

CAV Update

November 2020

From the Editors

Tis the season for webinars and we want to draw to your attention to the **CAV Canada 2020 Digital Event Series**. The first event was a big success, and the next two are in early December:

- **Wednesday December 2:** there are three sessions featuring innovation leaders discussing CAV innovation and investment.
- **Wednesday December 9:** there will be a panel session moderated by Barrie Kirk on the impact of CAVs on the general public, followed by a panel on the impact of CAVs on communities.

More details are [here](#), and you can register [here](#) to get your free tickets. Participants will also receive access to recordings from the entire conference.

Canadian CAV News

Following a 10-month pilot project, **Loblaw Companies Ltd.** announced a multi-year partnership with the AV developer **Gatik** for deploying automated trucks for transporting goods from its warehouses to its retail locations in the Greater Toronto Area (GTA). Starting in January 2021, up to five Ford Transit 350 box trucks outfitted by Gatik's automated system will be deployed on five fixed routes. The service will be 7 days a week for up to 12-hours per day. More information is on Loblaw's site at [this link](#).



Back in 2017, **General Motors (GM)** donated a Bolt electric vehicle to eight universities. This included the **University of Toronto**. The universities were tasked with making these vehicles self-driving through student-led teams. An annual competition was held to see which teams had made the best advances in vehicle automation. For the third year running, the 50-strong student team from the U of T was placed first in this annual competition. Due to the pandemic, this year's competition was held virtually through computer simulations. Details are at the U of T site at [this link](#).



GM Canada has started construction and paving work at its *McLaughlin Advanced Technology Track* in Oshawa, Ontario. The target completion date is Spring 2021. This 55-acre site will support GM's efforts in developing software and hardware for advanced vehicle systems including vehicle motion embedded controls, advanced driver assistance systems (ADAS) and autonomous vehicle systems. This facility (see below) is one of the four sites that form GM's *Canadian Technology Centre (CTC)*. GM Canada's other R&D facilities are in Markham ON and its cold weather testing site at Kapuskasing ON. Altogether, about 900 people are employed by GM's CTC. More information is at GM's site at [this link](#).



On November 17, 2020, Edmonton-based **Stantec** announced the formation of a new business unit devoted to automated vehicles. The initiative dubbed *GenerationAV* is a consulting service aimed at organizations planning to study or deploy AVs in their jurisdictions. Stantec has partnered with a number of specialist firms to assist in the new venture. UK company **dRisk** (expertise in AI and AVs), software firm **Icarus** and AV

specialist **POCO Labs** are some of the firms named by Stantec in its announcement. More information is on Stantec's site at [this link](#).

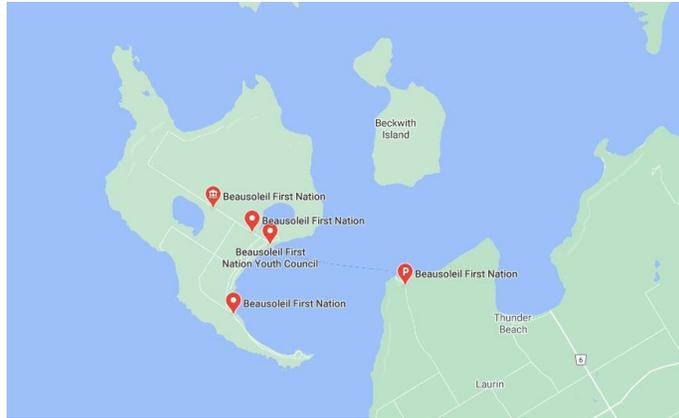
Marie-France Laurin, a friend and colleague to us in CAVCOE, is the new Director of Business Development for *GenerationAV*. Congratulations Marie-France and our best wishes.

Earlier this year, U.S. based **Raven Industries Inc.** completed its acquisition of Regina-based **DOT Technology Corp.**, a high-tech firm specializing in automated farming machinery. Raven has now announced plans for opening a new location near Regina as *Raven Applied Technology's Canadian Headquarters*. This 5-acre site will be used for machine production and testing. Raven has partnered with **Economic Development Regina** to promote precision and autonomous agriculture in Saskatchewan and elsewhere. More information is at Raven's site [this link](#). See another story on farming automation in the *International* section below.

In related news, the **Financial Post** (FP) of November 12, 2020 reported that **Telus Corp.** is making a significant investment in agricultural technology. Part of the reason for this is the need for connectivity for automated farming machinery. According to this report, in 2019 Telus has acquired seven agriculture technology related businesses in Canada, U.S. and UK. Details are at the FP's site at [this link](#).

Vancouver-based **Sierra Wireless** has announced the development of world's first multi-network 5G vehicle router (model MG90 5G). Initial applications are expected to be for first responders, field service and transit applications. The new device will utilize existing 4G infrastructure and automatically connect to 5G networks as they become available regionally. More information is on Sierra Wireless site at [this link](#).

