

CAV Update

A monthly newsletter
on the CAV ecosystem

August 2021

From the Editors

Much of the CAV development and testing work is being conducted in warmer climates – California and Arizona come to mind. This is partly because of the low-hanging fruit strategy: it is easier to do the initial development in warmer climates and avoid some of the more challenging issues. However, year-round operation of CAVs is essential and we see a key trend that puts more focus on winter weather testing and a growing ecosystem for winter weather testing. Here are a few examples:

- The **University of Toronto Institute for Aerospace Studies (UTIAS)** is working on autonomous vehicles operating under inclement weather conditions such as Canadian winters. Later in this newsletter, there are details and a link.
- Sensors capable of operating in Scotland’s infamous rain, snow and fog are providing data that could help autonomous vehicles see and operate safely in adverse weather, thanks to the *Radiate* project led by **Heriot-Watt University**. Again, there is more information and a link later in this newsletter.
- As we have previously reported, **Thompson MB** has a long history of winter weather testing in the aerospace, automotive and other sectors and is expanding its activities in this area. More information is [here](#).
- **Area X.O**, led by **Invest Ottawa**, provides testing, validation and demonstrations in a four-season climate in a secure facility in Ottawa. More information is [here](#).

There will be more winter weather testing information in future issues of CAV Update.

Canadian CAV News

In May 2021, **Manitoba’s Vehicle Technology Testing Act**, received Royal Assent. It enables future testing of vehicle technology and vehicle types on Manitoba roads, including testing of automated vehicles on public roads. In August 2021, Manitoba announced a public consultation program on the details through an EngageMB survey. Infrastructure Minister Ron Schuler announced:

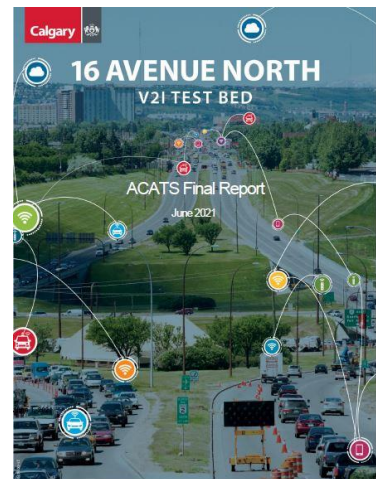
“Our government introduced legislation last year that would allow for testing of automated vehicles on provincial roads and we are honouring our commitment to bring forward legislative amendments that would create the framework to allow for the safe testing of these vehicles,” said Schuler. “Enabling developers to test emerging vehicle technologies will support Manitoba’s economy and technology development sectors to advance opportunities for Manitoba-based businesses.”

More details are [here](#).

In August 2021, Ontario's **Autonomous Vehicle Innovation Network (AVIN)** published a 25-page report titled *Spotlight on Skills and Competencies*. The report's audience includes the automotive and parts manufacturers. According to this report, the automotive production industry employs nearly 160,800 workers in Ontario. Additionally, 19,300 workers are employed in automotive technology and research jobs related to connected and autonomous vehicles, vehicle safety, advanced manufacturing and artificial intelligence. Due to the fast pace of technological innovation, future employees in the automotive sector will need to be skilled in areas such as cybersecurity, data analytics, database, file storage, artificial intelligence, electronic design, other digital skills as well as battery and charging technologies. The report can be viewed/downloaded at [this link](#).



We have reported previously about the **City of Calgary's** connected vehicle project. This project is now completed, and the city has published a 39-page report on it. This Vehicle-to-Infrastructure (V2I) project was implemented along a major roadway in Calgary and included 12 traffic signals equipped with **Kapsch TrafficCom's** dual-mode DSRC/C-V2X roadside units. **BlackBerry's Security Credential Management System (SCMS)** was deployed to provide secure communication between equipped vehicles and the signalized intersections. **Transport Canada** contributed \$290,000 towards this project through its *Connectivity and Automation in the Transportation System (ACATS)* program. The report can be viewed/downloaded at the City's website at [this link](#).





