Autonomous Air Vehicles : Are they at the gates of our cities?

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For many years now, we have been discussing the arrival of autonomous vehicles on Quebec roads. Thus, in April 2018, the government amended the *Highway Safety Code*[1] to adapt it to the particularities of these new vehicles

However, the automotive sector is not the only one being transformed by automation: the aeronautics industry is also undergoing profound changes, particularly with the introduction of autonomous air transport technologies in urban travel.

Terminology

There are many terms used in the autonomous air transport industry, including “autonomous flying car”, “unmanned air vehicle” and even “autonomous air taxi”.

For its part, the International Civil Aviation Organization (ICAO) has proposed some terms that have been included in various official documents, including certain legislation[2]. These terms are as follows:

> **Unmanned air vehicle**: A power driven aircraft, other than a model aircraft that is designed to fly without a human operator on board;
> **Unmanned air system**: An unmanned aircraft and all of the associated support equipment, control station, data links, telemetry, communications and navigation equipment;
> **Remote piloted aircraft system**: A partially autonomous remotely piloted aircraft;
> **Model aircraft (also called “drone”)**: A small aircraft, the total weight of which does not exceed 35 kg that is not designed to carry persons.

As for Canadian legislation, it uses specific vocabulary and defines a remotely piloted aircraft system as a “a set of configurable elements consisting of a remotely piloted aircraft, its control station, the command and control links and any other system elements required during flight operation”, whereas a remotely piloted aircraft is defined as “a navigable aircraft, other than a balloon, rocket or kite, that is operated by a pilot who is not on board[3]”.

Legislative Framework

In accordance with Article 8 of the *Convention on International Civil Aviation*[4], it is prohibited for unmanned aircraft to fly over the territory of a State without first obtaining the authorization of the State in question.

In Canada, the standards governing civil aviation are found in the *Aeronautics Act*[5] and its regulations. According to subsection 901.32 of the *Canadian Aviation Regulations* ((the “CARs”),

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“[n]o pilot shall operate an autonomous remotely piloted aircraft system or any other remotely piloted aircraft system for which they are unable to take immediate control of the aircraft[6].”

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Since the 2017 amendment of the CARs, it is now permitted to fly four (4) categories of aircraft ranging from “very small unmanned aircraft” to “larger unmanned aircraft[7]”, subject to certain legislative requirements:

> The use of unmanned aircraft weighing between 250 g and 25 kg is permitted upon passing a knowledge test or obtaining a pilot permit, if applicable[8];
> To fly unmanned aircraft over 25 kg to transport passengers, it is mandatory to obtain an air operator certificate[9].

Ongoing projects

Many projects developing unmanned aircraft are underway. The most high-profile and advanced projects are those of automotive, aeronautics and technology giants, including Airbus’s Vahana, Boeing’s NeXt program, Toyota’s SkyDrive and the Google-backed Kitty Hawk Cora[10].

The most advanced project appears to be UberAIR. In addition to actively working on developing such a vehicle with many partners like Bell and Thales Group, Uber’s project stands out by also focusing on all the marketing aspects thereof. The program is slated for launch in three cities as early as 2023[11]. These cities are expected to host a test fleet of approximately fifty aircraft connecting five “skyports” in each city[12].

Challenges

Despite the fact that technology seems to be advancing rapidly, many obstacles still remain to truly implement this means of transport in our cities, in particular the issue of the noise that these aircraft generate and the issues relative to their certification, costs and profitability, safety linked to their urban use, social acceptability and the establishment of the infrastructure necessary to operate them.

In the event of an accident of an autonomous aerial vehicle, we can foresee that the manufacturers of such vehicles could be held liable, as could the subcontractors that are involved in manufacturing them, such as piloting software and flight computer manufacturers. We could therefore potentially be faced with complex litigation cases.

Conclusion

A study predicts that there will be about 15,000 air taxis by 2035 and that this industry will be worth more than $32 billion at that time[13]. In the context of climate change, sustainable transportation and in order to bear urban sprawl, these vehicles offer an interesting transit alternative that may very well change our daily habits.

The flying car is finally at our doorsteps!

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1. *Highway Safety Code, CQLR, c C-24.2.*
2. Government of Canada, Office of the Privacy Commissioner of Canada, *Drones in Canada*, March 2013, at pp. 4-5
3. *Canadian Aviation Regulations, SOR/96-433,* s. 101.01.
4. International Civil Aviation Organization (ICAO), *Convention on International Civil Aviation* (“Chicago Convention”), 7

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December 1944, (1994) 15 U.N.T.S. 295.
5. Aeronautics Act, RSC 1985, c. A-2.
6. *Canadian Aviation Regulations, SOR/96-433,* s. 901.32.
7. Government of Canada, Canada Gazette, *Regulations Amending the Canadian Aviation Regulations (Unmanned Aircraft Systems) - Regulatory Impact Analysis Statement,* July 15, 2017.
8. *Canadian Aviation Regulations, SOR/96-433,* s. 901.64 et seq.
9. *Canadian Aviation Regulations, SOR/96-433,* s. 700.01.1 et seq.
10. Engineers Journal, The 13 engineers leading the way to flying car. May 29, 2018
11. Dallas, Los Angeles, and another city yet to be announced.
12. Uber Elevate, Fast-Forwarding to a Future of On-Demand Urban Air Transportation. October 27, 2016,
13. Porsche Consulting, "The Future of Vertical Mobility – Sizing the market for passenger, inspection, and goods services until 2035." 2018

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