CAVCOE

CAV Update

A monthly update on the CAV ecosystem

October 2023

From the Editors

CAVCOE requests your feedback and comments on whether Canada should have a unified, national approach to Connected and Automated Vehicles (CAVs).

Canada has many stakeholders that have made and continue to make significant contributions to the CAV ecosystem. These include governments, the private sector, 22+ associations, and academia; each stakeholder contributes within the mission of their organizations. The CAV ecosystem has reached a point where a unified, national approach is badly needed. The benefits would be a stronger focus, more synergies, and faster progress towards innovation, testing and deployment of CAVs for passenger, freight and service use cases.

However, there is no such approach in Canada comparable to other countries:

- In the UK, **Zenzic** was jointly created by government and industry to champion the UK Connected and Automated Mobility (CAM) ecosystem and lead the UK in accelerating the self-driving revolution. Zenzic exists to make champions of others and to place the UK at the heart of the global CAM ecosystem. By leveraging the power of innovation through collaboration, Zenzic promotes and enables UK organizations to play an impactful role in the future of mobility. It has developed the UK CAM Roadmap which provides guidance for a complex and connected ecosystem, identifying what needs to happen and by when to achieve the vision of CAM at scale in the UK.
- In Australia and New Zealand, the **Centre for Connected and Automated Transport** (CCAT) is a membership organization that includes government transport agencies, municipalities, industry stakeholders, technology and car companies, mining companies, the agricultural sector, researchers, next-gen technology developers, and start-ups. CCAT is actively planning a national summit on connected and automated transport, including the importance of working across transport modes.

We propose that Canada convene a national CAV summit to be held in 2024 with a wide range of stakeholders. The objective would be to plan how we move Canada towards a unified, national CAV ecosystem and its integration internationally. More specifically, to deliver:

- A national focus on Canadian CAV activities, creating synergies between the many excellent activities already being worked on;

- A brand for Canadian CAV capability and promote it nationally and internationally;
- A national road map for the deployment of CAVs for passengers, freight, and service vehicles, identifying all steps to achieve that;
- And identify synergies with the US ecosystem in those areas where there are gaps, recognizing that many but not all Canadian CAV stakeholders have links to their US counterparts.

Please reply to this email or IM me on LI with answers to these two questions:

1. Do you think Canada would benefit by this initiative?
2. If so, do you support the vision of a national summit in 2024 to plan how we move towards this?

Canadian CAV News

Toronto-based **Waabi** has announced a 10-year strategic partnership with the trucking arm of Uber - **Uber Freight**. Under this agreement, Waabi is providing a *driver-as-a-service* business model to freight and logistic companies wishing to introduce driverless truck technology in their fleet. This means carriers buy trucks equipped with Waabi's software known as *Driver* and then opt into the Uber Freight marketplace. According to Uber Freight, the partnership will result in connecting the software systems of both companies, network optimization, Uber Freight app, load bundling, reducing empty miles, sustainability and data benefits. Due to the long-term nature of this partnership, Uber Freight and Waabi are looking for shippers that can commit to 5 to 10 year pilots so they can really understand how AVs will impact future operations, supply chain and network deployment. In late September 2023, Waabi's test fleet started commercial pilots with shippers on the Uber Freight network to haul goods between Dallas and Houston. More details on Waabi's site information at this link.

Staying with **Waabi**, on September 28, 2023, the **BBC** published an article on Waabi and its advanced AI-based driving simulator known as *Waabi World*. Using this simulator, Waabi is able to crash its trucks over and over again in testing. It believes it is essential to understand what will happen in different accident situations. Numerous scenarios can be created by the AI software, e.g., computerized cars mindlessly crossing lanes in the road ahead, or the truck having to brake sharply after a pedestrian walks into the road. Waabi uses AI to create something called *synthetic data*. This is data that has been created artificially, but can then be used in a real world application to train Waabi's virtual *Driver*. The BBC article can be viewed at this link.

On September 29, 2023, the **CBC** published an article titled *Will self-driving cars bring us a safer future on the roads? Not everyone is convinced*. The article recounts some of the more recent controversies regarding robotaxis in San Francisco and taps into the expertise of Prof. Steven Waslander who is a **University of Toronto** expert in robotics and autonomous vehicles for further insight. According to the professor, there are an infinite variety of objects and people that do unpredictable things. This means that the AVs do not necessarily know how to respond. AV developers are constantly updating unusual scenarios that an AV may encounter, however, there is a long list of them. Another expert believes that autonomous vehicles could best be used in cities that actively plan around their integration into its roads and surrounding infrastructure. The CBC article can be viewed at this link.

