

CAV Update

A monthly newsletter
on the CAV ecosystem

May 2021

From the Editors

As the impact of COVID-19 slowly diminishes, we are seeing a resurgence in planning hybrid conferences and even physical conferences in the medium term. Both parts of this are obviously excellent news. And linked to this, we are seeing more requests for speaking about CAVs at these conferences. We are now booking through to the end of this year and into 2022. If you are planning a conference and are interested in a presentation on CAVs, please contact us at speakers@cavcoe.com

Canadian CAV News

A little-known Canadian gem is the winter weather testing that is being conducted in **Thompson**, Manitoba. Real-world winter testing is going to be a very important strategy for CAV development and testing, as well as their safety.

It got started 12 years ago when **Rolls-Royce** and **Pratt & Whitney**, well-known competitors in the jet engine business, decided to cooperate on building and operating an engine test facility in Canada.



Photo © MDS AeroTest

The **National Research Council** (NRC) evaluated 12 potential sites and concluded that Thompson MB was the best place in Canada for winter weather testing. A new company, **MDS AeroTest**, was formed to operate the GLACIER test facility. Since then, a full array of companies use Thompson's low cost, real-world ecosystem including: **Ford, Jaguar Land Rover, Honda, Hyundai, Kia, BMW, Porsche, Bombardier Aerospace**, and heavy equipment and snowmobile manufacturers.

CAVCOE, in association with KGS Group and Stiletto, has been helping Thompson with planning the future of winter weather testing. One interesting fact that has emerged is that the duration of the winter testing season is crucial. Records show that Thompson averages 222 days a year when the temperature is below zero, and there is snow cover



for up to six months. One data point is that on a late May morning, it is +9 deg here in Ottawa, and it is still below freezing in Thompson!

Real-world winter testing is going to be a crucial strategy for CAV development and testing, sensor development, as well as overall CAV safety.

For more information, please write to winterweather@cavcoe.com

The **Canadian German Chamber of Industry and Commerce** is organizing a two-day virtual *Canadian German Conference on Sustainable Mobility, Connected and Autonomous Driving, and E-mobility*.

The conference will take place on June 15-16, 2021, 9:00am-12:30pm ET, and will bring industry leaders, academic and research institutions, government organizations and regulatory bodies together under one platform.

The conference will include keynote speeches from Canadian and German industry leaders. It will also include the following panel discussions with leading Canadian and German companies:

- Benefits & Challenges in Autonomous Driving
- Sustainable Mobility in Urban Areas
- EV Charging-Infrastructure for Mass-Scale Adoption
- EV Battery & Drive Technology

CAVCOE's Barrie Kirk will be speaking at this event.

To learn more about the program and/or to register, please click [here](#).

Since the Fall of 2018, **Transport Canada** and an advisory group made up of experts from the industry, academia, municipalities, provincial agencies, a number of consultants (**CAVCOE** included) and other stakeholders have been working on a project titled the *Vehicle of the Future*. The broad aims of this project was to to address safety and security; economic growth and development; employment and skills; privacy; the environment; social equity and accessibility; insurance and liability in the context of new vehicle technologies such as connected and automated vehicles, electrification, and on-demand mobility. Transport Canada has now published a synopsis of this study on its website; it can be viewed at [this link](#).

Another study supported by **Transport Canada** explores what needs to be done to make traffic control devices effective for autonomous vehicles. The 17-page report is titled *Traffic Control Devices: Considerations to Support Automated Vehicle*



Deployment and was published in April 2021. Using the *National Committee on Uniform Traffic Control Devices* (NCUTCD) as a reference document, the report focuses mostly on lane marking, traffic signals, work zone and traffic signage. The report can be viewed/downloaded at [this link](#).