Canada's mining industries have an interest in autonomous vehicles and clean technologies. To support these initiatives in the mining sector, the federal government's **Innovation, Science & Economic Development (ISED)** is pumping \$40 million into the **Centre for Excellence in Mining Innovation (CEMI)** based in Sudbury, Ontario. It is anticipated that the federal government's funding will generate another \$100 million from the private sector to propel this initiative forward. A coalition of over 350 mining companies, industrial suppliers, academic researchers, and industrial innovators will bring their knowledge, expertise and new technology from within the mining industry and from outside. Canada's mining sector is worth \$109-billion annually. More information at [this link](#).



On July 22, 2021, **Magna International Inc.** announced it has acquired Sweden's **Veoneer Inc.** for \$3.8 billion in cash.

Veoneer is a manufacturer of automotive radars, vision cameras, advanced driver assist systems (ADAS) hardware and software, electronic control units for highly automated driving (HAD) and autonomous driving (AD). The company also makes driver monitoring systems, LiDAR sensors and other technologies used in ADAS, HAD, and AD solutions. This acquisition is an indication that Magna is planning to be a major player in the CAV space. More details on Magna's website at [this link](#).

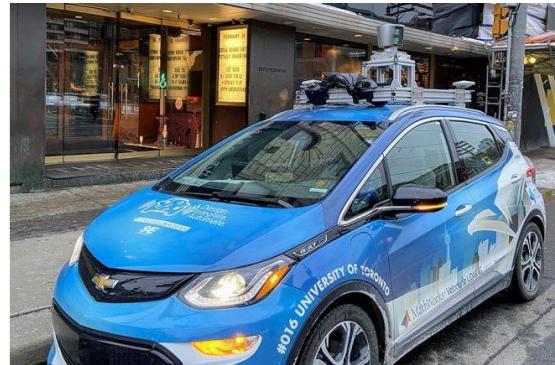


In the July 2021 edition of *CAV Update*, we did a brief report on **Embark Trucks** and its Canadian roots. On August 10, 2021, **electricautonomy.ca** published an article titled *From Waterloo to world-beaters? How Embark's Canadian founders are building an autonomous trucking success story in Silicon Valley*. The article is mostly an interview with Embark's 25-year old CEO (Alex Rodrigues) and his vision of how automated trucks will transform the freight and trucking industries. Among other things, Mr. Rodrigues says that currently the cost of a human truck driver is about US\$1.76 per mile. Embark believes that its autonomous-driverless technology would drive the cost down to US\$0.96 per mile. The Canadian freight company **Bison Transport** has partnered with Embark to trial its technology in Canada. The article can be viewed at [this link](#).

Winter Weather Testing

The **University of Toronto Institute for Aerospace Studies (UTIAS)** is working on becoming the premier R&D centre for autonomous vehicles operating under inclement weather conditions such as Canadian winters.

The project dubbed *WinTOR* has partnered with **General Motors Canada, LG Electronics, Applanix, Algolux** and others to develop the technologies needed by AVs for winter driving. The project employs about 20 people and has funding of \$12 million from **Ontario Research Fund – Research Excellence** program, as well as funding from the **Natural Science and Engineering Research Council**, and direct and in-kind donations from the project partners. More information is at [this link](#).



Sensors capable of operating in Scotland's infamous rain, snow and fog are providing data that could help autonomous vehicles see and operate safely in adverse weather. Thanks to the *Radiate* project led by **Heriot-Watt University**, a new data set has been published that includes three hours of radar images and 200,000 tagged road actors, including other vehicles and pedestrians, gathered in the country's often inclement weather. The full article is [here](#).

