CAVCOE

CAV Update

A monthly newsletter on the CAV ecosystem

October 2022

From the Editors

The recent report from **Transport Canada** Minister Alghabra's *Supply Chain Task Force* does not mention the use of automated freight vehicles as a way to improve supply chain efficiency and help address Canada's shortage of truck drivers.

The report, released on October 6, 2022, identifies the shortage of truck drivers and recommends employing more people as truck drivers. But that is only half the answer. There is no mention of using automated vehicles in the supply chain, nor of leveraging Canada's substantial expertise in automated vehicle technology.

It is unlikely that the report's recommendations on their own will solve the labour issue. It is likely that Connected and Automated Vehicles (CAVs) for non-passenger applications will deploy in greater numbers in the 2020s than passenger vehicles because of solid business cases and easier ways to ensure safety.

The future of transportation in the supply chain is not a choice between human or computer drivers, it is a blend of both. I hope that Minister Alghabra clarifies that he supports freight vehicle automation and agrees that this technology can improve supply chain efficiency, help address the labour issue, and leverage Canada's significant CAV ecosystem.

The full opinion piece on this is on Barrie Kirk's LinkedIn page here.

Canadian CAV News

We have been reporting on the many Canadian CAV and mobility-related events this Fall. Some have already been held. Here is an update on the events for November and December:

- **November 2, 2022**: *CAVs Today, Emerging Trends, and Getting to Market*, a webinar with panelists from **PAVE Canada**, **CAVCOE**, **Marsh**, **NuPort Robotics**, and **Waabi**. Questions that we will discuss are: What autonomous vehicles will we see first? Who is liable if things go wrong? And what does the public think?
- **November 7-8, 2022: ITS Canada** and the **City of Toronto** present the *Technology Innovation Forum*. Day 1 is focused on Municipal research needs

and Technology Innovation Zones. Day 2 is focused on autonomous and connected vehicles. Details are here.

- **November 15-17, 2022**: this is double-header event. **Sub Zero North's** conference *Ready…Set…Test,* is its first ever cold weather testing conference with a special feature on alternative fuels. It is in Winnipeg and Thompson MB. More details are at subzeronorth.ca Linked to this is the following event.
- **November 17, 2022**: the **National Research Council Canada (NRC)** and **Transport Canada (TC)**, in collaboration with **Sub Zero North**, have announced a one-day hybrid (in-person and online) workshop on *Canada: Terrains and Temperatures for Testing Transportation Technology,* this is part of the series on *Community of Practice (CoP) for Intelligent Transportation Systems (ITS) Living Labs in Canada*.
- **December 5, 2022**: Hosted collaboratively by **Area X.O**, **Invest Ottawa**, and the **Kanata North Business Association (KNBA)**, this hybrid event brings together speakers to discuss the future of smart mobility. The details are here.

Over the past two years, AV developer **Gatik** and **Loblaw Inc.** have been testing self-driving delivery trucks for transporting goods from Loblaw's warehouses to its retail stores. In early October 2022, both companies announced that their automated trucks are now driverless, i.e. there is no safety driver behind the truck's steering wheel. However, there is still a person in the passenger's seat in case something unexpected happens. Loblaw states that Gatik's driverless technology was reviewed by a group of third-party experts to ensure it is safe for deploying on public roads. According to Loblaw, standards and guidelines from ISO/SAE and NHTSA including security standards NIST Framework as well as those from SAE J3061, ISO/SAE 21434 and UNECE R155 were part of this review. Furthermore, part of the testing was trying to hack into the vehicle for controlling its steering and braking systems as well as trying to jam its GPS navigation systems. It passed all of these tests. More information is at this link. CTV News (Toronto) broadcast a short video on Loblaw/Gatik driverless truck; the video can be downloaded/viewed at this link.

On September 26, 2022, the **CBC** published an article on this year's *Detroit Auto Show* with its focus on companies developing airtaxis, both piloted and pilot-optional. The airtaxi technology has advanced so much that **United Airlines** has placed an order for 200 of them with **Eve Air Mobility** and another 100 with **Archer Aviation**. Its competitor - **American Airlines**, has placed an order for 250 airtaxis with **Vertical Aerospace**. The airtaxis are battery powered and take-off and land vertically dispensing with the need for a conventional runway (eVTOL), and are designed for carrying cargo and/or passengers. This creates the opportunity for building so-called *vertiports* for them to take-off and land from. Montreal-based **Vports** is trying to fill this niche by building a network of 1,500 vertiports for commercial cargo transportation over the next two decades, starting with a corridor between Canada and the U.S.

The CBC report can be viewed at this link. A short video of the event and airtaxis is also available at the same link.