Vaughan ON based **Drone Delivery Canada** (DDC) has a $1.2 million contract with Canadian government's *Innovative Solutions Canada* program. Under this contract, its heavy-lift *Condor* remotely piloted aircraft is undergoing evaluations to determine its suitability for federal government needs. The company states that the *Condor* could be deployed in sectors such as mining, oil and gas, inspection, and emergency preparedness. Furthermore, DDC is offering its services on a *Software as a Service* (SaaS) business model. The aircraft will undergo short flight test, long endurance flights and flights under extreme environmental conditions. Should the evaluations be satisfactory, other branches of the federal government will be able to tap into this home-grown technology. More information is at DDC's site at this link.

In early 2024, the **Urban Robotics Foundation** (URF) will publish a series of *Municipal Guides* designed to help prepare senior municipal leaders, smart city teams and other stakeholders as they seek to understand more about the challenges, opportunities, risks, and rewards of deploying robots on city streets and in public spaces.

URF believes that the biggest barriers to successful PMR deployment are not technology-related, but rather are seen in the domains of *municipal readiness* and *public acceptance*. By publishing the first edition of these documents in advance of ISO-4448, they can help maximize the promised benefits of these technologies and help stakeholders anticipate and minimize any unintended consequences during pilot testing and early deployment.

URF invites stakeholders to pre-order the free Executive Guide from here.

Aurrigo, based in Coventry, UK with an operation in Ottawa, has announced a collaborative project with **UPS** to deploy *Auto-Cargo*, an autonomous electric vehicle designed to move heavy cargo loads to and from aircraft at the UPS hub at East Midlands Airport, the UK's second-largest cargo terminal. Its autonomous technology

will enable the limited numbers of security-cleared drivers to be freed up to perform other roles around the airport, while also producing zero tailpipe emissions. The two companies will develop and pilot Auto-Cargo at East Midlands Airport over a 14-month period. David Keene, Aurrigo CEO: “This vehicle allows an airfreight operator to help decarbonise and automate its ground operations for lower emissions and greater efficiency. By combining the tractor and trailer into one unit, we save space, which in a busy cargo hub like East Midlands Airport is vital to efficient loading and unloading of aircraft.’’ More information is here.

International CAV News

GM’s Cruise has been in the news recently – for the wrong reasons. In San Francisco, a pedestrian was struck on a crosswalk by an unknown third-party vehicle and then fell into the path of a Cruise CAV. The Cruise stopped and then moved 20 feet with the pedestrian remaining under the vehicle. There is an open dispute as to whether the video that Cruise initially showed the **California DMV** included or excluded the subsequent movement of the Cruise. The follow-up includes:

- The California DMV suspended the license for Cruise to operate this service in a driverless mode; the DMV letter is here and the background statement is here.
- The Cruise statement and its analysis is here.
- Subsequently, GM has suspended all driverless operations; more information is here.

Developing commercial robotaxis is a very expensive business. The leaders in the field, Google’s **Waymo** and GM’s **Cruise** have been operating with significant losses for many years. As recently as 2022, it was reported that Cruise, was losing up to US$5 million per day. Recently, Cruise’s CEO has indicated that its *operating cost per mile* has been dropping by 15% per month in 2023. The cost savings have been achieved in four key areas: optimizations, infrastructure, automation, and process improvements. Furthermore, costs have been reduced in simulation and machine learning areas. The holy grail of *cost per mile* is reported to be one US dollar. At this rate, it is believed that a robotaxi will become cheaper than owning a car. Cruise predicts revenues of US$1 billion by 2025. More information is at this link.

Researchers at the (South) **Korea Advanced Institute of Science & Technology** (KAIST) claim to have developed a humanoid robot capable of flying a variety of aircraft. The key enabling technology is the recent advancements in AI-based *Large Language Models* (LLM) such as ChatGPT. Dubbed the *Pibot* and thanks to its large memory, it is able to memorize complex flight manuals presented in natural language, a feat that enhances its adaptability across various aircraft. It can also memorize all of the **Jeppesen** aeronautical navigation charts for the entire world, which is impossible for human pilots. The *Pibot* can be taught to operate all the flight instruments and controls in the cockpit by using its arms and fingers. It can communicate with Air Traffic Control (ATC) and other nearby aircraft using synthesized voice. The research project is sponsored by the **Korean Agency for Defense Development** (ADD), the government body charged with research into defence technology in South Korea. It is stated that the robot can be adapted to operate cars, ships and military vehicles. More information at this link. A short YouTube video showing the *Pibot* in action can be viewed at this link.

In a somewhat related story, Michigan-based **Humanetics** - the company best known for making *Anthropomorphic Test Devices* (commonly known as Crash Test Dummies), has teamed up with the **University of Michigan**'s *Mcity* test facility by providing robotic test platforms, which can mimic a range of road users – such as pedestrians, bicyclists, motorbikes and children. The purpose of these devices is to assess how automated systems can safely deal with other people on the roads, in cars, trucks, buses and bikes. *Mcity* is a 32-acre mock city and proving ground built for the testing of connected and driverless vehicles. It is located on the University of Michigan's North Campus in Ann Arbor, Michigan. More information at this link.