On October 16, 2020, **Transport Canada** granted a *Special Flight Operation Certificate* (SFOC) to **Drone Delivery Canada** (DDC) to enable it to begin automated flight operations *Beyond Visual Line-of-Sight* (BVLOS). These are commercial Covid-19 flights for the **Beausoleil First Nation** (BFN) located in Simcoe County ON. The two-way flights will be between BFN's location on the mainland and BFN's locations on *Christian Island* – about 5 Km to the northeast over water. More information is on DDC's website at [this link](#).



Another Canadian company has its eye on the delivery robot business. Calgary-based startup **Dianomix** has developed a semi-autonomous delivery robot dubbed *Robox*. This robot travels on sidewalks and is intended for delivering groceries and other goods from nearby stores to homes. At present, the delivery robot is operating in only one community in Calgary. The developers indicate that they are working towards full autonomy for this product. More information can be viewed at [this link](#).



In October 2020, Ontario's **Autonomous Vehicle Innovation Network (AVIN)** in collaboration with **Deloitte** published a 92-page report titled *AVIN Ecosystem Analysis and Roadmap 2020*. The automotive sector is vital to Ontario's economy. The Province is home to five global automakers as well as 700+ parts manufacturers. In 2019, the sector produced over 1.9 million vehicles. The value of auto-related exports was almost \$71 billion. The report recognizes the importance of CAVs and gives a good overview of Canadian and international advances in the CAV field. This comprehensive report focuses on four main areas: legislation and policy; economic development; research and development, and talent development. The report can be viewed or downloaded at [this link](#).

Due to the popularity of **Driver Assistance Systems** (ADAS) in newer vehicles, **Transport Canada** has set up a website to provide basic information on the capabilities and limits of these technology driven systems. Some of the systems covered are:

- Lane departure warning*
- Lane keeping assistance*
- Automatic emergency braking*
- Blind spot warning*
- Driver monitoring*
- Collision warning*
- Parking assistance*
- Remote parking assistance*

There are also short educational videos on the site. More information is on Transport Canada's site at [this link](#).

CASPI News

New Member

CASPI is pleased to announce that **Invest Ottawa** has become the most recent addition to the CASPI membership. Welcome Invest Ottawa!

CASPI members benefit from: building the Canadian ecosystem for automated snow plows for sidewalks and trails, customized research reports, education on trends and issues, participation in the annual university student snow plow competition, an enhanced profile within the industry, networking, the member directory and discount pricing on sponsorships and trade show. For membership details click [here](#).

Research

Through CASPI's partnership with CAVCOE, research into utilizing automated snow plow technology in municipal winter operations will also be made available to CASPI members. This, and future research reports, will benefit members in strategic and operational decision-making, saving them time and money.

2021 Student Snow Plow Competition

CASPI has received interest from 11 teams from British Columbia to Newfoundland and Labrador. This competition - the third in the series - is truly national in scope. The competition will take place May 15-16, 2021.

Ontario Good Roads Association

OGRA presented its Winter Maintenance Operations Training Workshop on November 5. CASPI's CEO Barrie Kirk, participated and presented in it. Barrie informed the audience of the scope of automated technologies presently incorporated in sidewalk maintenance and advised them of future opportunities as the ecosystem grows. OGRA's membership consists of most of Ontario's 444 municipalities.

Information and Communications Technology Council

Barrie Kirk also participated in the ICTC webinar on October 27 and discussed non-passenger CAVs, including automated snow plows and how the issues related to safe interaction with obstacles while adhering to standards.

International CAV News

In the August 2020 issue of *CAV Update*, we reported on an article by Dr. Egil Juliessen titled *Connected Cars: Let Me Count the Ways*. In a follow-up article titled *AV Software Platforms: More Partners & Rivals* published in *eetimes.com* on October 15, 2020, he writes about all the major companies involved in developing software and hardware used in the AV industries. He covers the major U.S. firms such as **Nvidia, Amazon-Zoox, Motional, Uber, Lyft, Tesla, Apple** as well Chinese firms such as **Baidu Apollo, AutoX, Pony.ai** and **WeRide**. Development work by Russian firm **Yandex** is also mentioned in the article. A graphic in the article illustrates all the present and past relationships among these companies and auto OEMs. The article can be viewed at [this link](#).

Australia-based **SwarmFarm Robotics** has been active in farm machinery automation since 2012. The firm started developing automated machinery at their own farm in Queensland; located about 800 Km northeast of Brisbane. The equipment got increasingly more sophisticated over the years and now includes automated machines for crop protection, mowing, slashing and other farming tasks. For more information on the technology and products, visit SwarmFarm's website at [this link](#).

BBC's technology program *Click* featured SwarmFarm in one of its recent episodes. The BBC report can be viewed on YouTube at [this link](#).