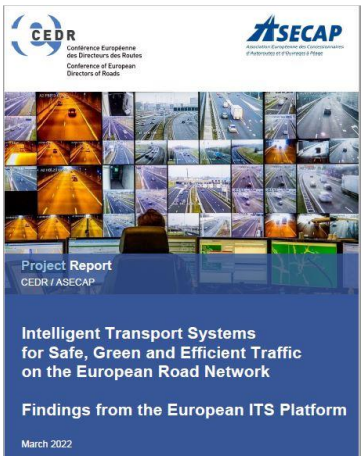
Another company planning to develop self-driving electric trucks is **General Motors** (GM) subsidiary *BrightDrop*. Created in 2021, *BrightDrop* will be manufacturing light electric trucks at GM's CAMI Assembly plant in Ingersol, Ontario. This plant is expected to open in the fourth quarter of 2022. GM intends to integrate autonomous driving into these trucks by leveraging technologies developed by another GM subsidiary, **Cruise**. According to BrightDrop's CEO, the Ingersol plant would be making up 50,000 electric trucks a year, starting in 2025. More information is at this link.

CAVCOE Speakers' Bureau

CAVCOE provides speakers for many different types of events across Canada, the US and overseas; we are now booking for 2023. On the one hand, our keynotes and presentations have core messaging on the status of CAVs, their deployment scenarios, and the impact on business plans, government policy, regulations, and almost all aspects of society. On the other hand, each presentation is customized for the audience and the time available. To enquire about a speaker for your event, please write to speakers@cavcoe.com

International CAV News

ITS International magazine published an article this year titled *Building Europe's roads for the driverless age*. The focus of the article is a discussion of a 146-page report published by the **Conference of European Directors of Roads** (CEDR). This organization consists of European road authorities and road network operators. The report is titled *Intelligent Transport Systems for Safe, Green and Efficient Traffic on the European Road Network, Findings from the European ITS Platform*. The report delves into many challenges facing road operators in introducing autonomous vehicles to the European road networks. One of these challenges is to figure out how to manage a mix of autonomous and non-autonomous vehicles as well as connected vehicles and non-connected vehicles on public roads. Another is the advanced digitalization of the road/transport infrastructure to make them capable of accommodating CAVs. The key elements for this task are: digital twinning, connectivity and positioning. More information is at this link. The report can be viewed/downloaded at CEDR's site at this link.

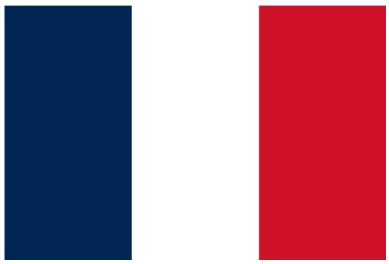


Tesla has been selling its automated driving technology to the public for a few years now. These are marketed by Tesla under *Autopilot* and *Full Self-Driving* (FSD) brands. Many people assume that FSD truly provides a fully self-driving experience. Unfortunately, Tesla vehicles under *Autopilot* and/or FSD control have had a number of serious crashes. Some of these have resulted in fatalities. California's Department of Motor Vehicles (DMV) whose responsibility it is to investigate incidents of this type had resisted taking Tesla to task for a long time. Now, the State of California wants to do something about this. They deem Tesla's claim for FSD to be false advertising. New legislation has been proposed to stop Tesla from advertising its technology as *Full Self-Driving*. It is worth mentioning that despite Tesla's claim to *Full Self-Driving*, it puts warnings (in small print) that FSD is not really FSD, and drivers must be constantly alert and ready to take manual control of the vehicle at any time. More information is at this link.

Forbes magazine published an article titled *Autonomous Vehicles Require Autonomous Roads*. In it, it cites the **Amercian Society of Civil Engineers** (ASCE) report on the U.S. road infrastructure. ASCE gives it a "C" grade adding that 43% of U.S. public roadways are in poor

or mediocre condition. This is hardly conducive for wide deployment of autonomous vehicles. For example, AVs use paint lines on roads to distinguish where the boundries of a lane are and to keep the vehicle centered on it; or when a lane change is necessary. If the paint lines aren't straight or placed too close or too far, this may be enough to confuse an AV. Similarly in a construction zone, traffic cones or barrels may be knocked over by cars or gusts of wind. An AV could interpret this situation as a closed lane and potentially come to a complete stop due to a lack of clarity on where it can drive. By contrast, a human driver would easily understand the anomaly and adjust to it. The article can be viewed at this link.

After Germany, **France** now allows AVs equipped for Level 3 automated driving to operate legally on France's public roads. In Level 3, the driving task is shared between the human driver and the computer. The computer driven part is only allowed under certain conditions. These conditions include roads having a central separator (median) from other roads and must be closed to pedestrians and cyclists. Furthermore, the maximum allowed speed will be 60 km/h initially but that will increase to 130km/h as France adopts the United Nations regulations. More information is at this link.



Times are hard at present for AV companies who have gone public as well those working in the electric vehicle sector. Unmet expectations and the general decline in the technology stocks has caused AV developers to lose significant amounts of market capitalization. One such company is **Aurora Innovations Inc.** which went public late in 2021 by merging with a *Special Purpose Acquisition Company* (SPAC), raising US$1.9 billion in cash at the time. The company market capitalization has dropped from a peak of US$19.2 billion in November 2021 to about US$2.54 billion at this time. This has prompted the company to seek cost cutting measures or the outright sale of the company. **Apple** and **Microsoft** have been touted as possible companies with the wherewithal and financial strength to acquire Aurora. The company has also contemplated taking itself private, freezing hiring, laying off staff and terminating its free catering program. Other AV developers such as **TuSimple**, **Embark** and others are not faring much better. More details are at this link.

