CAVCOE

CAV Update

A monthly newsletter on the CAV ecosystem

April 2022

From the Editors

Sometimes, a well-known global trend becomes very real on a personal level. In this case, the trend is the slow-down in the production of new cars and the resulting increased wait times for delivery. The reasons are well-known: the pandemic-based reduction in demand for new cars, which caused production cutbacks and layoffs, followed by the recent, sudden increase in demand which the car manufacturers are still adjusting to. Linked to this is the shortage of semiconductor chips for cars, a problem made worse by the war in Ukraine which has impacted the availability of neon gas used in the manufacture of chips. A further factor is the increase in the price of fuel, which has a lot of people deciding that ***now*** is the time to go electric. All these issues impact, of course, all types of cars and not just CAVs.

This became personal when I went to a local dealership to order a new battery-electric car. I had done my research and selected a make and model but discovered that the manufacturer has stopped accepting orders from dealers until they can address the backlog. I signed the purchase agreement and put down my deposit. This will be held by the dealer until the manufacturer opens up its order book. When will my new car be delivered? I don't know! My best guess is sometime in 2023. The worst case scenario could even be 2024. What crazy times we live in!

Canadian CAV News

Ontario Vehicle Innovation Network (OVIN) in collaboration with **Rogers Communication** has organized *5G Transportation Challenge*. This challenge is aimed at *Small & Medium Enterprises* (SME) to motivate them to develop innovative transportation related projects leveraging Rogers' 5G network. Specifically, projects needing ultra-low latency application - a feature of of 5G technology, high precision positioning technologies and *Multi-access Edge Computing* (MEC) are sought.
Deadline for submissions is May 2, 2022. More information is at this link.

In a somewhat related story, on March 14, 2022, **Rogers Communications** and Ontario's **Sheridan College** announced a two-year partnership that will focus on 5G autonomous vehicle research and development through Sheridan's *Centre for Mobile Innovation* (CMI). The collaboration will involve studying the potential of integrating navigation, diagnostics, and infotainment systems into autonomous vehicles over new 5G wireless technologies and networks. The 5G research will focus on the following applications:

• autonomous public transportation systems
• driverless taxis
• autonomous delivery systems
• assisted driving for seniors and people with disabilities

More information is at this link.

With the use of Artificial Intelligence, Machine Learning, and other emergent technologies, the certification of CAVs increasingly depends on the development of a safety or cybersecurity assurance case that argues that the system is safe or secure. Vancouver-based **Critical Systems Labs Inc.** has developed a software tool, *Socrates – Assurance Case Editor*, that helps its clients create and maintain assurance cases for autonomous vehicles and other kinds of high assurance systems. Originally developed by CSL for internal use in providing safety engineering expertise to clients, *Socrates* is now a commercial product used by organizations developing substantial assurance cases as part of their overall engineering and regulatory processes.

CSL describes a safety or security assurance case as a "structured argument, supported by a body of evidence, that provides a compelling, comprehensible and valid case that a system is safe for a given application in a given environment" (UL 4600 1st Edition, 2020). These engineering artifacts are required for compliance with internationally recognized standards such as ISO 26262, ISO 21434, SAE J3061, and UL 4600. Assurance cases are complex engineering artifacts that require input from a diverse range of collaborators, each offering their own expertise. *Socrates* offers a team-oriented environment to develop and maintain assurance cases. For more information on *Socrates*, see the overview video and brochure, or contact socrates@cslabs.com.

On April 1, 2022, **Transportation Association of Canada** (TAC) published a 96-page report titled *Developing Highly Qualified Personnel for an Era of Connected and Autonomous Vehicles*. This major report delves deep into trends in technology and mobility over the next 20-years and suggests skillsets that transportation authorities will need to develop. It also examines current measures to educate and train HQP in Canada, identifies key gaps, and recommends a comprehensive action plan that focuses on educating the future transportation workforce, training the existing transportation workforce, and improving human resources practices.

The report is supplemented by a two-part (95-pages) *Technical Appendices* where Appendix A details the literature review, and Appendix B details the engagement process with road authorities. A copy of the report can be downloaded at this link.

International CAV News

Aurora Innovations Inc. is one of the key players in the development of autonomous cars and trucks. In a recent announcement, Aurora indicated that it is developing a common set of hardware platforms (sensors, compute and other components) that could be installed on both cars and trucks. Aurora's rationale for this is that AV trucks and cars will drive on the same roads, see the same things, and obey the same traffic laws. Therefore, hardware that is optimized for these common requirements and made transferable across vehicles enables the more rapid development of self-driving technology. Furthermore, Aurora states that the sensors are designed to blend in with the vehicles body so as to cause as little disturbance to the vehicle's aerodynamics as possible. Aurora's approach to its hardware suite is similar to its *Driver* software which at its core is common to all types of vehicles Aurora is planning to automate. More information is on Aurora's website at this link.