Autonomous Vehicles are often cited as being beneficial to the elderly, the disabled, and those who don't drive or own a personal vehicle. To partially address the needs of the elderly and the disabled, the **City of Detroit** Council recently voted unanimously to award a US$2.4 million contract to **May Mobility** to provide automated shuttle service for some of its citizens. This new service is expected to become operational in the Spring of 2024. According to the City, riders will have the options available to pre-book roundtrip rides through a mobile app, website or reach out to a call center to book trips with a live representative. More information on City of Detroit's website at this link. A short YouTube video of the shuttle in action can be viewed at this link.

George Mason University's **Professor Missy Cummings** is an expert in Robotics and Artificial Intelligence. She has been critical of lax regulations governing AI in general, and autonomous vehicles in particular. In a recent article in **IEEE Spectrum**, she outlines some of shortcomings of government regulations and states that the AV industry cannot be trusted to police itself. She posits that the decision making software in AVs is similar to that used in *Large Language Models* (LLMs) such as *ChatGPT*. She argues that neither the AI in LLMs nor the one in autonomous vehicles can "understand" the situation, the context, or any unobserved factors that a person would consider in a similar situation. The difference is that while a language model may give you nonsense, a self-driving car can kill you. Another issue is what is known as *Model Drift* in AI models. The drift occurs when relationships between input and output data change over time. For example, if a self-driving car fleet operates in one city with one kind of bus, and then the fleet moves to another city with different bus types, the underlying model of bus detection will likely drift. Thus, AI models need to be maintained and updated with new training data to stay relevant and current. The IEEE Spectrum article can be viewed at this link. A related short YouTube video showing a Tesla vehicle in self-driving mode ignoring a STOP sign can be viewed at this link

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The **BBC**'s technology correspondent stationed in San Francisco has had several first-hand experiences with robotaxis in that city. In a recent article, he wrote that the people in San Francisco are divided over robotaxis. Some are in favour of them, and some are opposed. And then there is a vigilante group calling themselves the *Safe Street Rebels*, who have taken it upon themselves to disable robotaxis owned and operated by **Waymo** and **Cruise**. They do this by placing traffic cones on the hood of the cars and thus stopping them in their tracks. They don't deny that they are the 21st equivalent of Luddites. The BBC reporter also attended the crucial **California Public Utility Commission**'s August 2023 meeting, where many people testified in a 6-hour hearing. Among others, he heard from Uber and Lyft drivers, a single mom, garbage disposal truck drivers and an orthopedic surgeon who believed robotaxis to be safer based on the injuries he had treated which were caused by human-driven vehicles. The BBC report can be viewed at this link.

Earlier this year, **Tesla** announced agreements with a few competing electric car makers to allow their vehicles to tap into Tesla's large network of superchargers. Currently, Ford, GM, Rivian, Volvo, Polestar, Mercedes, Nissan, Honda, Jaguar, Kia, Hyundai/ Genesis have struck this deal with Tesla. It now appears that Tesla is exploring the possibility of doing something similar with its *Full Self-Driving* (FSD) system, i.e. licensing its FSD system to its competitors. This

is according to Tesla's CEO (Elon Musk) in a recent earnings call with financial analysts. If other automakers were to adopt FSD technology, they would likely need to install both Tesla's software and hardware suite in their vehicles. More information at this link.

And finally, an article in the **Jerusalem Post** titled *Are self-driving cars kosher? San Francisco rabbis weigh in* delves into the intricacies of whether using robotaxis in the *Shabbat* is kosher or not. To gain insight into this, two San Francisco-based rabbis are consulted. One reason for this is the abundance of robotaxis in the city of San Francisco. Both Cruise and Waymo operate large fleets of robotaxis in that city on a commercial basis. In the opinion of the rabbis, if the robotaxi ride can be pre-arranged and prepaid, and the passenger does not have to do anything to activate the ride, then a robotaxi may fit the bill of the *Shabbat*. 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. On the one hand, our keynotes and presentations have core messaging on the status of CAVs, their deployment scenarios, and the impact on business plans, government 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

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Upcoming CAV-Related Events

November 2, 2023	How Drones & Advanced Robotics are Empowering Key Sectors, free webinar organized by Area X.O
November 7-10, 2023	Aerial Evolution Association of Canada Conference & Exhibition, Ottawa, Ontario
November 15-16, 2023	AutoTech Europe, Berlin, Germany
January 9-12, 2024	CES 2024, Las Vegas NV
February 1, 2024	J.D. Power Auto Summit, Las Vegas NV
March 20-21, 2024	Connected Places Summit, London UK

About CAV Update

CAV Update is a free, monthly summary of news and analysis in the world of connected and automated vehicles, and their 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.*

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