

CAV Update

October 2020

From the Editors

There are two key articles in this month's issue about the Canadian Automated Snow Plow Initiative.

First, companies and government departments can now join CASPI and benefit from the detailed information and synergies. Second, the third annual student automated snow plow competition is underway, and we are pleased with the number of teams who have registered. More details on both are provided below.

In addition, CAVCOE is pleased to extend to readers of CAV Update an invitation from **Invest Ottawa** to attend (virtually of course) the launch of an autonomous shuttle pilot in Ottawa on Monday November 2. Details are below.

Canadian CAV News

On October 13, **Invest Ottawa**, announced the launch of *Area X.O*, a focal point for innovation and collaboration. Evolving from the Ottawa L5 CAV Test Facility, the plan is for Area X.O to enable and accelerate the safe and secure development, testing and application of next-generation technologies across many sectors.

Almost \$17 million in new investment was announced for Area X.O, including \$7 million from the Government of Canada through the Federal Economic Development Agency for Southern Ontario (FedDev Ontario), and nearly \$10 million in in-kind contributions of technology, services and expertise from industry partners including **Accenture**, **BlackBerry QNX**, the **City of Ottawa**, **Ericsson**, **Hexagon | AutonomouStuff**, **InDro Robotics**, **Kongsberg Geospatial**, **Microsoft**, **Nokia** and **TÜV SÜD**. Additional information is [here](#).



On October 14, 2020, The **City of Toronto** provided an update for its automated shuttle pilot project. Starting in Spring 2021, the shuttle will start operating in the West Rouge neighbourhood and transport passengers to the Rouge Hill GO station. The pilot project will last six to twelve months. The pilot will enable the City, **Toronto Transit Commission (TTC)** and **Metrolinx** to learn more about the future role of automated shuttles in public transit delivery. Phoenix-based **Local Motors** was selected by the City as the shuttle partner for this project. **Transport Canada** is providing a contribution of \$365,000 for service preparation, delivery, and evaluation. The City of Toronto's news release can be viewed at [this link](#).



Invest Ottawa invites readers of CAV Update to join Area X.O and many partners on Monday, November 2 at 9 AM as they celebrate the launch of the first on-road Electric Low-Speed Automated Shuttle (LSAS) trial of its kind in Ontario in Ottawa. Speakers at this announcement include:

- The Honourable Catherine McKenna, Minister of Infrastructure and Communities, Government of Canada
- His Worship Jim Watson, Mayor of Ottawa
- Michael Tremblay, President and CEO, Invest Ottawa and Bayview Yards

To register and receive your Zoom link, please click [here](#).



On September 28, 2020, the **CBC** published an article titled *They promised us driverless cars. What happened?* The reporter had written an article on self-driving cars five years ago. He wanted to know where we are at in 2020. To find out, he contacted **CAVCOE's Paul Godsmark** as well as a number of other Canadian CAV experts. He also contacted **Waymo** for a timeline on when CAVs may go mainstream. No one could give him a specific date as there are so many unresolved issues such as cybersecurity, Canadian winter weather, the legal and insurance regimes, artificial intelligence ethics and the very real unpredictability of human behaviour. The CBC article can be viewed at [this link](#).

There is also a related humorous YouTube clip from March 2017 when comedian **Rick Mercer** visited the **University of Waterloo** to try out their self-driving car. The YouTube clip can be viewed at [this link](#).

On October 15, 2020, **Drone Delivery Canada (DDC)** announced a joint research project with **University of Toronto Institute of Aerospace Studies (UTIAS)** and **Ford Motor Company**. The main goal of this project is testing an automated drone as it tracks and lands on a moving ground vehicle within a defined flight area. More information is on DDC's site at [this link](#).

On September 29, 2020, the **Autonomous Vehicle Innovation Network (AVIN)** published a 31-page report titled *Leading the Future of Goods Movement: Drivers of Change, Transformations, and Opportunities*. The report delves into all the forces and developments impacting the goods movement industry. Among these are autonomy and connectivity. The report cites the **McKinsey Center for Future Mobility** and its viewpoint that autonomy will happen in four waves. It started in 2018 and will go to 2027+ before fully autonomous trucks will be operating on highways. A copy of the report can be downloaded from AVIN's site at [this link](#).

