



## Airlines and Airports Going Green

### Article 1 – 2022 TaxiBot Trials Planned for Canada

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#### Overview

Royal Pacific Consulting Group's Series One Articles reported on COVID-19 and its impact to aviation. This was an incredibly accurate series that properly projected passenger ridership and explained the reasons behind government decisions. As the pandemic overstates its original forecasts, the pathway to a greater recovery is known. It is just a matter of time. Thereby, the next series of articles will deal with the environmental changes coming to airlines and airports. For example, the goal of "Airlines for America" is airline net-zero CO2 emissions by 2050.<sup>1</sup> The main focus is on aircraft/engine efficiency, sustainable aviation fuel (SAF), the electrification of aircraft and ground equipment, and "greener" airport operations. It is the latter that this article will look at, specifically, the TaxiBot.



Photo courtesy of Alternate Aeroworks Canada Inc. ***A TaxiBot connected to an Airbus aircraft***



## Airport Operations

A Boeing 747-400 aircraft once airborne can fly around 50 miles for each one ton (approximately 1,200 litres) of fuel consumed. On the ground that one ton of fuel may taxi the same aircraft 3 miles. Clearly, taxiing jet aircraft at airports is not efficient. Up until the current COVID-19 crisis, the average taxi time has been increasing each year since 9/11<sup>2</sup>. These longer taxi times are expected to return to aviation as the recovery from the pandemic continues. As airports manage their “banks” of arrivals and departures, traditional tug operations lead to ramp pushback delays, and prime time congestion leads to lengthy taxi times.

Normally, the longest taxi-out times are from 8 to 10 a.m. and 4 to 9 p.m., local time. Summertime shows the longest average taxi times, but winter operation especially around the Christmas holidays can also have long taxi times. In extreme cases, these taxi delays can lead to internationally operated aircraft returning to their gate to be refueled to remain legal for their flights.

To address the fuel burn, carbon emissions, and other costs of long taxi periods, the Delhi International Airport has deployed the TaxiBot into its ground operations plan. This is a pilot-controlled semi-robotic special purpose vehicle (see photo above). The TaxiBot moves the aircraft close to the runway take off point without the aircraft running its main engines while controlling its speed through the normal aircraft brakes. The “Aircraft – TaxiBot” combination is steered by the pilot in the flight deck.

An aircraft coupled to a TaxiBot performs taxiing in the same manner as an aircraft moving under its own power, with the aircraft Auxiliary Power Unit (APU) supplying power to the aircraft electrical and hydraulic systems. TaxiBot provides the same turning radius of a normal aircraft, with the added benefit of giving better traction in slippery conditions<sup>3</sup>. When the TaxiBot is disconnected from the aircraft, an operator in the TaxiBot drives the machine back to the terminal using airport service roads. The TaxiBot will operate at up to 25 knots. Thereby, it can be used on the main airport taxiways at all times.



In the last two years, the Delhi International Airport has, by using the TaxiBot, reduced carbon emissions, saved tonnes of fuel for airlines, reduced engine wear (e.g. operating times, foreign object damage – FOD, etc.), and reduced ramp pushback times<sup>4</sup>. This has led to the airlines saving money in the area of fuel and engine usage. The airport has reduced their carbon emissions and reduced congestion during the aircraft pushback stage.

These green initiatives led to the Airports Council International (ACI) Asia-Pacific awarding the Delhi International Airport the highest airport recognition for “*outstanding achievements in improving local air quality in the Green Airports Recognition 2021 programme.*”<sup>5</sup> This is the sole 2021 “Platinum” award for airports with over 25M passengers per year.



Currently, the TaxiBot is only in service in Asia, at the Delhi and Bangalore International Airports. In 2021, Alternate Aeroworks Canada Inc. of Toronto commenced planning to bring one of these massive TaxiBots to Canada for a free operational trial at one selected major airport by mid-2022<sup>6</sup>. Airlines in Canada are signing up to secure an opportunity to participate in these trials. Transport Canada will also have to approve the use of TaxiBot in Canada.

Speaking to a representative of Alternate Aeroworks Canada, they stated that to date the Delhi International Airport has performed 1650 TaxiBot missions that has saved airlines 306 tonnes of fuel, 968 tonnes of Co2 emissions, saved 385 hours of engine running time and saved 116 hours of ground taxi time (reduced ramp/apron congestion). Alternate Aeroworks Canada estimates that Canada will require 26 TaxiBots to properly service the major airports.

Even though the pilot operates the TaxiBot during taxi, no simulator training is required. The pilot is provided a simple briefing before operating the TaxiBot during taxiing. The aircraft's normal steering and braking is used to operate the TaxiBot.

TaxiBot is a real way to achieve a greener footprint. This is particularly important as a new generation of passengers seek out those airlines deemed to be more environmentally friendly. Websites like Green Vacations coordinate their users to use only the "greenest" of airlines and hotels<sup>7</sup>. Combined with actual cost savings, the drive for greener operations is turning airlines towards TaxiBot operations. Although, already in use on Boeing aircraft, in October 2021, AirAsia, India announced that they are now using the TaxiBot on their Airbus 320 family, focusing on their sustainability initiatives by leveraging innovative technological solutions<sup>8</sup>.

In coming articles, Royal Pacific Consulting Group will examine other techniques targeted to reduce airline and airport carbon emissions.

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## End Notes

<sup>1</sup> Airlines for America – Retrieved November 18, 2021, from: <https://www.airlines.org/airlines-fly-green/>

<sup>2</sup> Bureau of Transportation Statistics, Retrieved November 18, 2021, from: [https://www.bts.gov/archive/publications/special\\_reports\\_and\\_issue\\_briefs/special\\_report/2008\\_008/entire](https://www.bts.gov/archive/publications/special_reports_and_issue_briefs/special_report/2008_008/entire)

<sup>3</sup> Sustainable Aviation Best Practices Document – October'2021 by Dr. Ashwani Khanna

<sup>4</sup> The Times of India, May 6, 2021, Retrieved November 18, 2021, from <https://timesofindia.indiatimes.com/business/india-business/going-green-delhi-airport-becomes-first-globally-to-have-1000-taxibot-movements/articleshow/82430183.cms>

<sup>5</sup> Green Airports Recognition 2021 - Retrieved November 20, 2021, from <https://www.aci-asiapac.aero/advocacy/environment/green-airports-recognition>

<sup>6</sup> Alternate Aeroworks Canada Inc. is a client of Royal Pacific Consult Group

<sup>7</sup> Green Vacations – Retrieved November 19, 2021, from <https://www.greenvacations.com/eco-friendly-airlines/>

<sup>8</sup> Financial Express – October 5, 2021 - Retrieved November 19, 2021, from <https://www.financialexpress.com/industry/airasia-claims-to-be-first-airbus-operator-to-start-taxibot-services-with-passengers-onboard/2344465/>