On May 5, 2021, **The City of Ottawa's Traffic Services** presented a 17-page report titled *Intelligent Transportation Systems and Connected and Automated Vehicle Update 2021* to that City's *Transportation Committee*. The report detailed a number of technology projects that the City's *Transportation System Management* group are working on. This includes some projects related to connected & autonomous vehicles (CAVs) such as certain traffic signal controllers broadcasting *SPaT* information (*Signal Phase & Timing*) in a format suitable for CAV applications. A copy of the report can be viewed/downloaded at [this link](#). The report by its author (Omar Choudhry) can also be viewed on YouTube at [this link](#).

In its pursuit of reducing emissions generated by the transportation system and to spur innovation in the automotive sector, on May 19, 2021, the **Federal Government** announced a \$7.5 million grant aimed at *Small & Medium Enterprises* (SMEs) for developing electric vehicle and CAV technologies. This initiative, known as the *automobility accelerator*, is directed specifically at the **Windsor-Essex** region in southern Ontario where many auto tech companies are located. [Invest WindsorEssex](#) is the major partner for this initiative. More information is at [this link](#).

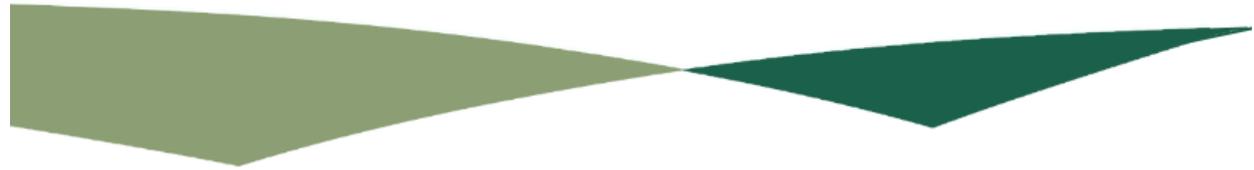
The **Automotive Parts Manufacturer's Association** (APMA) has launched *Project Arrow* to design and build the first all-Canadian, Zero-Emission Concept Vehicle. Many Canadian auto tech companies and academic institutions are involved in this ambitious project. One of the key requirements for the design of the concept vehicle is ensure that the vehicle is CASE ready, i.e., it needs to be **Connected, Autonomous, Shared and Electric** (CASE). APMA expects the concept vehicle will be ready for demonstration in 2022. More information is at *Project Arrow's* site at [this link](#).

CASPI News

On May 15, 2021, CASPI proudly hosted Phase II of the *Canadian Automated Student Snow Plow Competition* via a remote Zoom webinar.

Two teams submitted qualifying presentations: **Team Caribou**, led by Team President Nicholas Schmidt from the **University of Ottawa** and **Carleton University**, and **Team VAUL**, led by Team President Maxime Vaidis from **Laval University**.

Phase II of the Competition was modified to a virtual competition as opposed to a physical demonstration event. The objective was not to build an operational snow plow, rather for teams to perform a "deep dive" into autonomy functions that are essential



aspects of autonomous vehicles. The aim was to help teams build capacity for future competitions and to develop skills related to autonomous technologies. (as stated in the *Concept of Operations* or Conops).

Our esteemed panel of judges Simon Diemert and Kirk Richardson were extremely impressed by the submissions of both teams. Kirk Richardson said: "Considering the challenges of both the competition objectives and the remote work situations, both teams presented a well developed and thought-out system".

Team Caribou showcased exceptional teamwork and our judges also appreciated the use of the Canadian adverse conditions dataset. Simon Diemert said that "this is especially important for the snow plow application". Simon added that Team VAUL demonstrated a system with "impressive technical depth".

The teams presented for 45 minutes and then answered questions from the judging panel for an additional 30 minutes.

Team VAUL was awarded first place and Team Caribou was awarded second place. The competition started with seven registered teams and three successful technical paper submissions.

						
						
						
Maxime Vaidis	Alexandre Guénette	Isabelle Eysseric	Théophile Berteloot	Nicholas Schmidt	Samarth Saxena	Loric Daqrboux
Vincent Breault	Samuel Carpentier	Akmaral Moldagalieva	Adjété Fred Wilson-Bahun	Greg Price	Kurian George Binu	Ben McLean
Ariane Asselin-Gonzalez	Tommy Bouchard-Lebrun			Zohaib Ali		

Congratulations to all the members of Team VAUL and Team Caribou. We look forward to seeing how your concepts and vehicles develop in the future.