The Goods Movement Journey



First-mile Delivery

refers to the first phase of the delivery journey where goods are moved from production facilities to warehouses.

Middle-mile Delivery

refers to the middle phase of the delivery journey where goods are moved from warehouses to distribution stores.

Last-mile Delivery

refers to the last phase of the delivery journey where goods are delivered to their final shipping address.

Bell Canada has announced a connected vehicle service for the general public. Through an app, the service provides several useful functions for the vehicle owner. These include knowing location of the vehicle, geofencing, fuel level, engine diagnostics, information on speeding and braking, reducing driving distraction by silencing the mobile phone, creating a Wi-Fi hotspot and other functions. More information is at [this link](#). A short video on how the system works can be viewed at [this link](#).



CASPI News

CASPI is now open for business and seeking members for this new not-for-profit association. The association's objectives include:

- Creating synergies among stakeholders in the rapidly evolving ecosystem of automated technologies for winter sidewalk management. These stakeholders include municipalities, equipment manufacturers, service providers, academia, and researchers.
- Building a future where sidewalk and trail winter maintenance solutions utilize automated technologies.
- Creating an ecosystem for snow and ice management through automated technologies.
- Creating synergies that will enable Canada to become a global leader in automated management of sidewalks and trails.

CASPI is focused on research, education, planning and networking.

More information on CASPI, membership benefits, etc. are [here](#)

CASPI's student automated snow plow competition has been launched. It provides an opportunity for students to apply their knowledge and skills from the classroom to a tangible real-world problem. The problem is a major snowstorm just days before a big city event. The challenge is to develop a semi-autonomous snow plow capable of completing a number of snow clearing tasks. There are two phases:

Phase 1: deliver a report with the technical design, approximately 10 pages, to the competition judging panel.

Phase 2: Competition either on-site or virtually by video (COVID-19 dependent).

Prizes will be awarded to the winning team of each competition round.

Submit letter of interest asap

Register by November 10, 2020

Technical paper due by January 25, 2021

Competition May 15-16, 2021

To express interest and/or to register, please write to Nicola McLeod, PMP at competition@caspi-icda.com Nicola will send you the registration form and the competition details.

Here is an opportunity to learn more about how CAV technologies can be leveraged to perform sidewalk winter maintenance. The **Ontario Good Roads Association (OGRA)** is holding virtual *Managing Winter Operations Workshops* on November 4 and 5. They will outline the issues and challenges, and review best practices, new ideas and solutions.

CASPI's Barrie Kirk is presenting on November 5 about – you guessed it – automated winter management of sidewalks. The presentation will address the current status and trends. There is more information on OGRA's workshops [here](#).

International CAV News

In the continuous quest to develop safer autonomous vehicles, a team of researchers at the **Technical University of Munich** have developed an algorithm based on rules defined by the *Vienna Convention of Road Traffic*. This algorithm is programmed to know all traffic rules and laws defined by this convention. The rules are applied in real-time to evaluate all possible scenarios to avoid a collision. Using real traffic data, the algorithm has managed to avoid all potential collisions. More information [this link](#).

Autonomous trucks are often portrayed as one of the more promising areas of automated vehicles and likely to see early deployment on public roads. **Daimler** is a major player in this field. It bought a majority stake in **Torc Robotics** last year to gain access to Torc's expertise in this field. Daimler sees development of automated trucks as a marathon rather than a sprint. It also subscribes to the *hub-to-hub* concept for delivering freight via automated trucks. It also expects advancements in lidar, radar,

camera technologies and compute power before automated trucks are ready for prime time. More information is at [this link](#).

Amazon bought **Zoox** in June 2020 for over US\$1 billion. Speculation was rife at the time that Amazon's intent was to acquire technology for developing its own driverless delivery vehicles. Zoox has now been granted a permit by the *California Department of Motor Vehicles* to test its driverless vehicles in a limited area near its headquarters in Foster City, California. Zoox is only the fourth company to be granted such a permit in California. The others are Waymo, AutoX and Nuro. More information is at [this link](#).