Staying with **Aurora**, the company is planning to launch a robotaxi service in Texas in collaboration with its partners **Toyota** and **Uber**. Known as *Aurora Connect*, the development work is occurring in the Dallas-Fort Worth area using modified Toyota Sienna minivans. Aurora hopes to offer robotaxi service to places such as DFW airport. The company's automated trucks are already ferrying goods for *Uber Freight* in Texas. More information is at this link.
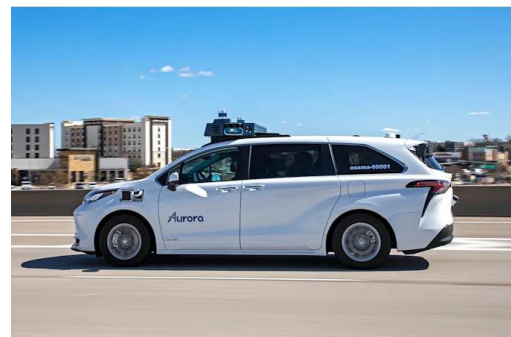
A 9-page report by **Keysight Technologies** titled *How 5G Will Influence Autonomous Driving Systems* delves into the benefits of 5G technology in the automotive context. It is also a good primer on wireless communication in its various forms and beneficial for vehicles equipped with *Advanced Driver Assitance System* (ADAS) as well as autonomous vehicles. While, many people are familiar with the basic workings of vehicle-to-vehicle (V2V) and vehicle-to-infrastructure communication, the report provides further insights into vehicle-to-pedestrian (V2P), vehicle-to-utility (V2U), vehicle-to-network (V2N), vehicle-to-grid (V2G) and eventually vehicle-to-everything (V2X) technolgies. 5G's very low latency (about 1 ms and 99.999% reliability) and significant carrying capacity (up to 20 Gb/s for video/audio/mapping communication) are cited as contributors to enhanced safety of vehicles equipped with 5G communication. A copy of the report can be downloaded at this link or this one.

In March 2022, **The British Standards Institution** (BSI) in collaboration with the UK's **Centre of Connected & Autonomous Vehicles** (CCAV) published a 20-page document titled *Connected & automated vehicles: Vocabulary BSI Flex 1890 v4.0:2022-03*. This is fourth version of this vocabulary. The first version was first published in January 2020. BSI states that the reason for creating this vocabulary is to have a consistent understanding of industry terms and acronyms to promote communication and reduce ambiguity within the global connected and automated vehicle (CAV) sector. The vocabulary defines 95 key terms including ego vehicle, remote operation, object and event detection and response, full trip feature, and dynamic driving task. Furthermore, 51 most commonly used abbreviations and acronyms such as ADAS, RADAR and CAM are decoded in the document. The vocabulary can be viewed/downloaded at this link.

In the recent **Mobile World Congress** in Barcelona, leading Indian IT company **Wipro Ltd.** unveiled its cloud-based *Software Defined Vehicle* (SDV). Wipro claims this is the first product of its kind and intended for automakers and related industries. This technology builds on the trend to add or enhance functionality of vehicles through software updates using Over-the-Air (OTA) wireless technology. Wipro believes this is beneficial to both automakers and consumers by reducing the need for physical recalls and increasing a vehicles' residual value, and ultimately help with the development of autonomous vehicles by collecting various data from the vehicle and the driver. Wipro indicates that it

has enlisted 40 partners for its SDV project who are focused on key technologies. More details at this link.

An insurance-related website called **carsurance.net** has compiled a list titled *24 Self-Driving Car Statistics & Facts.* The information is compiled from various sources such Forbes, New York Times, The Verge, Business Insider, The National Law Review and other sources. Starting with the first autonomous car concept introduced at the *Futurama* section at New York World's Fair in 1939, it jumps to the recent history of AVs and into some of the less publicized aspects of automated vehicles such as the common types of accidents that AVs are involved in. The article can be viewed at this link.

The role of Pentagon's **Defense Advanced Research Projects Agency** (DARPA) in kickstarting autonomous vehicle development in the early 2000s is well documented. Lesser known is DARPA's *Subterranean (SubT) Challenge* which was initially launched in 2017. *SubT* was focused on four key technical areas: autonomy, perception, networking and mobility.

