CAVCOE

CAV Update

A monthly newsletter on the CAV ecosystem

September 2022

From the Editor

Last month, we reported on seven Canadian CAV and mobility related events this Fall. Here is an update on these:

- **TCXpo** was held on September 20 and was hosted by **Area X.O** in partnership with **Transport Canada** and **Innovation, Science and Economic Development Canada (ISED)**. It was excellent and there have been many photos and comments on LinkedIn. CTV News did a very good report on this, and the 2 mins 42 sec video is here. Congratulations on the event to Mike Tremblay, Sonya Shorey and the entire team at **Invest Ottawa**.
- **October 5, 2022**: webinar on **Supply Chain and Automated Freight** sponsored by CAVCOE and other stakeholders. The full agenda and line-up of speakers has been announced. For more information: https://bit.ly/3PMbWSR **CAVCOE** and **Praxiem** are proud to be the sponsors of this webinar.
- **November 2, 2022**: *CAVs Today, Emerging Trends, and Getting to Market*, a webinar organized by **PAVE Canada** that CAVCOE is also helping with.
- **November 15-17, 2022**: double-header event. **Sub Zero North's** conference *Ready…Set…Test,* is its first ever cold weather testing conference with a special feature on alternative fuels. It is in Winnipeg and Thompson MB. Linked to this is the following event.
- **November 17, 2022**: the **National Research Council Canada (NRC)** and **Transport Canada (TC)**, in collaboration with **Sub Zero North**, have announced a one-day hybrid (in-person and online) workshop on *Canada: Terrains and Temperatures for Testing Transportation Technology,* this is part of the series on *Community of Practice (CoP) for Intelligent Transportation Systems (ITS) Living Labs in Canada*.
- **December 5, 2022**: This date for the next **CAV Canada** conference was recently announced. The details are here.

Canadian CAV News

Back in May 2018, the City Council of **London, Ontario** directed its Administration to develop plans for future deployment of Connected and Autonomous Vehicles (CAV) in that City. City staff have now produced a draft plan and are inviting public comment/feedback on it. The plan's background documentation (see below) lists CAVCOE as one of the *Key Stakeholders in London's Local and Regional Context*. The City believes driverless vehicles may be available to consumers within the next 10-20 years. This will require the City to prepare its physical and digital infrastructures to accommodate this new mode of transportation. The deadline for the public to provide submissions on the draft CAV plan is December 1, 2022. More information and the comment form are at this link.

Two Canadian reports on *Public Mobile Robots* (sometimes referred to as sidewalk and/or delivery robots) were published this year. The first is a 32-page report titled *Surface Robotics* and published by the Ottawa-based **Institute on Governance** (IoG). The second is a 27-page report titled *Micro Utility Devices - Observations from Transport Canada's Winter 2022 Urban Trial* and published by **Transport Canada**'s Innovation Centre.

The IoG report was commissioned by Transport Canada and focuses on issues related to surface robotics. These are small vehicles that operate with some degree of autonomy on sidewalks in uncontrolled settings. This is contrasted with similar robots that operate in controlled environments such as warehouses or farm fields.

The second report begins with an overview of *Micro Utility Devices* (MUDs) and their operations, followed by an appraisal of the legal, policy, and safety concerns associated with this emerging technology.

The Governance Institute report can be viewed/downloaded at this link and Transport Canada's report can be viewed/downloaded at this link.

The UK-based AV developer **Oxbotica** has chosen Toronto as its North American development hub. The company hopes to employ up to 200 people and begin testing its vehicles on Ontario's public roads. According to the company CEO, Oxbotica intends to start its testing by initially patrolling farms, solar energy installations, mining sites, and doing off-road tests. Oxbotica's main product is its *Oxbotica Driver* software which is integrated with various sensors and mapping information. Oxbotica cites the good availability of software engineers and roboticists as one of the reasons for choosing Toronto as its base.

Oxbotica has a YouTube video describing the various AV technologies that it is working on in Oxford and Toronto. The video can be viewed at this link.

We do not normally report on new appointments, but this is an exception. Our friend and colleague, Dana Borschewski, has been appointed to a new position as VP Aviation Products and Operations at **Aurrigo**. This ties in with the trend that we see towards automated freight use cases. Congratulations, Dana!

