CAVCOE

CAV Update

A monthly newsletter on the CAV ecosystem

May 2022

From the Editors

Recently, **Innovate UK KTN's Centre for Connected and Autonomous Vehicles** (CCAV) held an Industry Engagement Event which CAVCOE attended. Innovate UK KTN (Knowledge Transfer Network) exists to connect innovators with new partners and new opportunities beyond their existing thinking - accelerating ambitious ideas into real-world solutions. Innovate UK KTN is part of the **Innovate UK Group**– the UK's innovation agency.

Within this ecosystem, there is substantial activity including £250 Million in government investment, £400 Million in industry investment, leading to over 90 projects. In addition, there is a clear strategy to encourage synergy between stakeholders. One example is *Test Bed UK*, which brings together six separate test sites for self-driving vehicle technologies with the capability to take ideas from concept to development both virtually and physically. The UK's comprehensive and integrated facilities are world-leading, with a unique ability to cross-share data and a collaborative way of working.

There is a lesson here for Canada. Too many of the activities in Canada are independent silos. For example, the Canadian CAV test sites are very good, but also independent and generally view each other as competitors. We are a strong believer in the importance and benefits of synergies, as well as the maxim that a rising tide lifts all ships.

Another example is that the UK has developed and published a CAV roadmap to 2030. Canada has nothing like this.

Based on all this, we continue to advocate for national CAV synergies in Canada. This requires a key role for Canada's Federal Government to encourage and provide more funding, especially to help stakeholders connect, and CAV testing and deployment.

Canadian CAV News

Borden Ladner Gervais (BLG) has announced a *Smart Mobility Summit* to be held on June 13, 2022 in Toronto. The in-person summit will examine topics such as the concerns facing manufacturers, suppliers, mobility solution providers, and adopters as part of the Canadian smart mobility transformation journey:

- Trade challenges for smart vehicle manufacturing in Canada
- Electrification & net zero: Navigating the energy transition

- Automated logistics solutions: use case perspectives
- Smart mobility readiness
- Regulations & Technology: examining smart mobility readiness

Details and registration information are here, or contact Heaven Melo at RSVPToronto@blg.com.

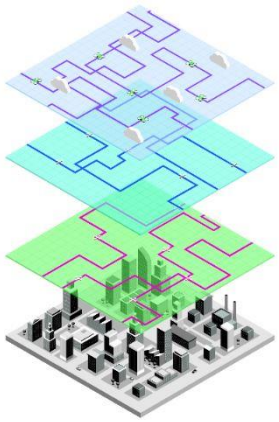
The **University of Calgary**'s Department of Mechanical and Manufacturing Engineering is host to the *Unmanned Vehicles Robotarium Lab* where advanced robotic R&D takes place. One of the projects under development are guided and autonomous robots designed for search and rescue missions in urban environments. Backed by a $500,000 grant from **National Sciences and Engineering Research Council** (NSERC), the University has partnered with **Canada Task Force 2** (CAN-TF2) and **Calgary Emergency Management Agency** (CEMA) for this research project. To gain a realistic understanding of how search & rescue missions are performed, the research team has interviewed many *subject-matter-experts* to learn about various situations and the type of spaces being explored in order to determine what would the best course of action. The information thus gained is used to train the robots. More information is at U of C's site at this link.

Staying with robotics, Edmonton-based **Greenco Robots** manufactures robots for deployment in resturants, golf clubhouses, hotels, banquet halls and supermarkets. Partly due to the current labour shortage in the food services industry, a Lethbridge resturant has procured one of Greenco's robots to supplement its staff. The robot named *Bella* has been a big hit with the resturant staff and customers. She can deliver food to tables, take away dirty dishes to the kitchen and say 'thank you' and 'bye' to the customers. *Bella* has a fairly large price tag. According to the resturant manager, the robot costs close to the price of a new car. Still that is about half of what the annual salary of a human would cost at this resturant. More information is at this link. A short video of *Bella* in action can be viewed at the same link.

Tesla is often in the media over its self-driving technology. Its latest self-drive technology known as *Full Self-Drive* (FSD) has been available in Canada for about 6-months. There are approximately 1,000 *beta testers* of FSD in Canada at present. The testers are selected by Tesla based on their driving behaviour in their respective Tesla vehicles. The **CBC** published a recent report and video on one such tester living

in St. John's, Newfoundland. Unlike newer cities with a regular grid layout, ancient St. John's roads are mostly narrow and winding. This makes it specially challenging for Tesla's FSD to navigate and drive. The person profiled in the CBC report owns a Tesla *Model Y* which is equipped with FSD. In the narrated video, he selects the start and ends points of the route on the Model Y's touchscreen map and the vehicle does the rest, even turning on the wipers automatically when needed. The CBC report and video can be viewed at this link.

