

CAV Update

A monthly newsletter
on the CAV ecosystem

January 2021

From the Editors

In an interesting development, the **Toronto Transit Commission** (TTC) has added a new option to the discussions about the future of mass transit in Canada. A new TTC report – mentioned below – describes the advantages of using a fleet of electric buses in *platooning mode*, as a possible alternative to light rail systems that require extensive infrastructure. The trend towards battery electric buses also means that platooned bus fleets could be used in tunnels that were designed for LRT trains. Another advantage is that the buses can travel around suburban neighborhoods in ways that LRT trains cannot. The TTC report notes other potential benefits: “*enhanced safety, lower emissions, improved operational flexibility, and significantly lower capital and operating costs when compared to light rail transit*”. A very interesting development!

Canadian CAV News

On December 14, 2020, Ontario’s **Autonomous Vehicle Innovation Network** (AVIN) published a 29-page report titled *Smart Mobility & the Future of Cities, Opportunities & Readiness Tactics*. This report is aimed at Canadian municipalities to assist them in preparing their jurisdictions for the CAV era. It covers topics that cities should keep in mind while planning for and developing new transportation assets and regulations to avoid costly changes later. It makes a good point that there is no single readiness plan that fits all cities, and that each city should plan for the changes in alignment with their existing assets and vision. AVIN’s report can be viewed/downloaded at [this link](#).

Staying with municipalities, the **Ontario Good Roads Association** (OGRA) has published the results of an extensive Autonomous / Connected Vehicles’ survey of Ontario municipalities. Conducted in 2020, over 80 municipalities participated in the survey. A slide deck with the survey results is [here](#).

As mentioned above, the **Toronto Transit Commission** (TTC) has published a 36-page document titled *Fleet Procurement Strategy and Plan*. Among other things, the plan includes *platooning buses* as part of its future technologies. TTC highlights some of the benefits of this technology such as enhanced safety, lower emissions, improved operational flexibility, and significantly lower capital and operating costs when compared to Light Rail Transit (LRT) which requires expensive rail line infrastructure. In 2021, TTC plans to engage the market to seek a partnership with a bus manufacturer in a demonstration trial that would advance this technology. More information is at [this link](#). A copy of TTC’s *Fleet Procurement Strategy and Plan* document can be viewed/downloaded from TTC’s site at [this link](#).



Edmonton-based **ACAMP** has partnered with **Telus** to incorporate advanced wireless communication technologies for the autonomous *All-Terrain Vehicle* (ATV) developed by ACAMP and deployed as an autonomous perimeter security sentry at **Edmonton International Airport** (EIA). ACAMP plans to use Telus technology to test edge computing and IoT applications using the autonomous ATV as a platform. This includes testing and developing innovative new products using 5G. More information is at [this link](#).



A recent article titled *Automated driving will end car insurance as we know it* was published on *LinkedIn* by Vancouver-based AV safety startup **Collisure**. The article discusses the historical basis for determining insurance rates for drivers and examines how this might migrate to a *Usage Based Insurance* (UBI) system and ultimately to automated vehicles. The article can be viewed on LinkedIn at [this link](#) or [this link](#).

Staying with insurance, **Usage Based Insurance** (UBI) technology has been around for at least a decade in the U.S. and other countries. It is about to make a debut in Canada with **Alberta** leading the way. The Alberta Government has introduced *Bill 41* to reform auto insurance regulations in that province. This includes a provision for UBI. As expected, some privacy advocates have major concerns on how data collected by insurance companies will be used. In UBI, insurance companies can monitor driving behaviour such as how fast you drive, how quickly you accelerate, how hard you brake, how often you drive, what time of day you drive, where you drive, and so on. Good drivers could enjoy a lower premium and not so-good drivers could face a higher premium. More details are at [this link](#). Also, see another car insurance story from **RAND Corporation** in the *International AV News* section below.

CASPI News

The big, fluffy white stuff has finally arrived, making us wish that automated technologies were available to help with snow and ice management for home owners, municipalities, parks, trails, and other private and public end users. We are getting closer as CASPI continues to strive toward building the Canadian ecosystem for these technologies, bringing together equipment manufacturers, service providers, municipalities, researchers, and regulators.

CASPI is pleased to announce that **Provectus Robotics Solutions** has become the most recent addition to the CASPI Corporate membership. Welcome Provectus Robotics Solutions! Here is a corporate profile:



Provectus Robotics Solutions Inc. is an industry leader in advanced robotic system design, integration, and control. Located in Ottawa, ON, Canada, the company delivers robotic control software and services to the aerospace, agricultural, industrial, mining, military, and security industries. Since 2010, Provectus has participated in design and development activities on many different robotic platforms, while delivering systems to customers worldwide. Provectus' experience and mature technology base are why it is the preferred development partner for robotic system integrators all over the world. More information is [here](#).