International CAV News

One of the oft-cited benefits of the CAV technologies is how it can help some of the more vulnerable members of the society such as people with mobility issues, visual and hearing impaired, people living in low-income neighborhoods, older adults and children. With a US\$8.2 million grant from the **U.S. Department of Transportation (USDOT)**, the **University of Buffalo** in collaboration with some local transportation partners will undertake research into these areas. The university will use its *Olli* electric driverless shuttle as part of this project. More information is at [this link](#).

Intel-owned **Mobileye** is one of the major players in ADAS and self-drive technologies.

It has now branded its self-drive technology as *Mobileye Drive*, similar to Waymo's and Aurora's *Driver* brand. Mobileye indicates that their self-drive system will have 13 cameras, three long-range lidars, six short-wave lidars, and six radars. It will be powered by Mobileye's EyeQ 5 processors. On April 12, 2021, Mobileye announced a major deal with the delivery company **Udelv** to incorporate its *Mobileye Drive* system into 35,000



automated delivery vehicles that Udelv is planning to deploy from 2023 to 2028. The automated vehicles will be provided by **Donlen**, one of United States largest commercial fleet leasing and management companies. More information is on Intel's site at [this link](#) and [this one](#).

The **Society of Automotive Engineers (SAE)** first defined the 6 levels of vehicle automation in 2014. Known as the *SAE J3016* standard, the definitions were revised in 2016 and 2018. On May 3, 2021, SAE announced its latest revision for this document. The 6 levels remain the same with some clarification for international audiences. Due to remote *teleoperation* of vehicles by some companies, SAE is now recognizing this practice and has given them names: *remote assistant* and *remote driver*. The other major changes are the first three levels (L0, L1, and L2) becoming known as *Driver Support Systems*, while L3, L4 and L5 are designated as *Automated Driving Systems*. The current reclassification was in collaboration with the **International Standard**



Organization (ISO) ISO/TC 204 technical committee. More information is on SAE's site at [this link](#) and at [this link](#).

In a project reminiscent of the failed 2020 *Sidewalk Toronto* by *Sidewalk Labs*, **Toyota** has announced plans to build a smart city from the ground up in Japan. Named the *Woven City*, Toyota is committing up to US\$4.6 billion to this project. This high-tech city will be designed with autonomous vehicles very much in mind.

Completion of the project is expected by 2024. Japan's **Nippon Telegraph and Telephone Corp.** (NTT) will be a key partner of Toyota for the *Woven City* project.



In a related development, Toyota has acquired the self-driving arm of **Lyft** for US\$550 million. With this transaction, Toyota gains 300 employees of Lyft as well as Lyft's know-how and technology in the deal. More information is at [this link](#).

On May 5, 2021, **General Motors's** CEO, Mary Bara, spoke to reporters and analysts regarding GM's plans and financial results. Part of this event was devoted to GM's twin initiatives for bringing self-drive technology to market. Ms. Bara described the twins as a revolutionary and an evolutionary strategy. The revolutionary stream is what GM's subsidiary **Cruise** is doing in bring L4 and L5 automation to market. The evolutionary path is GM's current *Super Cruise* technology available on some GM models. Part of GM's automation efforts is the development of a new vehicle network architecture known as the *Vehicle Intelligence Platform* (VIP). The VIP system will be capable of managing all the data loads of the ADAS, electric propulsion, over-the-air updates of every vehicle module as well as managing feature applications. GM expects that by the end of 2023, VIP will be on 7 million vehicles and 38 global models. More information is at [this link](#).