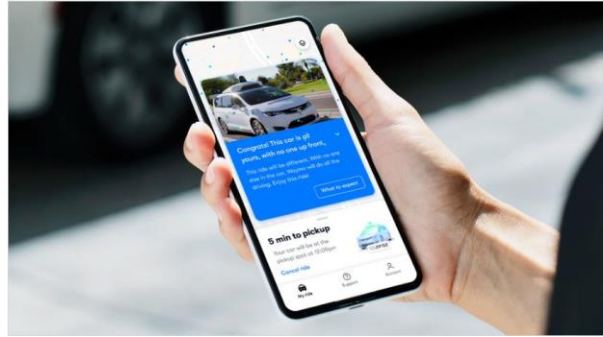
On a somewhat related subject, on October 15, 2020, the self-driving division of **GM – Cruise**, was granted a licence by the same California agency to operate its electric autonomous vehicles without a safety driver onboard. The company's CEO – Dan Ammann – indicated that Cruise will be deploying its unmanned automated vehicles in the city of San Francisco before the end of 2020. More information is at [this link](#) or [this link](#).

In another development, on October 21, 2020, **Cruise** announced it would seek U.S. regulatory approval in coming months to deploy a limited number of *Cruise Origin* vehicles without steering wheels or pedals. More information is at [this link](#).

On October 3, 2020, **Forbes** magazine published an article titled *Tire Blowouts Could Cause Self-Driving Cars to Go Astray*. The author delves deep into how an AV and its controlling AI might handle a blown tire. These can take the form of smart tires packed with sensors to inform the AI that the tire has developed a problem. However, this can produce a false positive or a false negative and the AI needs to be capable of dealing with either situation. The article compares how a human driver and an AI-driven vehicle would handle such a situation. The Forbes article can be viewed at [this link](#).

The **European New Car Assessment Programme** (Euro NCAP) is a voluntary car safety performance assessment programme based in Belgium. Its method of assessment consists of two main areas: *Assistance Competence*, based on the balance between driver engagement and vehicle assistance, and *Safety Backup*. Applying this methodology to ten select vehicles for determining the overall efficacy of driver assistance systems, the **Audi Q8** was rated as the top vehicle among the ten contenders. Details about the methodology and vehicle rankings at Euro NCAP's site at [this link](#).

On October 8, 2020 and through a blogpost, the CEO of **Waymo** (John Krafcik) announced that Waymo has opened up its driverless ride-hailing service to the general public. Till now, the service was only available in the Phoenix area to a select group of *early riders* who had agreed to sign a *Non-Disclosure Agreement* (NDA) with Waymo. Mr. Krafcik credits advances made in driverless



technology for this decision. Members of the public can request a driverless ride through Waymo's app. The app, available on Apple's App Store or the Android Play Store, will feel familiar to anyone who uses Uber or Lyft, and the service is comparable in cost. You plug in your destination and you get a price and ETA. The blogpost can be viewed at [this link](#).

Staying with **Waymo**, a veteran journalist covering automotive sector with an eye on AVs, took a ride in a Waymo driverless *Chrysler Pacifica* in Chandler, Arizona recently. He gives a detailed account of what it is like in riding such a vehicle. There is a lot of discussion of the effort Waymo has put in the *User Experience* (UX) for the riders to put them at ease. This includes audio/visual cues as well as being able to speak to a live person at Waymo's control centre if necessary. The article can be viewed at [this link](#).

General Motors (GM) has announced a US\$2.2 billion investment plan to retool its Hamtramck plant located in Detroit for building electric and autonomous vehicles. Dubbed *Factory Zero* – its aim is to produce vehicles with zero emissions, zero crashes, and zero congestion. Among the vehicles to be built at this plant will be **Cruise Origin**, a shared electric self-driving vehicle unveiled last year. More information is at [this link](#).

Trucking automation start-up **Plus.ai** is one of the first companies in the self-drive ecosystem to submit its products for independent testing to a reputable testing organization. The testing body is the **Transportation Research Centre** (TRC) located about 78 Km northwest of Columbus, Ohio. Traditionally, TRC tests vehicles in areas such as safety, energy, fuel economy, emissions, durability, noise, crash, crash simulation, and performance using their 12 Km long four lane oval test track. They have recently built a new *SMARTCenter* research complex specifically designed for testing automated and connected vehicles -- both passenger cars and heavy trucks. Plus.ai believes that independent testing of its driverless technology by TRC creates more trust among various regulators, customers and the general public. More information is at [this link](#).