A recent article by **Reuters** titled *Truly autonomous cars may be impossible without helpful human touch* suggests that AVs will need to be remotely monitored by people for a long time to come. This appears to be the opinion of many AV industry experts such as the CEO of leading AV developer **Cruise**. For Cruise, it is simply a case of assuring customers riding in one of its driverless robotaxis that someone is keeping an eye on the vehicle and can intervene if

necessary. Cruise states that such interventions are less than 1% of the time that its driverless vehicles are on the road. However, if this is scaled up to hundreds, thousands or even millions of AVs, that would add up to a significant amount of time stopped on the road waiting for human guidance. The Reuters article can be viewed at this link

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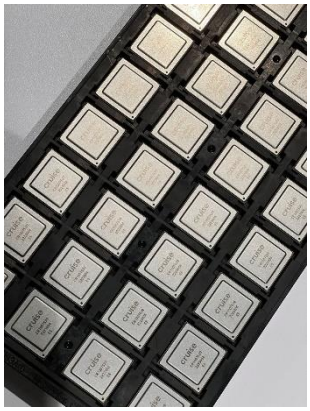
Some AV experts view the interplay between AVs and the road network infrastructure as something of a chicken-and-egg situation. This is because car manufacturers desire a smart road infrastructure while governments need the smart cars to justify investing in the smart infrastructure. This is an issue that many roadway authorities and operators are facing in a future where AVs go mainstream. **Britain** has been especially active in encouraging AV development by providing significant funding and incentives to get a jump on the competition. The organization responsible for Britain's strategic roads is **National Highways**. In the view of this organization, wholesale physical modification of roadways is impractical and hugely expensive. So, they are looking at the other alternatives such as creating highly accurate *digital twins* of the road network which in the future can feed reliable data to AVs. More details are at this link.

It may be an indication that **GM** and its subsidiary **Cruise** are getting ready to produce autonomous vehicles in large volumes. On September 13, 2022, Cruise executives announced that the company has designed its own chips for the AVs under development and those targeted for mass production. One reason given is the high cost of *Graphic Processing Units* (GPU) supplied by the leading GPU producer – **Nvidia**. Cruise is following the lead of **Tesla** and **Apple** who had previously gone down the same path. Cruise has developed four in-house chips so far - a computing chip called *Horta*, the main brains of the car, *Dune* which processes data from the sensors, a chip for the radar, and one whose function will be announced later. Artificial Intelligence (AI) systems rely heavily on GPUs. In turn, AVs rely heavily on AI for perception, navigation, control and data fusion. More information is at this link.



And finally, on September 8, 2022, UK's **The Guardian** newspaper released a 5-minute video titled *Why self-driving cars have stalled*. The video shows some challenges faced by AVs and their developers in bringing this technology to market. It suggests that AV developers grossly underestimated how hard it is to perfect this technology. The reliability expected of AVs is 99.9999%. At present, the technology can only deliver 99.99%. Apparently, this is not good enough. The endless scenarios that an AV can face in real-world is the reason for the so-called *edge cases*. For example, the AV can be trained not to collide with a cow on a roadway should there be one in its path. However, if a sheep instead of a cow was the obstacle, it may not know what to do. The video can be viewed at Guardian's site at this link.

Upcoming CAV-Related Events

Nov 2, 2022	CAVs Today, Emerging Trends, and Getting to Market, a free webinar sponsored by PAVE Canada, CAVCOE, Liberty Mutual, Marsh, and Waabi
Nov 7-8, 2022	Technology Innovation Forum, presented by ITS Canada and the City of Toronto.
Nov 13-15, 2022	9th Tech.AD USA, Detroit, MI
Nov 15-16, 2022	Auto Tech: Europe 2022, Munich, Germany
Nov 15-17, 2022	Ready…Set…Test, Sub Zero North's cold weather testing conference; Winnipeg and Thompson, Manitoba, Canada
Nov 17, 2022	Canada: Terrains and Temperatures for Testing Transportation Technology, Transport Canada and National Research Council; Thompson, Manitoba and virtual. To register: Douglas Miller douglas.miller@tc.gc.ca or Kristine Philippe kristine.philippe@tc.gc.ca
Dec 2022	CAV Canada conference, hosted collaboratively by Area X.O, Invest Ottawa, and the Kanata North Business Association (KNBA); Ottawa ON and virtual
June 4-7, 2023	UITP Global Public Transport Summit, Barcelona, Spain

About CAV Update

CAV Update is a free, monthly summary of news and analysis in the world of connected and automated vehicles, and their impact on the private sector, government, and society.

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CAVCOE (formerly the Canadian Automated Vehicles Centre of Excellence) advises the public and private sectors on planning for the arrival of self-driving vehicles.

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