CAV Update

A monthly newsletter on the CAV ecosystem

December 2022

From the Editors

All of us at CAVCOE wish all of you, our readers, much business success and personal happiness in 2023.

The end of the year is the traditional time to review the past year. Here are the top ten success stories from *CAV Update* in 2022:

- We addressed the perennial question of when will CAVs be deployed. Our answer was that there will be no "light-switch" moment. The CAV era has started, but slowly. CAVs will be deployed incrementally with different deployment scenarios for the various use-cases.
- In February, we reported on the steps taken by the **City of Ottawa** to ban sidewalk robots, following a similar decision by the **City of Toronto**.
- We had several articles about automated freight and the supply chain. One of these reported that **Amazon** uses 350,000 robots worldwide to move parcels around its warehouses. The technologies used for automated freight will act as a stepping stone to the large-scale deployment of passenger CAVs.
- In April, we reported on the personnel aspects of CAVs. The **Transportation Association of Canada** (TAC) had just published a 96-page report titled *Developing Highly Qualified Personnel for an Era of Connected and Autonomous Vehicles*. This major report delved into trends in technology and mobility and suggested skillsets that transportation authorities will need to develop.
- In 2022, **Innovate UK KTN's Centre for Connected and Autonomous Vehicles** was in the news for their substantial funding of £650 Million (US$1.1 Billion), leading to over 90 projects. In addition, the UK has a clear strategy to encourage synergy between stakeholders.
- In the first of its kind in Canada, **Drone Delivery Canada** (DDC) started commercial drone flights in collaboration with its partners from **Edmonton International Airport** (EIA). The partners are **Air Canada** and two local delivery companies providing same day/next day service and last-mile service – **Apple Express** and **Zing Final Mile**.
- **CAVCOE** and its partners **PAVE Canada**, **Gatik**, **Liberty Mutual**, and **Marsh** sponsored a well-attended webinar on *CAVs Today, Emerging Trends and Getting to Market.* We addressed multiple questions such as what autonomous vehicles will we see first and who is liable if things go wrong?

- Fall 2022 saw six Canadian events on different aspects of CAVs and mobility. Some were in-person, some virtual, and some hybrid. CAVCOE is pleased to have been involved in four of these.
- We reported on the report from **Transport Canada** Minister Alghabra's *Supply Chain Task Force and* focused on the fact that it did not mention the use of automated freight vehicles as a way to improve supply chain efficiency and help address Canada's shortage of truck drivers. Our wish for the New Year is that Transport Canada corrects this omission.
- Finally, in November 2021, we reported that Kitchener-based **Swap Robotics** has developed a six-wheeled electrically powered autonomous snowplow for snow clearing and salting on sidewalks. **Transport Canada** and **Innovation, Science and Economic Development Canada** (ISED) has been putting this automated snowplow through its paces.

Canadian CAV News

A **Pizza Hut** store in Vancouver has worked with California-based **Serve Robotics** to deploy its delivery robots for delivering pizzas in a limited area of Vancouver. Upon arrival at the destination, customers used a unique code to open the robot's lids to retrieve what they had ordered. Serve Robotic's motto is *why move a two-pound burrito in a two-ton car?* The company claims that its delivery robots can reduce vehicular traffic, boost local commerce and help merchants get food to consumers in a less expensive way. Furthermore, the company says that half the deliveries made in the country cover less than 2.5 miles (4 Km) and 90 per cent are completed by car. This suggests that delivery robots may be a viable option for short distance delivery of food and other goods, instead of gas or diesel vehicles driven by a person. A Toronto-based company called **Tiny Mile** was offering a similar service in Toronto until it was banned by the City of Toronto in December 2021. Shortly after, the

City of Ottawa implemented a similar ban. According to Tiny Mile, they moved their business to United States where they were welcomed in Florida and N. Carolina. The Vancouver pilot project ran for only two weeks for customers and had a 95 per cent satisfaction rate according to the company. More information is at this link.

On November 30, 2022, **The Globe & Mail** published an article titled *No, you can't buy a self-driving car yet, but a lot of people seem to think you can*. The article explained that many people in Canada and elsewhere are mistaking *driving assist systems* such as *adaptive cruise control* or a *lane keeping system* for a self-driving car. It emphatically says that no one can yet buy a driverless car anywhere. Misleading advertising is partly to blame for this state of affairs. Companies like **Tesla** have described their driver assist system as full self-driving, adding to the confusion for the public. Tesla is being investigated for these claims by the U.S. authorities. Unfortunately, five fatalities involving Tesla vehicles may have been caused by the overconfidence of their owners in the capabilities of what the vehicle is designed to do. The Globe & Mail article can be viewed at this link or this one.