UK's **Loughborough University** was the winner of a £1 million (US\$1.3 million) competition by **Highways England's** *Innovation and Air Quality* competition. The funds will be used for a project focused on preparing the UK's motorways for CAVs. This will be achieved through evaluating how road layouts and construction zones affect their

operational boundaries, such as their ability to sense lanes and make appropriate decisions. More details are at [this link](#).

Oak Ridge National Laboratory (ORNL) is the largest US Department of Energy science and energy facility. Among its many activities, it has now created a new *Connected and Automated Vehicle Environment (CAVE)* for testing virtual approximation of physical assets fed by real-world hardware and data. This technique is known as a *digital twin* and is a popular technology in other areas such as aerospace. The digital twin aided by artificial intelligence allows scientists to study and model physical systems and how they will respond under different scenarios. More information is at [this link](#).

Trombia Technologies is a Finnish company claiming that it has developed the world's first full power, electric and autonomous street sweeper. Dubbed *Trombia Free*, the automated street sweeper is an all-weather machine using Lidar and machine vision technology as its main sensors. According to the company, *Trombia Free* uses less than 15% of the energy used by a conventional diesel-powered sweeper. More information is at [this link](#). A short video of the automated sweeper can be viewed on YouTube at [this link](#).



The UK's **Meteorological Office**, abbreviated as the *Met Office*, has long collaborated with road and transportation agencies to provide weather and road information to motorists. The *Met Office* has developed an interest on how automated vehicles might operate in UK's changeable weather that can often hover between fog, mist, drizzle, rain, and snow. These can be challenging environments for AVs and their associated sensors and software. The *Met Office* has expressed an interest in working with the AV industry to address these challenges. More information is at [this link](#).

And finally, another article on the ethics of autonomous vehicles from driving.ca. The article recasts the old **trolley problem** first posed by the American philosopher *Judith Jarvis Thomson* in 1976 by asking who should be responsible for the ethical decisions that a future AV may have to make in the context of a trolley problem dilemma, i.e. who survives and who dies. Choices are 1) government mandated rules, 2) ethical rules by

AV manufacturers, and 3) by individuals in line with their own ethics, morals, and judgement. The article can be viewed 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 2021. This keeps us busy because people understand that CAVs will have an impact on almost everything. On the one hand, our 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

Upcoming CAV-Related Events

Nov 3-6, 2020: [UC20 Remote: Unmanned Systems Canada's annual conference](#) (online.)

Nov 2, 2020: Deadline for Call for Papers for [IEEE Vehicular Technology Conference 2021-Spring](#).

Nov 16-18, 2020: [Canadian Parking Association Annual Conference and Trade Show](#), Montreal (hybrid event)

Nov 16-17, 2020: [Car.HMI and Tech.AD USA 2020](#), Detroit MI

Nov 18, 2020 [Accelerating ADAS: AV R&D Paving the Fast Lane for ADAS](#) (virtual)

Nov 18-Dec 16, 2020: [IEEE Vehicular Technology Conference 2020-Fall](#) (virtual)

Dec 8-9, 2020: [Autonomous Vehicles 2020](#); Long Beach California

Jan 6-9, 2021 [Consumer Electronic Shows](#) (CES), Las Vegas NV

Feb 21-24, 2021: [Ontario Good Roads Association Annual Conference](#); Toronto ON

Apr 2021: [ADAS Sensors 2021](#), Detroit MI

Apr 25-28, 2021: [IEEE Vehicular Technology Conference 2021-Spring](#), Helsinki, Finland.

Jun 20-23, 2021: [ITS Canada 2021 Conference](#)

Dec 14-17, 2021: [UITP Global Public Transport Summit](#); Melbourne, Australia

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

Chief Editor: Ahmad Radmanesh
Contributor to this issue: Barrie Kirk

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We welcome all comments; please send them [here](#)

CAVCOE (formerly the Canadian Automated Vehicles Centre of Excellence) provides advice to the public and private sectors to help plan for the arrival of self-driving vehicles.

CASPI (the Canadian Automated Snow Plow Initiative) is an association for all stakeholders involved in winter operations and maintenance of sidewalks and trails.

300 Earl Grey Drive, Suite 222, Ottawa ON K2T 1C1, Canada.

info@cavcoe.com www.cavcoe.com

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