We would add that Provectus was actively involved in the first CASPI Student Snow Plow Competition. The **Carleton University** team borrowed Provectus equipment and converted it into a snow plow, as you can see in the photo. (The competition was held in Ottawa in May 2019. Garden mulch was an excellent substitute for snow!)



Plans for the May 2021 virtual Student Snow Plow Competition are progressing. As COVID-19 continues to rage through society, the judges met to revise the requirements for the virtual presentations. This will minimize student interaction and focus on the technical aspects of their designs, rather than the operation in a physical competition. The revised Concept of Operations (Conops) will be sent to the teams soon. The deadline for technical papers has been extended to February 7.

Sponsorship opportunities for this event are available. Please contact gmartin@caspi-icda.com for details.

We would like your input! The outreach work CASPI has undertaken in the CAV sector has provided valuable, constructive feedback to the CASPI executive team. As a result, we have organized a strategic planning meeting in February. Questions under consideration include whether CASPI should remain focused only on sidewalk winter maintenance, or expand its scope to include other automated technologies for non-passenger, urban applications such as grass cutting, sidewalk inspections, deliveries, garbage collection, etc. We welcome your thoughts on this topic; please send them to gmartin@caspi-icda.com

International CAV News

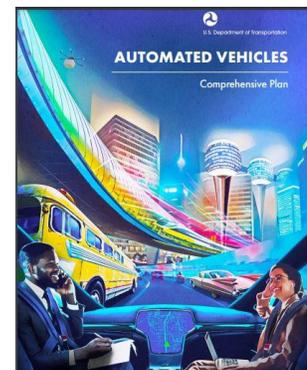
Teleoperation is being used by many companies active in autonomous vehicle development. The **National Institute of Standards & Technology (NIST)**, a division of the **U.S. Department of Commerce** has its eye on this technology and its potential applications. Teleoperation is playing an important role in helping self-driving cars navigate through unusual and difficult situations and providing emergency assistance to them. Teleoperated vehicles can also provide new services such as teleoperated taxis and teleoperated delivery services. Teleoperation will also help other organizations, such as law enforcement officers, automotive technicians, and parking attendants interact with automated vehicles. For these reasons, NIST organized a forum on vehicle teleoperation with the participation of many industry experts and government regulators. In all, twelve sessions were held on the various facets of teleoperation technology. All these sessions are available for viewing on NIST's site at [this link](#).



The **United States Department of Transportation (USDOT)** has published a 167-page report titled *Intelligent Transportation Systems Deployment - Findings from the 2019 Connected and Automated Vehicle Survey*. The report summarizes findings from the 2019 CV/AV survey sent to freeway, arterial, and transit agencies from 78 large metropolitan areas and 30 medium-size cities. The survey was conducted to provide baseline data on the current state of CV and AV readiness and deployment. The report can be viewed/downloaded at the USDOT's site at [this link](#).

Staying with **USDOT**, on January 11, 2021, the Department published a 38-page report titled *Automated Vehicles – Comprehensive Plan*. This is the fourth report on AVs published by USDOT since 2017. The intent of these reports is to support the safe integration of *Automated Driving Systems (ADS)* into the surface transportation system in the U.S. The report details three main initiatives by USDOT to achieve this goal:

- Promoting Collaboration and Transparency
- Modernizing the Regulatory Environment
- Preparing the Transportation System



More information is at [this link](#). The USDOT report can be viewed/downloaded at [this link](#).

In a similar initiative, in December 2020, Australia's **Austrroads** and **National Transport Commission** published a 24-page report titled *Guidelines for trials of automated vehicles in Australia*. The guidelines provide a flexible mechanism to encourage innovation while maintaining safety. They aim to accommodate a range of different automated vehicle technologies and applications. For example, the report makes a distinction between small scale pilot projects such as a single, low-speed, driverless shuttle on a set route, and for example, a fleet of heavy vehicles on a highway. The report can be viewed/downloaded at [this link](#).

In yet another move to remove barriers for the development of AVs, on January 13, 2021, the U.S. **National Highway Traffic Safety Administration** (NHTSA) published a 147-page ruling titled *Occupant Protection for Vehicles With Automated Driving Systems (ADS)*. The purpose of this final ruling is to exempt AVs from certain regulations governing vehicle safety. One reason for this ruling is the absence of conventional vehicle controls such as a steering wheel, and accelerator and brake pedals. This final rule is limited to the crashworthiness standards and provides a unified set of regulations for vehicles with and without ADS functionality. More information is at [this link](#). NHTSA's document can be viewed/downloaded from [this link](#).