The **Applied Science and Technology Research Institute (ASTRI)** is a Government of Hong Kong funded R&D organization. ASTRI in collaboration with **Hong Kong Telecom (HKT)** and Sweden's **Scania**

have started trialling one of the world's first *Cellular-to-Everything (C-V2X)* systems using the nascent 5G communication technology. The project covers a 14 Km stretch of road in Hong Kong where 14 *Road Side Units (RSU)* exchange information with suitably equipped vehicle for a variety of traffic information as well as public notifications, eg. hazardous driving/road situations, traffic light changes, pedestrians on a road crossing and alternative travel routes in the event of a nearby accident or traffic congestion. It is indicated that the 5G technology is 20 times faster than 4G and 5 times shorter in latency. More information is at [this link](#). There is also a YouTube clip available for this project. The video clip can be viewed at [this link](#). It is 4 minutes long.



In another setback for the CAV industry, on April 28, 2021, the **U.S. Senate Commerce Committee** failed to pass amendments that would have substantially increased the number of *exempt vehicles* that AV companies could have on public roads. An exempt vehicle is one that does not necessarily have to have brake/accelerator pedals, a steering wheel or side mirrors. The amendment was seeking to increase the number of exempt vehicles to 15,000 vehicles per manufacturer with that number increasing to 80,000 in three years. Some powerful lobby and advocacy groups such as the *trial lawyers* lobby and *Advocates for Highway and Auto Safety* are opposed to these amendments on grounds of public safety. More information is at [this link](#).



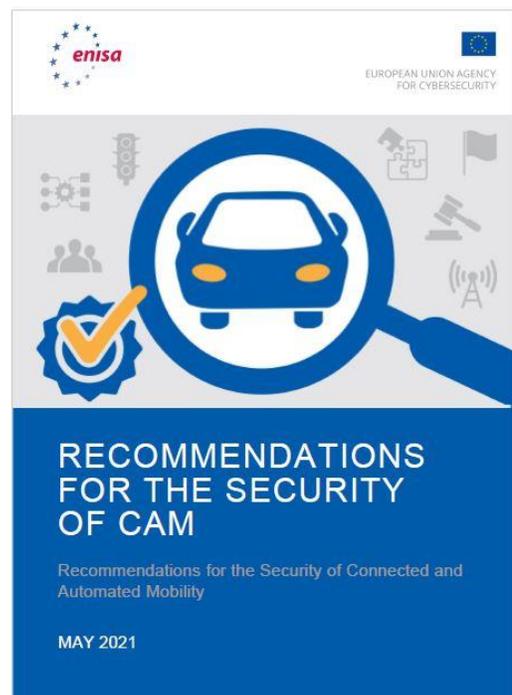
By contrast, AV legislation fared better in **Florida** where the state House and Senate approved legislation to regulate operation of autonomous delivery vehicles starting July 1, 2021. Bill *HB 1289* authorized the operation of low-speed autonomous delivery vehicles as defined by the federal government. The empty vehicles would be limited to roads with speed limits of 45 mph (72 Km/h) or less, though the vehicles will only move at speeds of 35 mph (56 Km/h) or less. The minimum insurance requirements were set at US\$1 million, the same as those currently in law for other autonomous vehicles. More information at [this link](#). Bill *HB 1289* can be viewed on *Florida House of Representatives* site at [this link](#).

A recent article titled *The Autonomous Vehicle World is Shrinking – it's Overdue* in *verge.com* highlighted the dashed hopes of many startups hoping to make it big in the AV industry and the ongoing consolidation in the industry. Some of the high-profile examples are **Uber** and **Lyft** giving up on developing their own AV technology and selling their self-drive divisions to **Aurora** and **Toyota**, respectively. The main reasons appear to be the realization that the task is much more difficult than first imagined and the enormous amount of money required for developing this technology. For these reasons, only deep-pocketed players in the auto and technology industries such as **Ford**, **GM**, **Volkswagen**, **Apple**, **Alphabet**, and **Intel** may be the last companies standing when the dust settles. More information at [this link](#).