On October 23, 2020, **slate.com** published an article titled *Will Robotic Trucks Be "Sweatshops on Wheels"?* It focuses on how the future of automated trucks will be determined by policy and regulations rather than by advances in self-drive technology. It does a deep dive into how deregulation and technology have greatly disrupted trucking and freight industries since deregulation occurred in the 1980s. Trucking companies appear to be keen on self-driving trucks to lower their operating costs. However, there are many human aspects of trucking that needs to be considered before automation can get a foothold in a meaningful way in the industry. The article can be viewed at [this link](#).

Waymo is generally believed to be a leading company in bringing AVs to market. Safety aspects of AVs are always at the top of the list of all AV developers. To this end, in October 2020, Waymo published a 30-page report on how it goes about ensuring its AVs are as safe as possible. The document is titled *Waymo's Safety Methodologies and Safety Readiness Determinations*. The methodology is based on established engineering processes and address new safety challenges specific to Automated Vehicles. Waymo's safety document can be viewed or downloaded at [this link](#).

Waymo also released additional information on the actual number of incidents that its AV fleet has been involved in. Since 2019, it includes 18 incidents that Waymo describes as minor. According to the data, the Waymo vehicles in Phoenix had minor incidents for about once every 339,000 miles (546,000 Km) traveled and another 29 incidents were avoided with the intervention of a safety driver. That amounted to once in every 210,000 miles (338,000 Km). More information is at [this link](#).

Staying with AV safety, in October 2020, **RAND Corporation** published a 143-page report titled *Safe Enough: Approaches to Assessing Acceptable Safety for Automated Vehicles*. This report was based on previous work in 2017 undertaken by RAND Corp. at the request of the **Uber Advanced Technology Group**. Many AV industry participants, stakeholders and the public were consulted in the preparation of this report. RAND also did a review of relevant literature. The report can be viewed or downloaded at [this link](#).

Food and grocery delivery company **DoorDash** filed for IPO on November 13, 2020. The company's valuation has gone from US\$1.8 billion in 2018 to US\$16 billion today. In common with similar businesses, DoorDash believes autonomous vehicles and delivery drones are part of its future business model. In 2019, DoorDash partnered with GM's self-driving division **Cruise** to experiment with deliveries using Chevy Bolt vehicles operated by Cruise. More information at [this link](#).

The popular automotive site **edmunds.com** published an article titled *Where are our self-driving cars?* According to this article, three main challenges have prevented AVs from going mainstream. They are: (a) how safe AVs need to be, (b) who will pay for the necessary city and vehicle infrastructure, and (c) the old issue of liability if an AV has a mishap. On the safety issue, one study indicated that to be 95% certain that autonomous vehicles match the safety of human drivers, the cars would need to log 275 million failure-free autonomous miles (443 million kilometres). Furthermore, to prove that autonomous vehicles are 10% or 20% safer than humans, the requirement jumps to billions of miles. The article can be viewed at [this link](#).

Another area targeted for automation are yard facilities such as freight yards, ports, warehouses, etc. Colorado-based **Outrider** is a firm focused squarely on this market. It has developed electric AVs specially designed for common yard tasks such as coupling a tractor to a trailer, precisely maneuvering between dock doors, parking spots, and areas for over-the-road pickup. In this, it has managed to automate hazardous,

repetitive, and manual tasks. It has also raised US\$118 million in venture capital so far. More information on Outrider's website at [this link](#).



Chinese e-commerce company **Alibaba** is experimenting with delivery robots in China through its logistic arm *Cainiao*. The last-mile delivery robots can transport 50 packages at a time and cover 62 miles (100 Km) on a single charge. This effort is mainly focused on communities, campuses and business zones. Alibaba is estimating that the robot can deliver as many as 500 packages a day. More information is [this link](#).

In October 2020, Maryland-based **Robotic Research LLC** published a 10-page document titled *Automated Bus Rapid Transit: A New Mode for High- Quality, High-Capacity Transit Corridors*. Part of the motivation for this research is the current Covid-19 pandemic and its negative impact on public transportation. The paper suggests that *Automated Bus Rapid Transit (ABRT)* can help public transportation leaders in deal with uncertain future demand, funding shortfalls, and competition from new services and technology. The paper can be viewed or downloaded from [this link](#).

And finally, another organization to pilot automated passenger shuttles is the **Yellowstone National Park** in Wyoming. The intent is to test emerging automated vehicle technology in a national park context and to determine AVs effectiveness in reducing the environmental impact of visitors while keeping the park accessible to the public. Traffic in the park has gone up almost 40% over the last 12 years. This pilot project started in May 2020 and will run until August 2021. The AV partner for this project is **Beep**. 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 2021. 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

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.

May 3-6, 2021: [Association for Unmanned Vehicle Systems International \(AUVSI\) 'XPONENTIAL'](#), Atlanta GA

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

October 11-15, 2021: [ITS World Congress](#), Hamburg, Germany

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, Glenn Martin

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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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