International CAV News

A recent law enacted by the **State of Michigan** authorizes the Michigan Department of Transportation to designate some of Michigan's public roads for testing and deployment of autonomous vehicles. This is partly because of Michigan's historical ties to the auto industry and its desire to keep abreast of new and emerging automotive technologies. Not everyone in that state is enthused about this new law. One group called *American Bikers Aiming Towards Education* (ABATE) told the committee that priority and funding should be directed towards fixing the crumbling transportation infrastructure of the state rather than untried technologies. ABATE also believes current AV technology is not good at identifying motorcyclists and emergency vehicles. More information is at this link.

Autonomous vehicles operating in an urban environment face many challenges in recognizing their environment and safely reacting to them. An engineer at AV developer **Argo** explains some of these challenges in the context of cyclists and their bicycles. Typically, the AV needs to recognize both the human and the bike separately as opposed to a combined entity. For example, cyclists may not always be on their bikes, or a cyclist may walk their bike through an intersection, which would make the AV behave differently due to the speed of the movement. AVs also encounter different kinds of people and

bikes. These include children on tricycles, adults on recumbent bikes, people on three-wheeled beach cruisers, tandem biking pairs, and so on. And then there are bike racks which can confuse an AV even further. A bike rack can have a bunch of bikes attached to it. The AV may recognize the bikes properly, however, they are not going to move in this context and the AV must know how to deal with this type of scenario among many others involving bikes and people. More information is at this link.

Beijing-based **Xiaomi, Inc.** is best known as a manufacturer of smartphones. In fact, after Samsung, it is the world's second-largest manufacturer of these devices. In a big departure from its core business, Xiaomi has committed a lot of capital and personnel for developing its own autonomous vehicles. Its approach is to develop a *full stack* of all the bits and pieces needed to bring this about. Along the way, it has also acquired an AV startup called **Shendong Technology** to leverage its technology and its people. More information is at this link.

Another firm making a foray into the self-driving/driverless sector is the Dusseldorf-based firm **Rheinmetall AG**. The company is known for its automotive and arms manufacturing. It has created a startup called **MIRA Mobility** which is initially offering teleoperation for autonomous and non-autonomous vehicles. For non-autonomous vehicles, a remote operator is in full control of the vehicle's steering, braking, acceleration, and other controls. This service is typically used in picking up or delivering a rental or ride-sharing vehicle, or for first or last-mile deliveries using vehicles that are only equipped to drive themselves on limited-access highways. As for autonomous vehicles, the remote operator/driver plays the role of the *safety driver* that many AV companies have been using for many years. MIRA's teleoperation technology currently conforms to German traffic safety regulations for cars, trucks, and special vehicles as approved by the City of Düsseldorf and the regulatory body TüV Rheinland. More information on Rheinmetal's site at this link.

Staying with teleoperation, on September 12, 2022, **Reuters** published an article titled *Truly autonomous cars may be impossible without helpful human touch*. Many of the leading AV developers were contacted by Reuters to ask if human intervention can ever be eliminated in future AVs. Some refused to provide an answer to this question. However, some others were quite candid on this topic.

For example, the CEO of **Cruise** stated that he saw no good reason to not monitor Cruise's AVs remotely. It provides comfort and peace of mind for the AV user to know

someone is keeping an eye on the AV remotely. Some others opined that the AV future will likely look like air traffic control where remote control rooms can monitor many aircraft in flight. The Reuters article can be viewed at this link.

On September 9, 2022, the website **smartcitiesworld.net** published an article titled *Five autonomous vehicle projects that can shape a driverless future*. The article states that the autonomous driving space has received significant funding and policy support in recent years to move from concept to real-world applications. The UK has provided funding for competitions worth tens of millions of pounds over the last six years; and many US DoTs have funded pilots on varying scales, from retirement villages to large-scale visitor hubs. The five projects are:

1. Motional and Lyft launch robotaxi project in Las Vegas
2. Tallinn launches free, self-driving bus pilot
3. Autonomous shuttle to launch in Rhine-Main area starting in 2023
4. First zero-occupancy autonomous driving journey in Europe by Oxbotica
5. Uber Eats pilots autonomous delivery service in Santa Monica

The article and details of each project can be viewed at this link.

In a departure from conventional AVs, S.Korean firm **Seoul Robotics** has developed technologies for converting non-autonomous cars into self-driving vehicles. The system dubbed *Level 5 Control Tower* (LV5 CTRL TWR) is specifically designed for parking and handling of parking lots for newly assembled vehicles by car manufacturers. With this technology, instead of equipping the vehicles themselves with sensors, the surrounding infrastructure is outfitted with sensors placed on infrastructures around a facility such as buildings or light poles. The system collects data via computer vision and LiDAR. The accumulated data is then analyzed by deep learning-based AI to determine efficient and safe paths for vehicles within the range. Using V2X technology, the vehicles are then moved around using their existing features such as adaptive cruise control, lane-keeping, and brake-assist functions.

