Simulation stimulates planning

Effective airport design could be transformed using simulation technology

Airport design has traditionally been a lengthy process, where planners, architects, civil engineers, ATC experts and other specialists develop the initial concept from paper sketches to computer-aided design system presentations and actual models, as the original ideas are shaped and refined into the final design commitment.

Yet at that point the challenge still remains of being totally sure that the final product will fully meet the operational requirements. As a result, airport design has always been a lengthy and painstaking process that, once complete, is almost cast in stone. At that point, design changes are costly – but nowhere near as costly as changes that are felt necessary once construction is under way or, worse, after construction is complete.

Prevention through simulation could prove better than the cure. Raytheon Canada demonstrated its FIRSTplus ATC training simulator in Vancouver, British Columbia. *Jane's* understands that this particular system is no longer offered on the marketplace but, since that time, simulation has moved giant steps ahead, with Micro Nav of the UK now a powerful world competitor with its full featured BEST (Beginning to End for Simulation and Training) systems for air traffic controllers, with units at Dubai, Heathrow, Malaysia and other international airports and training establishments.

Micro Nav has also developed its Fast Airport Builder (FAB) simulation technology. In fact, the company's involvement can start even before those first concept sketches are drawn. Using satellite and aerial photography, plus all other data available, FAB allows the visualisation of how a greenfield site could eventually be transformed into a commercial airport, capable of efficiently handling expected current requirements, and showing how the airport can be expanded to cope with forecast future traffic loads. The simulation can not only include its terminal building and boarding gates but also runways, taxiways and manoeuvring and ramp areas, plus other essentials such as de-icing stands and crash fire rescue locations.

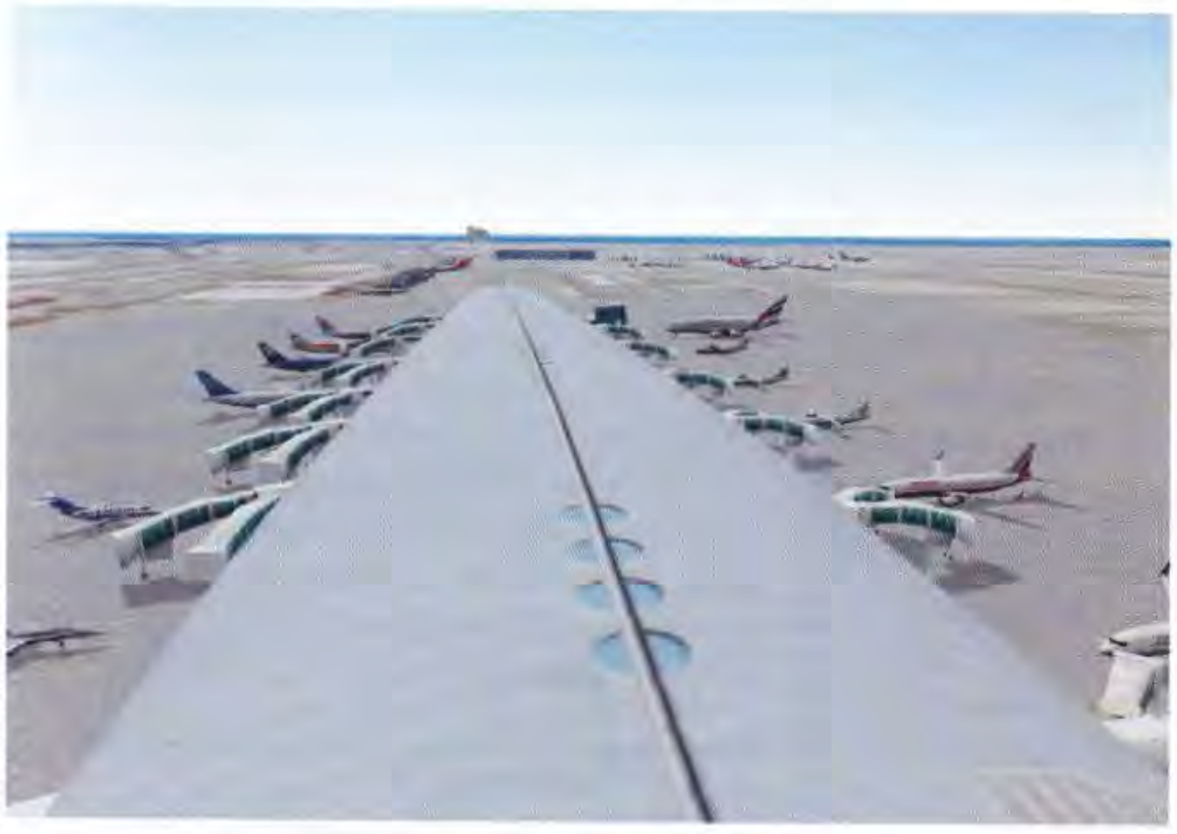
To add further realism, the simulation can include taxiing aircraft and vehicles that quickly show up bottlenecks in the surface movement streams, as well as pinpointing runway and taxiway intersections where inadvertent runway incursions could occur. Public access roads to and around the terminal areas, parking lots and all the other necessary public services can also be included.

Equally important, a greenfield simulation would include aircraft arrival and departure routes in the surrounding terminal airspace, permitting ATC specialists to determine the most efficient traffic flows under various levels of current and future demand, along with their integration with the larger national airspace structure. Besides new greenfield studies and planning guidance, FAB can be applied to the expansion of existing airport facilities, where the need arises to add more aircraft stands and passenger gates.

Yet such additional facilities, particularly any expansion of the terminal buildings, can create visibility obstructions for the airport's control tower staff, who may find that their view of the overall scene is now blocked in certain directions. However, since the monitoring of surface movements is a vital safety function of the tower personnel, this can sometimes only be resolved by building a new control tower in another location or, less commonly, increasing the height of the current tower.

Again, FAB can create a simulated control tower cab above any point, and at any height, on the airport surface. Experienced local controllers can then view the planned airport buildings presented to them in simulated – but very realistic – form on life-sized screens that portray what their view would be through 360 degrees from the location and height selected. Should obstructions still exist, the simulator engineer can move the location of the virtual tower to another location or adjust its height to find the optimum viewing conditions.

Wes Carleton ■



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