International CAV News

The German car company **Audi** has been on the forefront of bringing connected vehicle (CV) technology to mass market. One of these CV applications is Audi's *Traffic Light Information (TLI)*. Briefly, the Audi vehicle receives data from a connected traffic signal whose data has been uploaded to a server and then from the server to the vehicle. This allows the drivers to adjust their speed to ride the *green wave*, i.e., get through a number of traffic signals without hitting a red light. Audi believes this can save up to 15% in fuel savings by reducing the number of stop and go cycles a vehicle goes through in an urban setting. According to Audi, TLI is now available at more than 22,000 intersections in more than 20 major metros and 60+ cities and regions across the U.S. and Canada. Audi is also testing its CV system to warn motorists on approaching work zones, school zones and school buses. More information is at Audi's site at [this link](#).



EasyMile, best-known for its passenger driverless shuttles, is diversifying into other types of autonomous/driverless vehicles. One such example is its recent collaboration with the Dutch company **Terberg** to take its advanced *drive-by-wire* tractor and apply its driverless technology to it. The tractor dubbed *AutoTUG* is designed to provide driverless hauling service at ports and logistic hubs. More details are at [this link](#).



At the recent virtual **2021 TRB Annual Automated Road Transportation Symposium** (July 12-15, 2021) a group of prominent AV experts presented and spoke on the benefits of automated vehicles and how it might enhance transportation equity in both urban and rural communities. For example, potholes, cracked sidewalks and poor lighting create conditions that are not fit for walking, much less for autonomous



vehicles. One speaker stated that it is *safer to fly across the ocean than it is to walk across the street*. He added that there is a need to fix the current infrastructure with an eye towards tomorrow's developments such as AVs. Another speaker indicated that there seems to be little interest in autonomous vehicles at the U.S. federal level, based on the current infrastructure bill. More information is at [this link](#).

The **State of California** is generally viewed as a progressive state when it comes to automated vehicles of all types (cars, trucks, delivery robots, etc.). **California Public Utility Commission** (CPUC) is one of the agencies making rules for deployment and testing of AVs on California's public roads. To this end, CPUC announced two new autonomous vehicle programs that allows companies to provide passenger transportation services, charge fares, and offer shared trips to the public. The two programs are AVs with a safety driver behind the wheel and the other is for driverless vehicles. A two-page summary of the document can be viewed/downloaded from CPUC's site at [this link](#). The detailed document (145-pages) is available at [this link](#).

One of the darker sides of automated systems is the *autonomous weapon systems*. This disturbing trend in the world militaries involves the design and deployment of autonomous weapons that are allowed to select and apply force to targets without human intervention. They are triggered by their environment based on a "target profile", which serves as a generalized approximation of a type of target. The loss of human control over the use of force raises humanitarian, legal, and ethical concerns. The **International Committee of the Red Cross (ICRC)** convened a 10-day meeting of the *Group of Governmental Experts on Lethal Autonomous Weapons Systems* to discuss and debate these concerns and to prepare for the *Review Conference of the Convention* in about five months. Details are at the ICRC site at [this link](#).




On October 23, 2021, the **Indianapolis Motor Speedway** will be holding the *Indy Autonomous Challenge (IAC)* with a top prize of US\$1 million. At present, 10 teams are participating from 19 universities. All teams will be using a modified version of the Italian race car *Dallara-15*. These vehicles can reach speeds of up to 200 MPH (322 Km/h). One interesting aspect of this race is the fact that the race vehicles are capable of communicating with each other through vehicle-to-vehicle (V2V) communication. V2V communication among these racing AVs simulates the signals that human drivers normally observe during a race, e.g., track location, ground speed, acceleration and braking rate. More information is at [this link](#).



