



Canadian Automated Vehicle Initiative

CAV Update

October 2024

From the Editors

A few days ago, Barrie Kirk spoke at the *Adventure in High Technology* event, organized by the **Rotary Club of Nepean-Kanata** (in the western part of Ottawa, Ontario.) The annual event brings together high school students from Ontario, Quebec and upper New York State for presentations and tours to help the students better understand the technology ecosystem and to explore the possibilities for their career decisions.

This event is now 40 years old and this is the fifth year that Barrie has presented. His presentation included the status and trends with CAVs of all kinds, followed by a section on the wide variety of skill-sets and career opportunities in the CAV ecosystem.

Many congratulations to the Rotary Club of Nepean-Kanata for an excellent event.

A key take-away from this event is that it is wonderful to see these students who are smart, intelligent and enthusiastic – much more than he was at their age (he says!). In a world that has too much darkness and despair, it is uplifting to see these optimistic students -- and there are many more like them – who are the leaders and experts of tomorrow.

Canadian CAV News

The unionized dockworkers at the **Port of Montreal** staged a short strike at the end of September. This was followed by a much larger strike at the major ports in the United States. The economic impact of the U.S. strikes was estimated to be US\$3.8 to US\$4.5 billion per day by **JPMorgan Chase & Co.** Although the strikes are over now, one of the key issues in the Canadian and U.S. port strikes was the issue of port automation. The union representing the port workers, **The International Longshoremen's Association (ILA)**, is concerned that increased automation will result in significant job losses for its members. As such, the union demanded the rollback of the language on automation in its negotiations with the port authorities. Operations that can be potentially automated include equipment such as automated stacking cranes, gantries and guided transport vehicles controlled from remote operating centres. On the other hand, the port authorities view automation as a means for increasing productivity and reducing operating costs. More information is at [this link](#).



The **Canadian Automated Vehicle Initiative** (CAVI) came into existence about 6 months ago following overwhelming confirmation by *Connected & Autonomous Vehicles* (CAVs) stakeholders that such a national organization was needed to advocate for the nascent Canadian CAV industry. In this short time, CAVI has attracted membership from the corporate, government and academic world as well as individuals. A 9-member Board of Directors from across Canada provides direction and input for furthering CAVI's goals, and CAVI has published a database a directory of about 100 organizations in Canada's CAV ecosystem. More information on CAVI is at this [link](#) and the database is [here](#).

This month's profiled CAVI corporate member is the **Advanced Cold Research Facility Area_55** located in Thompson, Manitoba. Thompson is

ideal for cold weather testing of vehicles, jet engines and any other machinery that needs to operate in a cold climate. Thompson, Manitoba experiences an average of 222 days per year with temperatures dipping below 0°C (32°F) and up to six months of snow coverage. The extended duration of the cold season empowers testers to efficiently carry out their tasks in a timely manner. More information can be viewed at Area_55's website at [this link](#).



On September 30, 2024, the **National Post** published an article titled *RCMP aims to dramatically expand reach into remote areas via drones*. Until now, the **RCMP** had been using the off-the-shelf drones for its surveillance work. The tender specification issued by the RCMP requires the drones to have a range of 400 Km, have a top speed of 100 Km/h and have a 5-hour endurance on a single battery charge. The drones must be able to transmit video, thermal imaging and other data back to a base station in real time. The force states that the drones are very useful for search and rescue operations and responding to emergency calls or natural disasters, where time is of the essence. As for crime fighting, the drones can help police locate suspects fleeing from an armed robbery in a remote location, or avoid the dangers of high-speed chases by following a suspect vehicle until it comes to a stop. The National Post article can be viewed at [this link](#). The tender document is available at [this link](#). The deadline for submissions is October 31, 2024.