On May 5, 2021, the **European Union Agency for Cybersecurity (ENISA)** published a 23-page document titled *Recommendations for the Security of Connected and Automated Mobility (CAM)*. The aim of this report is to provide a high-level overview of the cybersecurity challenges in the CAM ecosystem.

Connected and automated vehicles may be attacked by cyber-attackers and create cyber fraud, data breach and privacy incidents, as well as software overrides resulting in dangerous situations and accidents when part of the vehicle-to-everything (V2X) network is attacked. Efforts across the whole industry should be made to ensure that even if one system is compromised and/or tampered with, the rest of the systems remain unaffected. Copy of the report can be downloaded from ENISA's site at [this link](#).



An article titled *Why hasn't Waymo expanded its driverless service?* appeared in **arstechnica.com** site. The author delves into reasons why **Waymo** has not expanded its *Waymo One* tobotaxi service since it became available to the public in October 2020. Waymo driverless taxi service is centered on the city of Chandler, AZ. Nearby cities of Mesa and Gilbert have very similar weather, road conditions, and traffic patterns. Yet, Waymo has not extended the service to these cities. The author theorizes on multiple reasons for Waymo's lack of expansion of its robotaxi service. His conclusion is that Waymo has run the numbers and has realized that it cannot turn a profit in this line of business and has therefore halted any expansion of its service. Details at [this link](#).



Some of the railway companies such as **Union Pacific** see a threat from autonomous trucks for eating into their freight business. Some analysts think that autonomous trucks could take up to 30% market share from the railways once they go mainstream. Automated trucks along with electric trucks (which are significantly cheaper to operate than diesel trucks) could erode rail's cost advantage over trucks. At a recent event, Union Pacific's CEO revealed that his company has invested in the automated truck company **TuSimple** to keep abreast of the technology and is working towards autonomous trains to reduce labour costs and stay competitive with automated trucks. More details are at [this link](#).



On May 12, 2021, **Mothers Against Drunk Driving** (MADD) published a 151-page report titled *Advanced Drunk Driving Prevention Technologies*. A good deal of this report explores the autonomous systems developed by various automakers. In all, MADD cites 241 examples of Auto Tech to help prevent drunk driving. The report was submitted to **National Highway Traffic Safety Administration** (NHTSA) in support of its work for introducing such technologies into future automobiles. More information at [this link](#). A copy of the MADD report can be viewed/downloaded at [this link](#).

And finally, **Volkswagen** (VW) has some out-of-the-box concepts on how consumers will be able to *lease* certain technological options on future VW cars instead of buying them as an option when they first buy the car. For example, the autonomous driving function of a future VW car can be turned on for as little as €7 per hour (approx. US\$8.50/hour) and only when the driver needs it, e.g., on a long drive. VW thinks they can make a profit with this type of business model. Details are at [this link](#).



Upcoming CAV-Related Events

- Jun 8-10, 2021 [Autonomous Vehicle Technology Expo 2021](#), Stuttgart, Germany
- Jun 15-16, 2021 [German Canadian Virtual Sustainable Mobility, Connected & Autonomous Driving and E-Mobility Conference](#)
- Jun 16-17, 2021 [Autonomous Vehicles 2021](#), Long Beach CA
- Jun 20-23, 2021 [ITS Canada 2021 Conference](#)
- Jun 22-23, 2021 [Autonomous Vehicle Technology & Test Expo 2021](#), Hannover, Germany
- Sept 1-2, 2021 [Autonomous Vehicles 2021](#), Long Beach, California
- Sept 13-15, 2021 [MINExpo](#), Las Vegas, Nevada
- 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
- 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

June 20-23, 2022 [HxGN LIVE Global](#), Las Vegas, Nevada

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.

Chief Editor: Ahmad Radmanesh

Contributors to this issue: Barrie Kirk, Nicola McLeod, and Keith Fagan

To subscribe, click [here](#). To unsubscribe, click [here](#).

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

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.

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

info@cavcoe.com

www.cavcoe.com

© CAVCOE 2021