Mississauga-based **Flash Forest** has developed drone technology designed for rapid reforestation of areas devastated by forest fires. Started in 2019, the company has integrated drones, AI, GIS, and plant science technology to automate replanting trees by automated drones. It operates in post-wildfire areas where it might be unsafe for human tree planters to work. So far, the company has landed two major contracts for its technology. One is for **Emissions Reduction Alberta** (ERA) for $1.8 million, and the other is for the federal government (**Natural Resources Canada**) for $1.33 million. The ERA contract calls for planting four million trees by 2023 in northern Alberta. The federal project is part of its plans to plant two billion trees by 2030. More information is at this link.

The **Schulich School of Engineering** at the **University of Calgary** now has a state-of-the-art driving simulator to aid with the research into automated vehicles and other advanced technologies. One of the areas of research is the interaction between automated vehicles and human-driven vehicles. This is a key area as the transportation system gradually moves towards vehicles under AI control. There will be a long transition period when both types of vehicles will have to share the road infrastructure. Another area of research is *Human Factors*, which encompasses how drivers perceive and react to information and feedback from the vehicle as well as the layout and functions of the vehicle's instrument panel and in-vehicle displays. The lab

uses a partial *Ford Focus* cab which is set in front of a realistic, virtual roadway display. This enables users to assess new driving technologies. More information is at this link.

International CAV News

Werner Enterprises is a major U.S. trucking company based in Omaha, Nebraska. Werner's fleet consists of approximately 10,000 tractors, 26,000 trailers; and it has 14,000 employees. Always looking for greater efficiency and lowering operating costs, it has partnered with the self-driving truck developer **Kodiak Robotics** to put the autonomous technology to work in a real world setting. To this end, the two companies undertook a *24/7 Long-Haul Autonomous Freight* pilot project consisting of eight trips between Dallas, Texas and Lake City, Florida – a distance of about 938 miles (1,510 Km). Safety drivers were onboard during these trips in case manual intervention was required. The first mile/last mile driving was done manually but most of the highway driving was done by the *Kodiak Driver* autonomous system. More information is at this link.

In another pilot project between Kodiak and **U.S. Xpress**, a self-driving 18-wheeler spent more than five straight days hauling goods between Dallas and Atlanta. Running around the clock, it traveled more than 6,300 miles (10,139 Km), making four round trips and delivering eight loads of freight. This five-day drive demonstrated the potential of autonomous trucks. A traditional truck, whose lone driver must stop and rest each day, would need more than 10-days to deliver the same freight.

Kodiak is also involved in a project with **IKEA**. On a daily basis, it delivers goods from an IKEA warehouse near Houston to a store close to Dallas, roughly 300 miles (482 Km) away.

Staying with **Kodiak Robotics**, the US Army's *Robotic Combat Vehicle* program has awarded a US$50 million contract to Kodiak to develop automated military vehicles for the purposes of reconnaissance, surveillance, and other high-risk missions. The automated vehicles will be designed to navigate complex terrain where GPS reception may be poor or non-existent. Furthermore, the Army will have the ability to remotely operate the vehicles when necessary. Kodiak Robotics has raised US$245 million in venture capital funding so far. The **U.S. Department of Defense** is listed as one of its investors. More information is at this link.

New regulations and procedures governing automated trucks has been drafted by the U.S. organization **Commercial Vehicle Safety Alliance.** CVSA has developed new guidelines and procedures for the new crop of commercial motor vehicles equipped with automated driving systems (ADS) which includes autonomous or driverless vehicles.

The trucks so equipped differ substantially from the regular trucks driven by a human driver. Whereas the human driver is responsible for a pre-trip and post-trip inspection of his/her commercial rig, with an automated truck, these are no longer possible. Thus, the need for new procedures for inspections as well as compliance with state laws, law enforcement and a host of other systems and regulations applicable to the trucking industry. For example, the automated trucks must be able to communicate with law enforcement while in motion to confirm that it has passed the origin/destination inspections, that its automated driving systems (as a whole) are functioning, and it is operating within its operational design domain. Many organizations were involved in drafting the new rules, among them the commercial motor vehicle law enforcement, the autonomous trucking community (through **Autonomous Vehicle Industry Association**), state and local government officials, and the **American Trucking Associations** (ATA). More information is at this link.