On October 16, 2024, the **Ministry of Transportation of Ontario** (MTO) announced a 10-year pilot project called *Framework for an Automated Commercial Motor Vehicles* (ACMV). This new initiative is an extension of MTO's 2016 program which allowed testing of non-commercial automated vehicles such as passenger vehicles, light-duty delivery trucks/vans, and small shuttles in Ontario. The new project is specifically designed for commercial vehicles weighing 4,500 Kg or more on Ontario's public roads.



MTO has published the details of the new framework for pilots in a 15-page draft document and has invited all stakeholders and interested parties to comment on it. More information is at [this link](#). The 15-page draft document can be viewed/downloaded at [this link](#). The deadline for submission of comments is November 14, 2024.

International CAV News

Waymo is the self-driving arm of **Alphabet/Google**. Waymo recently announced the release of its sixth-generation self-driving car. The past generations of Waymo vehicles were estimated to cost between US\$200,000 to US\$400,000. The high costs were mainly due to expensive sensors such as the LiDAR units that are used to create an accurate 3D map of the vehicle's surroundings. A LiDAR unit cost was over US\$50,000; however, costs have come down due to advances in technology and more competition. According to Waymo, the sixth-generation vehicles are equipped with 16 cameras, 5 LiDAR, 6 radar, and an array of external audio receivers (EARs). These sensors create an overlapping fields of view around the vehicle, up to 500 metres away, day and night, and in a range of weather conditions. This is the equivalent of over five football fields of visible range. Through advancements in sensor technology and strategic placement, Waymo has been able to reduce the number of sensors while maintaining the safety-critical redundancies. Waymo's new sixth-generation robotaxis are based on electric minivans manufactured by the Chinese automaker **Zeekr**. More information is at [this link](#).



One of the oft repeated benefits of driverless cars is the transport of children and teenagers who do not have their own car or a driver's licence. This benefit appears to be happening in San Francisco where robotaxis have been operating for some time and have built up confidence in the people who use them. An article in

The San Francisco Standard

The San Francisco Standard describes some parents who use robotaxis in that city to transport their children to and from school or for their other activities. They state that they feel more comfortable entrusting their children to a robotaxi than to Uber or Lyft driven by a human. Furthermore, the parents say that through the Waymo app, they are fully in the loop about the pickup and drop off of their kids as well as their exact location during the trip. They also say it frees up their time when they don't have to ferry the children to school and other events. Waymo monitors the inside of their vehicles with cameras which serves as a deterrent against bad behaviour. At present, children and teenagers cannot directly open a Waymo account and arrange for robotaxi rides. The children's rides are arranged through the parent's Waymo account. Waymo is

considering making its rides available to teenagers. The SF Standard article can be viewed at [this link](#).

Another benefit of autonomous vehicles often repeated by advocates of the technology is the expected reduction of fatalities and injuries due to crashes. Reason for this optimism are many: AVs obey all the rules of the road such as speed limits, AVs do not get distracted or tired, they do not become impaired like humans by alcohol and drugs, etc. While all of these are in theory correct, there is scant real-world hard evidence yet to back them up. By contrast, the existing collection of technologies known as *Advanced Driver Assistance Systems* (ADAS) do have a track record of reducing crashes and the resulting injuries. Examples of ADAS are forward collision alerts, autonomous emergency braking, lane keeping assist, blind spot monitoring, adaptive cruise control and others. This is according to information from the **Insurance Institute for Highway Safety** (IIHS). IIHS believes these systems substantially reduce the types of crashes they were designed to address. For example, IIHS has stated that *Automatic Emergency Braking* (AEB) has reduced police-reported rear-end crashes by 50%. The effectiveness of AEB has spurred the **National Highway Traffic Safety Administration** (NHTSA) to make AEB mandatory on all new cars. The agency announced in April this year that by 2029, AEB would be standard on all passenger cars and light trucks. Drawbacks for ADAS are the high cost of repairs if they are damaged in a collision, and the recalibration of the sensor so that it provides the same accuracy as before the damage. More information is at [this link](#)