Toronto-based **AirMatrix** is a technology company specializing in development of *Unmanned Aircraft Traffic Management* (UTM) for future drone fleets deployed in urban environments. AirMatrix has partnered with the Cities of **Calgary** and **Waterloo** to deploy and test its technology in collaboration with the local drone operators. According to AirMatrix, just as cars need roads and trains need railways to properly function, future drone fleets will need precision aerial pathways to operate safely over an urban environment. The results of AirMatrix's findings will be anonymized and shared with **Transport Canada** to support the development of the standards required for the next phase of complex drone operations. More information is at this link or this one. A short video of how AirMatrix system works can be viewed at the company's website at this link.



International CAV News

On April 20, 2022, UK's **Department for Transport** (DfT) announced its intention to update the *Highway Code* to accommodate autonomous vehicles. This is partly due to the rapid pace of development of CAVs in Britain and elsewhere. And according to DfT, the economic benefits of the technology are very significant. DfT predicts that the development of self-driving vehicles could create around 38,000 new, high-skilled jobs within Britain's industry which could be worth £41.7 billion by 2035 (US$51.6 billion). The update to the *Highway Code* follows an extensive public consultation launched by the UK government. The findings indicated that the majority of respondents were broadly supportive of the proposed changes to the *Highway Code* to clarify drivers' responsibilities in self-driving vehicles. It is expected that the introduction of the technology will begin with vehicles travelling at slow speeds on motorways, such as in congested traffic. More information is on DfT's website at this link.

Department for Transport

Most of the development work and testing of autonomous cars and trucks occur in the U.S. sunbelt. However, expectations are that AVs be able to operate in all kinds of weather including wintery weather. To this end, automated truck developer **Embark** initiated a winter testing program beginning in January 2022. Testing took place on a 60 mile (96.6 Km) round trip on public roads between cities of Clinton and Missoula in the state of Montana. According to Embark, under snowy conditions, common sensors such as LiDAR do not perform that well. Same goes for the High-Definition (HD) maps used by many AV developers. Snow and ice distort HD maps hiding crucial landmarks, lane markings and other artifacts. Embark states relying more on cameras and its proprietary *Vision Map Fusion* (VMF) technology produced much better results. More information is at this link.

In 2019, **IBM** filed a patent for a project that would permit it to manage information and interactions for autonomous vehicles using blockchain technology. Though the blockchain technology has found applications in many business areas, automotive sector has not been one of them. IBM hopes to change this. The challenge is immense. Billions of IoT devices must interact with each other with little delay. These interactions must be auditable and shareable. One of the biggest hurdles for creating a commercial blockchain in the automotive sector is the sheer number of parties that need to be convinced to use decentralized ledgers. IBM estimates that by 2025, up to 8 million cars may be on the road equipped with some of automated technology. More information is on IBM's site at this link .

Privacy advocates have been alarmed by reports that some police forces have used data gathered by autonomous vehicles for their investigations. Two of the leading AV developers **Waymo** and **Cruise** have stated that if law enforcement present their companies with a proper warrant, they will comply and disclose data from their fleet of AVs. This includes video footage captured by the AV's cameras. Through a public records request, media company **Vice** obtained a copy of a guidance document prepared by the **San Francisco Police Department** (SFPD) on how SFPD police officers should deal with autonomous vehicles if the need arises. More information is at this link. A copy of SFPD's guidance document can be viewed/downloaded at this link.

As part of its Smart City initiatives, **Seoul's Municipal Government** (SMG) is deploying two autonomous robotic vehicles to patrol a certain district of the South Korean capital. Dubbed the *Autonomous Robot Patrol Service*, Seoul claims this to be the first municipal government to introduce robots as patrols. Two autonomous robots will be deployed on public roads to keep the city safe at night. The robots will patrol dark neighbourhoods late at night to ensure citizens can return home safely. When risks are detected, robots will send live footage to the district's CCTV control centre so that they can rapidly respond to emergencies and prevent crimes. The robots are also capable of monitoring and warning against illegal parking activity such as obstructing the entrance to an EV charging station. More information is at this link.