Through these technologies, *SubT* was intended for exploiting complex underground environments such as human-made tunnel systems, urban underground, and natural cave networks. All these environments present challenges for military and civilian first responders; hazards vary drastically across terrain that can change over time, making it too risky for personnel to enter. Typical real-life scenarios include rescue efforts in collapsed mines, post-earthquake search and rescue in urban underground settings, and cave rescue operations for injured or lost *spelunkers*, people whose hobby is exploring and studying caves. The final competition was held in September 2021 and involved 20 teams competing for US$5 million in prize money. More information is on DARPA's site at this link. A short YouTube video about the final *SubT* challenge can be viewed at this link.

In a vote of confidence in autonomous vehicle future, **General Motors** (GM) recently increased its ownership stake in **Cruise** to 80%. This was achieved by buying out Japan's **SoftBank** stake for US$2.1 billion and pledging to invest an additional US$1.35 billion in Crusie. The rationale according to Mary Barra, GM's CEO, is to simplifiy Cruise's shareholder structure and to provide Cruise with maximum flexibility in pursuit of commercializing and unlocking the full potential of AV technology. Other minority stakeholders in Cruise are **Microsoft**, **Walmart** and **Honda**. More information is at this link.

In an industry first, **Mercedes-Benz** (MB) has taken legal responsibility for its semi-autonomous Level 3 system. Until now, the onus for the control of the vehicle had been on the human driver. The new system named *Drive Pilot* is available in some models of Mercedes S-Class or EQS passenger cars. At present, MB has obtained government approval only in Germany. It hopes to do the same in California and Nevada by the end of 2022. *Drive Pilot* operates under very specific circumstances. For example, *Drive Pilot* can only engage at speeds under 40 mph (60 km/h in Germany) on limited-access divided highways with no stoplights, roundabouts, or other traffic control systems, and no construction zones. Eligible roads must be mapped by Mercedes for *Drive Pilot* use. MB has already mapped every such highway in Germany, and most of those in Nevada and California. The system will only operate during daytime, in reasonably clear weather, without overhead obstructions. Inclement weather, construction zones, tunnels, and emergency vehicles will all trigger a handover warning. More information is at this link.

Ford Motor Company has formed a new business unit known as *Ford Next*. The company's AV arm - Ford Autonomous Vehicles LLC is now rolled into *Ford Next*. Same goes for Ford's stake in AV developer **Argo AI**. The creation of *Ford Next* is part of a major restructuring by CEO Jim Farley. The passenger car-making operations of Ford have now been split in two. *Model e* for electric models and *Ford Blue* for traditional internal combustion engine vehicles. And Ford has created *Ford Pro*, which focuses on commercial vans and trucks. More information is at this link.

At the recent **South by Southwest** (SXSW) event, Swedish AV company **Einride** demonstrated its new *Remote Pod Operator* system. Einride has specialized in building automated trucks without a driver's cab. These are known as *Pods*. The *Remote Pod Operator* allows these pods to be remotely monitored and controlled from a control room. Einride employs professional truck drivers for this task. One operator can monitor one or more Einride pods in the field. Long hours away from home in a stressful, body wrecking environment. As a *Remote Pod Operator*, truckers could put in a normal eight hours and go home to their families like anyone else. They could stand up

and stretch, like any other officer worker. More information is at this link. A short YouTube video of the remote pod operator can be viewed at this link.

The International Telecommunication Union (ITU) held its annual *Future Networked Car* symposium virtually from March 22nd to March 25th. The theme of this year's symposium was *Moving Towards Automated Driving*. During these four days, participants examined the latest advances in automated driving, vehicle connectivity, cybersecurity and artificial intelligence. The program for this major event and the related videos can be viewed at ITU's site at this link.

And finally, in late March 2022, a **Cruise** driverless robotaxi in San Francisco was investigated by **San Francisco Police Department** (SFPD) for a traffic violation. Some media reports say that the robotaxi did not have its lights on when it was night. Other reports say that the vehicle drove too close to some pedestrians. This being the first of its kind, the attending police officers were a little confused in how to deal with the situation. Especially since the Cruise vehicle pulled away from the attending officers after it was first inspected by the officers. Cruise claims the car was not making a run for it, merely pulling away and stopping in a safer place. Police got in touch with Cruise and the issue of the errant AV was resolved. More information and a short video of the incident are at this link.

Upcoming CAV-Related Events

May 25-26, 2022	Autonomous Vehicles USA 2022, Huntington Beach, California
June 8-9, 2022	AutoTech: Detroit, Novi, Michigan
June 20-23. 2022	HxGN LIVE Global, Las Vegas, Nevada
June 21-23, 2022	Autonomous Vehicle Technology Expo, Stuttgart, Germany
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, 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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