Yet another AV developer is going public through a *Special-Purpose Acquisition Company (SPAC)*. This time it is **Aurora Innovation, Inc.**, co-founded by one of AV world's luminaries – Dr. Chris Urmson in 2016. Aurora will merge with *Index Ventures* who have committed US\$1 billion to Aurora, valuing the company at US\$11 billion. Aurora is engaged in developing autonomous



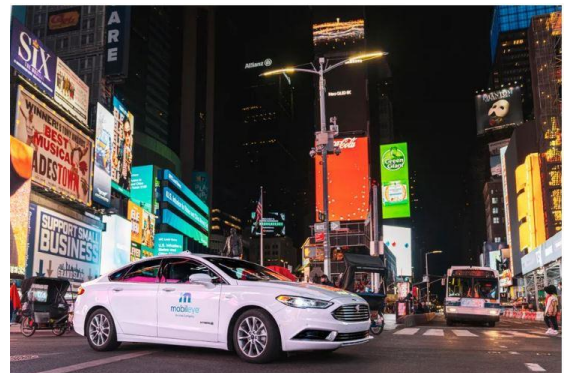


trucks, robotaxis and other automated vehicles. **Uber** owns 26% of Aurora. More information is at [this link](#).

Several companies are working on bringing autonomous air-taxi to the masses. One of the leading companies in the field is **Joby Aviation, Inc.** On August 13, 2021, Joby went public through a SPAC and is now valued at more than US\$7.5 Billion (as of August 30, 2021). However, it is unlikely that air-taxi can operate like normal taxis, picking you up and dropping you off at your home or business. The current thinking envisions customers travelling to a *vertiport*, getting in an air-taxi, and flying to another *vertiport*. Rooftops of big parking garages are considered good candidates for a *vertiport*. This sounds a whole lot like current air travel, but on a smaller more local scale. On August 2, 2021, *insideevs.com* published an article titled *Diving Into The Electric Air-Taxi Fallacy*. The article takes a deep dive into the many obstacles in the way of air-taxi. The article can be viewed at [this link](#).



And finally, it is hard to imagine any city other than **New York City** as more challenging to operate an autonomous vehicle. Intel-owned **Mobileye** has taken on this challenge by deploying two of its automated vehicles in the Big Apple. It plans to increase these to seven in the near future. The vehicle's only sensors are a set of 12 advanced *EyeQ* cameras developed by Mobileye. The State of New York is not a hot-bed of AV testing due to its very strict rules. For example, an AV under test on the state's public roads is required to have a safety driver whose hands must be on the steering wheel at all times. Additionally, the AV must have a state police escort at all times to be paid for by the testing company. More information is at [this link](#).





Upcoming CAV-Related Events

- Sept 1-2, 2021 [Autonomous Vehicles 2021](#), Long Beach, California
- Sept 13-15, 2021 [MINExpo](#), Las Vegas, Nevada
- Sept 16-17, 2021 [Autonomous Ship Expo](#) – virtual and live.
- Sept 22, Sept 29, and Oct 6 [CAV Readiness Training workshop](#). An online course presented by ITS Canada with various partners.
- Sept 27-30, 2021 [IEEE VTC2021-Fall](#).
- Oct 4-5, 2021 [UK CAV Infrastructure Symposium](#), London, UK
- Oct 11-12, 2021 [Auto Sensors 2021](#), Detroit MI
- Oct 11-15, 2021 [ITS World Congress](#), Hamburg, Germany
- Nov 17-18, 2021 [Autonomous Vehicles and Public Transport in Europe](#), Amsterdam, The Netherlands.
- Nov 23-24, 2021 [Monetizing the Digital Car](#), live virtual event, UK
- Dec 1-2, 2021 [Autonomous Vehicles Europe 2021](#), Berlin, Germany
- Dec 14-17, 2021 [UITP Global Public Transport Summit](#); Melbourne, Australia
- Feb 27 – Mar 2, 2022 [Ontario Good Roads Association's Conference](#); Fairmont Royal York, Toronto
- Mar 1-2, 2022 [Autonomous Vehicle Technology Expo](#), San Jose CA
- Jun 20-23. 2022 [HxGN LIVE Global](#), Las Vegas, Nevada
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About CAV Update

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

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