



AVIPLAN AIRSIDE PRO

Aircraft Maintenance Facility Aircraft Parking

Brief

A leading Canadian air carrier with a maintenance facility at a major international airport had limited available apron space with site layout, hangar access and parking challenges.

This case study outlines the details of their challenges and how AviPLAN Airside Pro helped lay out apron parking positions for different code aircraft at their aircraft maintenance facility. The results were not only a functional parking plan for a restrictive space, but cost savings for the required ALR pavement construction in addition.

Project Details

Client Name: EXP Services Inc.
Date started: June 2018
Duration: 26 weeks
Date Completed: November 2018

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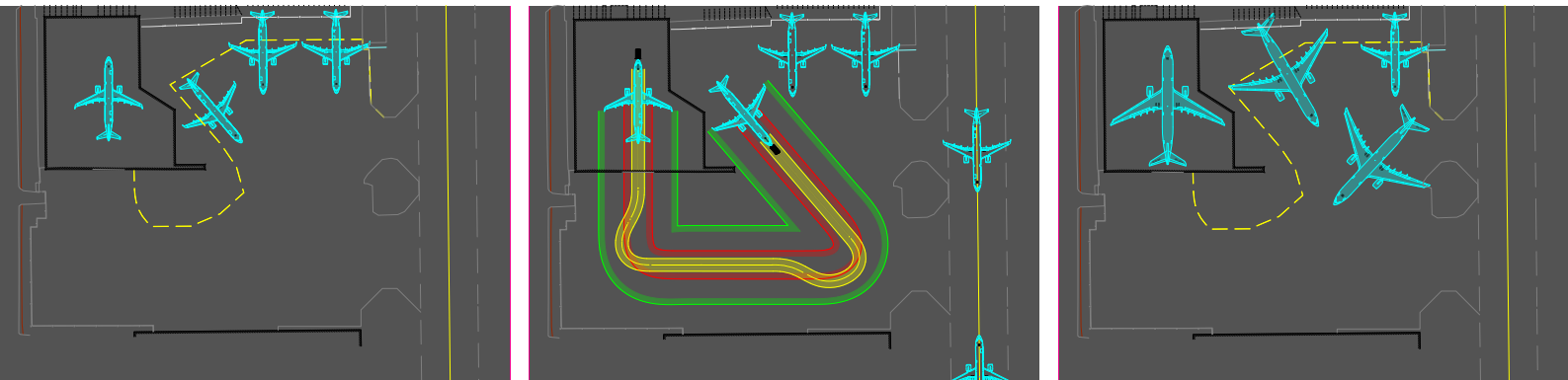
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Challenge

A major Canadian air carrier has a maintenance facility at Lester B. Pearson International Airport in Toronto, but the available apron space is limited with site layout, hangar access and parking challenges.

The air carrier cycles the Airbus A330-300 and the A321-NEO through this facility for routine maintenance. As part of an apron expansion and rehabilitation project EXP was asked to develop apron parking options that could accommodate two A330s or three A321s or a combination of both. The apron area was being expanded on the east side of the hangar and the expanded apron would be constrained by an employee parking area, a taxiway, a roadway and a neighbouring structure. The aircraft had to be towed through a 90 or 135 degree turn to access the hangar from the apron and then would have to be pushed out through the 90 or 135 degree turn back into the parking positions. Alternatively, the aircraft could be pushed back to the taxiway upon completion of the maintenance cycle.



A321 - Apron Layout

A321 - Hangar to stand

A321 with A330 - Apron Layout

Analysis

Through the use of AviPLAN Airside Pro, a CAD-based airside design, planning and operations software from Transoft Solutions, aircraft were positioned in the parking area to determine how to best fit the required aircraft in the limited and odd shaped area. The air carrier was able to work with less than the standard wingtip offsets (reduced to 3.0 meters for both the A330 and the A321) as all the movements would be completed by their staff in an area that is confined to only their aircraft. Additionally, the aircraft tails were permitted to overhang the fencing between the apron and the employee parking area.