A recent article in the **Wall Street Journal** (WSJ) titled *How Will Self-Driving Cars Learn to Make Life-and-Death Choices?* delved into some of the less discussed topics that are or will become part of a connected & autonomous vehicle (CAV) future. The oft cited *Trolley Problem* is a simplified version of the ethical issues associated with CAVs. To cast a wider net, WSJ sought points of view from an anthropologist as well as from engineers, programmers and a bioethicist. One of these issues is how CAVs will behave towards animals, i.e. will there be a distinction between large



animals such as a moose or a deer and smaller animals such as dogs, cats and other small animals. The rationale for this is that in a collision with a large animal, chances of fatality and/or injuries are higher. Another intriguing issue is competition between fleets of CAVs owned by different companies. Will there be cooperation among these competing companies, or will the profit motive be the deciding factor? Also, the trade-off between safety and speed is an issue discussed in the article. According to a CAV industry expert, this trade-off is what affects 99% of the moral questions around autonomous vehicles. The WJS article can be viewed at [this link](#).

Ever since **ChatGPT** was released to the public in November 2022, numerous use cases have been found for it. ChatGPT's technology is based on *Large Language Models* (LLMs). Now, novel research at **Purdue University** in Indiana has attempted to marry ChatGPT and a specially trained LLM with autonomous vehicles (AVs). The researchers trained their model to understand implied verbal commands. For example, saying that *I am in a hurry* prompted the AV to drive faster or select the most efficient route to reach the destination. Once the driving task was performed, feedback was provided to the model by saying *I am satisfied with that response* or providing alternative feedback to further train the model. The researchers also added a *memory module* to the system to assist the AI to remember each passenger's particular preferences, something akin to a *digital twin* of the passenger. This helped the AV to behave on subsequent trips the way the passenger preferred a certain task to be performed, e.g., where to park upon reaching the destination. Field testing was done at an old airport runway at highway speeds and at a large parking lot belonging to the university. More information is at [this link](#). A short YouTube video of the AV being tested with spoken commands through ChatGPT/LLM can be viewed at [this link](#).



And finally, it is common knowledge that driverless cars and robotaxis can be made to stop by placing obstacles on the road, placing traffic cones on their hoods and other means. A recent incident involving a **Waymo** robotaxi in San Francisco was widely reported by the media. A couple of men obstructed the Waymo vehicle's path by standing in the vehicle's travel lane. As expected, the vehicle stopped as it was programmed to do. The motivation for the men's action was the lone passenger in the robotaxi who was an attractive young woman. The men started catcalling her and asking for her phone number. The incident was over quickly and the woman in the robotaxi filmed part of this unusual incident with her phone. The robotaxi continued its journey once the men left the road. The passenger reported her experience as terrifying. Unfortunately, this is not the first incident of this type. Waymo advises its passengers to stay inside *when a pedestrian attacks the vehicle*. More information is at [this link](#). A short YouTube video of the incident can be watched at [this link](#).



CAVI Speakers' Bureau

CAVI 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 inquire about a speaker for your event, please write to speakers@cavi-icva.ca

Upcoming CAV-Related Events

November 5 & 25, 2024	Are self-driving cars truly ready for the road? Online webinars by Dutch organization TNO
November 5-7, 2024	2024 Aerial Evolution Canada Conference & Exhibition , Ottawa ON
November 20, 2024	The ever-expanding use of autonomous vehicles , free webinar organized by CAVI
January 23, 2025	J.D. Power Auto Summit , New Orleans
March 19-20, 2025	Connected Places Summit , London, England
April 16-17, 2025	DiscoveryX , organized by the Ontario Centre of Innovation, Toronto, Ontario
April 23-24, 2025	International B2B Forum for Innovations in Automotive & Mobility , Pontiac, MI

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

The Canadian Automated Vehicle Initiative (CAVI - formerly CAVCOE) is an association for all stakeholders in industry, government and academia involved in any aspect of the ever-increasing automated vehicles ecosystem.

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