new airport runways, taxiways and aprons, and to evaluate and improve existing areas.

AutoTURN Aircraft allows designers to easily:

- ? Simulate cockpit or nose wheel tire paths and wing swept path envelopes
- ? Evaluate and adjust airport design plans
- ? Perform dual aircraft vehicle turns
- ? Track landing gear and wing tip paths
- ? Option of nose wheel or pilot's eye simulations

Other features that designers like are a comprehensive aircraft library of over 100 industry-standard aircraft including all models of the A380, and user-defined aircraft options where professionals can input user-defined specs for aircraft or ground vehicles of any size or parameter needed. They also appreciate the ability to analyse jet blast exhaust contours – whether at idle, breakaway, or takeoff and evaluate important conflict areas. Designers also like the program’s aircraft ground service point feature – used to display the location of electrical, disposal, fuel, oxygen, air, hydraulic, and other aircraft ground service points.

Glen White, General Manager (II) at Tampa Airport said that in their preparation for a new parallel North-South runway, “We use AutoTURN Aircraft a lot for real-time motion of high-speed exits and the adjustments needed to accommodate the A380 and other aircraft.”

When asked about Transoft Solutions Technical Support for AutoTURN Aircraft, Peter Bianconi of PAPI said, “We never had to use it! In fact, AutoTURN Aircraft is a very user friendly program, you just load it and away you go.”

ParkCAD

The second innovative software tool, and newest product by Transoft Solutions, **ParkCAD** – launched April 2004, outflanks other parking-layout software programs on the market.

Just in time for A380 airport preparations, Transoft promises that ParkCAD will change the way architects, civil engineers, drafters, airport designers, and CAD technologists design parking facilities.

Traditional parking design uses basic CAD programs or tedious manual drafting which generally takes weeks to develop a useful parking layout concept. Instead, ParkCAD helps designers drastically reduce the time it takes to create layout alternatives.

By offering designers an array of functional tools including the ability to create parking rows along lines and arcs and to instantly populate a set region with stalls based on user-defined dimensions, ParkCAD saves time. These powerful features let designers create parking layout concepts quickly, allowing them to assess “what if” scenarios in literally minutes instead of hours or days. In fact, a recent independent study showed an average time savings of 75% when comparing ParkCAD against more traditional approaches.

The heart of the software lays in its database capabilities. ParkCAD comes loaded with ITE and ULI parking guidelines, popular North American references, as well as an array of international guidelines from countries like Germany, Australia, and the UK. It allows airport designers to easily localize dimensions for their region and also includes a Wizard for full customisation of parking modules to meet their local ordinances and codes.

In addition to ParkCAD’s intelligent parking row and lot design tools, it also comes with advanced features such as instant stall counts, the ability to create pedestrian walkways, and custom stalls to meet ADA handicapped space requirements. ParkCAD’s robust editing features allow users to go one step further with their design by giving them the ability to add wheel stops, stall numbering, and customise various parking lot elements to suit their needs.

ParkCAD is a complete solution for fast, accurate, and efficient conceptual design of parking facilities.

What people say:

“Great program that would tremendously help with parking layouts.” Cosby Wood, Kimley-Horn and Associates.

“Real good program for quick concept layouts and space counts.” Brandon Laxton, Clark Nexsen

To get a jump on your preparations for accommodating the A380 and designing the parking facilities at your airport visit www.transoftsolutions.com.

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