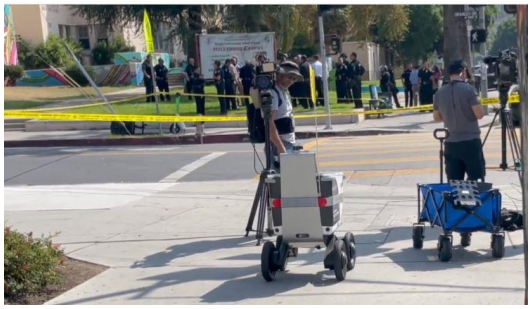
The system is currently being tested at a **BMW** manufacturing plant in Munich. More information is at this link. A short YouTube of the system in action can be viewed at this link.

On August 29, 2022, **Wired** magazine published an interview with General Motors (GM) President (Mark Reuss). The interview touched upon GM's plans for electrification, supply chain issues such as the shortage of

semiconductor chips, the future role of GM dealerships in the era of electric vehicles, and GM's outlook for autonomous vehicles. On the AV topic, Mr. Reuss stated that GM is attempting to align its core business with opportunities presented by AVs and *personal autonomous vehicles* (PAVs). PAVs are AVs owned by individuals as opposed to fleets of AVs owned and operated by transportation companies or automakers. GM's AV subsidiary - **Cruise** - currently has driven over 34 million miles (54.7 million kilometres) thereby gaining a lot of expertise in this nascent technology. He also stated that GM's robotaxi called *Origin* is being built alongside the Hummer and the Silverado at GM's *Factory Zero* in Detroit. The Wired interview can be viewed at this link.

Established in 1919, **Cummins Inc.** is a well-established manufacturer of engines and powertrains for all kinds of internal combustion vehicles. Cummins has now partnered with AV developer **Gatik** to incorporate its autonomous vehicle technologies into certain of its powertrains. Specifically, Cummins will integrate Gatik's suite of advanced software features in its powertrain to enable *Drive-by-wire* (DbW) for **Isuzu** trucks used by Gatik and equipped with the Cummins B6.7 engine. It is expected that this integration will increase functional safety and enhance the reliability of the autonomous system, while improving fuel efficiency and offering superior vehicle performance on Gatik's automated Isuzu delivery trucks. More information is at this link.

And finally, in another case of an automated vehicle getting stymied by an *edge case*, a delivery robot owned and operated by **Serve Robotics** drove through a crime scene in Los Angeles while police had cordoned off an intersection due to an alleged shooting near a school. The robot made its way straight into the intersection and navigated around the police equipment set up, ignoring the cordon. A police officer allowed the robot to drive through the barrier. The robot then drove on past the amused officers and hopefully made its delivery. More information is at this link. A short YouTube video of the errant delivery robot can be viewed at this link.



Upcoming CAV-Related Events

Oct 5, 2022	Supply Chain and Automated Freight in Canada, a free webinar sponsored by AIoT Canada, Alberta Motor Transport Association (AMTA), CAVCOE, The Chartered Institute of Logistics & Transport in North America (CILTNA), Intelligent Transportation Society of Canada (ITS Canada), and Vitesse
Nov 2, 2022	CAVs Today, Emerging Trends, and Getting to Market, a free webinar sponsored by PAVE Canada, CAVCOE, Liberty Mutual, and Marsh
Nov 13-15, 2022	9th Tech.AD USA, Detroit, MI
Nov 15-16, 2022	Auto Tech: Europe 2022, Munich, Germany
Nov 15-17, 2022	Ready…Set…Test, Sub Zero North's Cold Weather Testing Conference; Winnipeg and Thompson, Manitoba, Canada
Nov 17, 2022	*Canada: Terrains and Temperatures for Testing Transportation Technology, Transport Canada and National Research Council;* Thompson, Manitoba and virtual. To register: Douglas Miller douglas.miller@tc.gc.ca or Kristine Philippe kristine.philippe@tc.gc.ca
Dec 5, 2022	CAV Canada free hybrid event, hosted by Area X.O, Invest Ottawa, and Kanata North Business Association (KNBA)
June 4-7, 2023	UITP Global Public Transport Summit, Barcelona, Spain

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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