Once parking positions were established, tow-in and push-back operations needed to be analyzed to ensure that the aircraft could be moved into and out of the hangar and parking areas. Four separate operations had to be tested for each parking position; tow-in from the taxiway and push back into the parking position upon arrival, tow-in from the parking position into the hangar, push-back from the hangar to the parking position, and finally out from the parking position to the taxiway for start-up and departure. These operations also had to consider other parked aircraft on the apron.

Solution

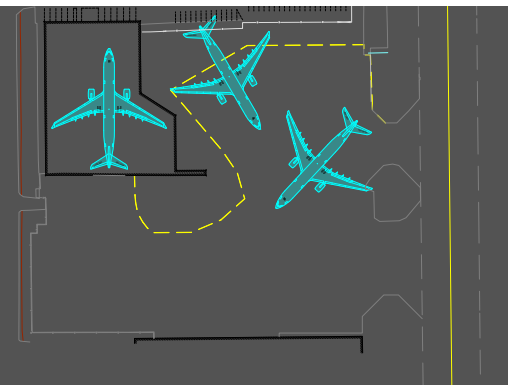
EXP was able to provide three alternative parking options; two A330s, three A321s and a combination of and two A330s and one A321. Due to the available space, some shuffling would be required to access some of the aircraft depending upon the maintenance schedule. In addition to developing the parking positions, AviPLAN was used to provide a marking scheme to ensure that the proposed aircraft are properly positioned and the whole plan can be performed as intended. Finally, AviPLAN was also used to determine the limit of Aircraft Load Rated (ALR) pavement in the apron expansion area so as not to over construct the apron pavement and save the air carrier the cost of constructing ALR pavement where it is not needed.

Program Flexibility

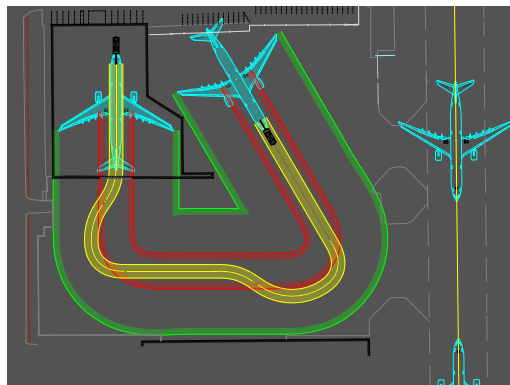
AviPLAN Airside Pro allowed EXP to use the aircraft that were parked with the 'Park' tool as the start or end point target for the movements that needed to be assessed. Aircraft were also positioned in the hangar to be used as start and end point targets for the various 'Path' sessions. To model the 'Path' sessions accurately EXP was able to select, from the AviPLAN library, the tractors and towbars that the air carrier had on site. If the make and model of the tractor had not been available, AviPLAN would have provided a list of the available tractors for the specific aircraft being modelled. Direction reversal during pushback operations can be completed in one Path simulation session, no need for two separate sessions.

All the Park and Path sessions are stored within one CAD file and can be individually customized and displayed as necessary through AviPLAN's Session Manager. Aircraft and vehicles can have different appearances assigned by the user at different points in the Path session.

The parameters for colours, visibility and offsets can be set once and then saved as a Template which can then be applied to subsequent sessions providing for a uniform appearance and time savings. Additionally, these templates are saved to the program database and can be recalled in other CAD files in any AviPLAN project or shared with other users.



A330 - Apron Layout



A330 - Hangar to Stand



ALR Pavement Limits

Easy Edits

Once an aircraft has been parked its position and orientation can be easily revised, no need to create a new position and delete the old one. Path sessions can be created and modified as required using several options for maneuvering the aircraft.

3D Capability

While not part of this assignment, AviPLAN Airside Pro would have been valuable in assessing vertical clearances for such things as top of tail to hangar door, and wing and engine clearances over equipment and stationary objects within the hangar or on a busy apron.

Results

Through the use of AviPLAN the air carrier was provided with a functional parking plan for a restrictive space as well as cost savings for the ALR pavement construction. This was all achieved in a more time-efficient manner due to the ease of editing capabilities of AviPLAN, resulting in significant time savings associated with the study.