An U.S. organization called **freeCodeCamp** is a non-profit that helps people learn to code by building projects. One of its recent courses was on how to write a simulation program in *JavaScript* to simulate a self-driving car. The course teaches how to implement the car driving mechanics, how to define the environment, how to simulate some sensors, how to simulate traffic, how to detect collisions, and how to make the car control itself using a neural network. More information is at this link. The course includes a 2.5 hour YouTube video. The YouTube video can be viewed at this link.

Many companies are engaged in commercializing the nascent *electric vertical take-off and landing* (eVTOL) air vehicles (Airtaxis). These come in both manned and unmanned variety. A lot of venture capital money is supporting these developments. In what is touted as the world's first project of its kind, the UK company **Urban Air-Port** launched an experimental *vertiport* in Coventry, UK on April 25, 2022. Dubbed as *Air-One*, this demonstration project is backed by the UK government and eVTOL developer **supernal**. Airtaxis are viewed as a new form of transport with the benefits of zero-emissions and congestion-free travel between and within cities. Urban Air-Port plans to redeploy *Air-One* to other locations after the Coventry demo project is over. The company claims it has plans for up to 200 vertiports

around the world including London, Los Angeles, Australia, South Korea, France, Germany, Scandinavia and South-east Asia. More information is at this link. A recent **CBS 60 Minutes** report on eVTOL companies and development can also be viewed at this link. The video is 13-minutes long.

An article titled *Driverless trucks tech echoes the big tech frenzy of two decades ago* in **landline.media** looks back at some prominent firms from 20-years ago who were promising to revolutionize the trucking industry; much as many automated trucking companies do today. The point of the article is to draw a lesson on overpromising and under-delivering. Case in point is **Peloton,** a company working on truck platooning. Founded in 2011, it raised over US$78 million in funding, did some notable demonstrations of its technology and eventually went out of business in 2021. The article can be viewed at this link.

And finally, **Dan O'Dowd** a technology billionaire from California is planning to run for a U.S. Senate seat in the June 6, 2022 primaries. He is the CEO of **Green Hills Software** and financing his own campaign. His single issue is to reign in what he considers unsafe software deployed is self-driving cars and United States' critical infrastructure. Specifically, he has taken aim at Tesla's *Full Self-Driving* (FSD) system running in estimated 50,000 Tesla vehicles. His LinkedIn profile summary says *I am running for U.S. Senate to make computers safe for humanity and ban Tesla Full Self-Driving.*

According to Mr. O'Dowd, Tesla's FSD system, along with most other driving systems, are written using insecure and buggy "consumer grade" software methodologies, and thus present great risk for failure and computer intrusion. He claims that Tesla's FSD encounters a problem every 8-minutes or so. Others who disagree with O'Dowd point out that there are close to 300 companies working on various aspects of self-driving car development and that this is an industry-wide challenge. At present, the driver is always supposed to be paying attention and protect the vehicle if it does something unexpected. More details at this link.

CAVCOE Speakers' Bureau

As COVID recedes, we are seeing more in-person events being planned. CAVCOE provides speakers for many different types of events across Canada, the US and overseas; we are now booking for 2022 and 2023. This keeps us busy because people understand that CAVs will have an impact on almost everything, including passenger transportation, freight and logistics, and service vehicles. On the one hand, our presentations have core messaging on the status of CAVs, their deployment scenarios, the challenges, and the impact on business plans, government policy, 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

June 8-9, 2022	AutoTech: Detroit, Novi, Michigan
June 9, 2022	Preparing for the Future of Autonomous Delivery Robots, free Webinar by Innovation Factory
June 9, 2022	Automated Freight & Logistics Technology Development in UK, free Webinar by Zenzic
June 13, 2022	BLG Smart Mobility Summit, free in-person seminar, Toronto, Ontario
June 20-23, 2022	HxGN LIVE Global, Las Vegas, Nevada
June 21-23, 2022	ADAS and Autonomous Vehicle Expo, Stuttgart, Germany
July 18-21, 2022	Transportation Research Board (TRB) Automated Road Transportation Symposium (ARTS), Garden Grove, Calif.
Sept 7-8, 2022	ADAS & Autonomous Vehicle Technology Expo, San Jose, California (postponed from March 2022)
Nov 16-17, 2022	North American Winter Weather Conference, Winnipeg and Thompson, Manitoba, Canada

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.

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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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