Australia is moving cautiously towards deploying automated vehicles on its public roads. The federal government is working on drafting its *Automated Vehicle Safety Law* with an expected completion date of 2026. The government is trying to protect the safety of pedestrians, cyclists, and motorists while not stifling innovation and technological progress. Autonomous trucks, cars, buses, motorcycles and shuttles have been tested on public roads in every Australian state and territory, starting in 2012. However, all of these have been on an experimental basis and in limited areas. As elsewhere, the current roadway infrastructure will play a role in the deployment of AVs in Australia. AVs need to be able to exchange information with traffic signals as well as read road signs and lane markings. More information is at this link.

On December 5, 2022, **ITS International** published an article titled *How to make people feel safe with AVs*. The article detailed the conclusions of a 3-year study between UK's **Imperial College**, **DG Cities**, and **DRisk.ai**. The goal of this collaborative research was to gauge how the public feels about the safety of automated vehicles and whether people actually trust them. As expected, there is a large divergence of views depending on demographics such as age, urban dwellers versus rural, and even whether people felt safer travelling in an AV in daytime or night. Other findings included most people wanting the AV software to be

re-certified on an annual basis and have an independent body perform an audit of the AV software. Some of the statistics coming out of this report and the article itself can be viewed at this link.

On December 5, 2022, automated truck developer **TuSimple** and truck manufacturer **Navistar** put out a joint news release stating that they have cancelled an agreement for joint devlopment of automated truck technology. Back in 2020, under the agreement, Navistar had taken an equity position in TuSimple. The cancellation is probably due to doubts about the viability of driverless trucks in the near future. Furthermore, TuSimple claimed to have about 7,000 orders from major logistic companies such as **DHL**, **Schneider**, and **U.S. Xpress**. TuSimple was one of the first AV companies to tap the public markets raising about US$1.1 billion in its Initial Public Offering (IPO) in April 2021. At the time, the company was valued at nearly US$8 billion. The current market cap for TuSimple is US$306 million. More details are at this link.

Aurora is one of the leading AV developers for both passenger cars and commercial vehicles. It recently published a fairly detailed account of how it handles AV safety concerns for its various vehicles. Called the *Safety Case Framework*, it is a rigorous process of identifying numerous safety cases, gathering evidence, analyzing them and then accepting or rejecting the solutions for inclusion in the operational parameters of the AVs under development. Depending on the scenario, safety cases can differ. For example, the vehicle under test might be an AV on a public road (as opposed to a closed test track) with an operator behind the wheel, or it might be an AV on a public road without an operator behind the wheel (driverless), or it might be an AV owned and operated by a customer operating on a public road in a driverless mode. More information is at Aurora's site at this link. A 4-minute video of Aurora's *Safety Case Framework* can be viewed at the same link.

And finally, on November 29, 2022, the **City of San Francisco** approved the use of so-called *Killer Robots* for use by the **San Francisco Police Department**. The purpose of these robots was to tackle extreme law enforcement cases that posed imminent risk to loss of life to members of the public or officers, and when the benefits of using the robots outweighed any other force option available. Following strong opposition to this initiative by the public and some of the City's elected officials, the City rescinded its approval on December 6, 2022. In 2016, police in Dallas, Texas, used a robot armed with C-4 explosive to kill a sniper who had killed five officers and injured several more. More information on the initial approval for the use of *Killer Robots* is at this link. And information on rescinding the approval is 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

Upcoming CAV-Related Events

Feb 1-3, 2023	UITP North America Forum 2023, Jacksonville FL, USA
Mar 15, 2023	CAM Innovators Event 2023, hosted by Zenzic and held at IET Place, London, UK.
June 4-7, 2023	UITP Global Public Transport Summit, Barcelona, Spain
June 7-8, 2023	AutoTech: Detroit, Suburban Collection Showplace, Novi MI, USA
June 12-15, 2023	Hexagon | AutonomouStuff News, Autonomy & Positioning Reality Summit, HxGN LIVE Global 2023, Las Vegas NV

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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