In a recent interview with the UK's **Financial Times** (FT), **Waymo's** boss John Krafcik described the rollout of driverless cars as an *extraordinary grind*. Back in 2018, Waymo was hoping to have 20,000 Jaguar and 62,000 Chrysler Pacifica vehicles on the road by 2020. They did not even come close. Waymo reportedly has a fleet of only 600 vehicles in operation at present. Mr. Krafcik attributes this to underestimating the difficulty of developing a reliable driverless car and inexperience. Waymo's focus is now squarely on developing its *Waymo Driver* software which can be adapted to various vehicle platforms. To this end, Waymo has signed partnership agreements with **Volvo**, **Fiat Chrysler Automobiles**, and **Daimler** for articulated trucks. More information is at FT's site at [this link](#) or [this one](#).





In December 2020, the **RAND Corporation** published a 108-page report titled *Autonomous Vehicles and the Future of Auto Insurance*. This major report examines the impact that the widespread deployment of autonomous vehicles could have on automobile insurance in the United States. To this end, RAND Corp. interviewed 43 subject-matter experts from 35 stakeholder organizations and conducted an extensive literature review. A key finding was that the existing automobile insurance system in the U.S. should be sufficiently flexible to accommodate the introduction of AVs. Furthermore, most of the experts predicted that AVs would be deployed in a fleet ownership model, although their predictions regarding the specific formulation of fleet ownership differed. The RAND Corp report can be viewed/downloaded at [this link](#).

On December 18, 2020, **The Law Commission of England and Wales and the Scottish Law Commission** published a 392-page document titled *Automated Vehicles: Consultation Paper 3 – A regulatory framework for automated vehicles*. This major work is a big step in formulating laws and regulations governing future self-driving cars in the UK. The commissions have been working on this for nearly three years. Two notable items in the latest report are the concept of *user-in-charge* to describe a former driver once the vehicle is driving itself. The other is lessons from the aviation sector, advocating a *no blame culture*. This will increase the quality of safety aspects over time while applying regulatory sanctions where appropriate. More information is on the Law Commission's site at [this link](#). A copy of the report can be viewed/downloaded at [this link](#).

Two major Chinese companies **Geely** and **Baidu** have signed an agreement to jointly work on *smart cars* of the future. Geely is one of China's largest carmakers; it owns Volvo and has a stake in Mercedes-Benz owner Daimler. Baidu has invested heavily in developing its own self-driving technology since 2017 when it created its self-driving business unit *Apollo*. The two companies envision combining Baidu's expertise in smart transportation, connected vehicles and autonomous driving with Geely's expertise as a leading automobile and EV manufacturer to take on rivals such as Tesla. More information is at [this link](#).





In a departure from the rest of the AV industry, **Waymo** has decided to ditch the term *self-driving* in favour of *autonomous driving*. The objective is to differentiate the fully autonomous technology Waymo is developing from driver-assist technologies (sometimes erroneously referred to as ‘self-driving’ technologies) that require oversight from licensed human drivers for safe operation. Although **Tesla** is not specifically mentioned by Waymo in its announcement, it appears that the intent is to distinguish itself from Tesla’s autopilot technology. More details are at [this link](#).

Amazon-owned Zoox recently unveiled its *robotaxi* prototype. This electric autonomous vehicle is designed from ground up to be a robotaxi carrying up to four passengers. Capable of speeds of up to 120 Km/h, it has bidirectional driving capabilities and four-wheel steering. This enables it to maneuver through tight spaces and changing directions without the need to reverse. The vehicle has no steering wheel and uses a 133 KWh battery able to operate for up to 16 hours on a single charge. More information is at [this link](#). A two-minute video of the Zoox AV in action can be viewed on YouTube at [this link](#).



Since 2014, the media has been abuzz with rumors that **Apple Inc.** is developing its own autonomous vehicle. In the latest iteration of this, it is reported that Apple intends to have some sort of AV on the market by 2024. Apparently, Apple intends to build a personal vehicle for the mass market. This is in contrast with rivals such as Waymo, which are aiming at fleet operations and robotaxis. Reports also speak of Apple’s efforts to introduce breakthrough battery technology for powering its vehicles. More information is at [this link](#).

On January 13, 2021, the website *Ars TECHNICA* published an article describing the three-way race between **Mobileye**, **Tesla** and **Waymo** for bringing self-driving technology to a mass audience. Mobileye and Tesla advocate for an evolutionary method of achieving true self-drive capability through incremental advances in *Advanced Driver Assist Systems* (ADAS) while Waymo’s belief is that a self-driving car needs to be designed from ground up as such a vehicle. More details are at [this link](#).

And finally, in a December 2020 article in **Forbes** magazine titled *What the EV and AV Community Wants From a Biden Administration*, the author advocates that the new Administration appoint an *Autonomous/Electric Vehicle Czar* to accelerate the pace of



development in EV and AV industries. The article argues that EV/AV adoption will increase equity in the transportation sector and be a positive for the environment. The Forbes article can be viewed at [this link](#).

Upcoming CAV-Related Events

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](#)

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

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

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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CAVCOE (formerly the Canadian Automated Vehicles Centre of Excellence) advises the public and private sectors on planning 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.

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