From the Editors

CAVCOE is pleased to announce that it is organizing and hosting the inaugural meeting of the **Canadian CAV Advisory Group**.

The objective is to add to the excellent work currently being conducted by all stakeholders in the Canadian CAV ecosystem. The focus is on leveraging the synergies and developing a national, united approach without duplicating the work that is already being done. Through this approach, we can accelerate the benefits to Canada, and make Canada more competitive in the global ecosystem for connected, automated and electric vehicles.

The plan is to meet in January 2024 to discuss the terms of reference, objectives, and a draft action plan for 2024.

The stakeholders who have already agreed to participate include governments, private sector companies, universities, associations, and consultants.

Reports on the Advisory Group's plans and activities will be included in *CAV Update*. Given that you are reading this in *CAV Update*, you are probably already on our distribution list. However, if you received this issue indirectly from someone else and would like you own copy, please send an email *here*, or to cavupdate.subscribe@cavcoe.com

If you have any questions, please click reply and write to Barrie Kirk. He will follow-up via email and/or a zoom call.

Canadian CAV News

Calgary-based **Imperial Oil Ltd.** is a major petroleum producer in the Alberta oilsands. In collaboration with **Caterpillar** and Caterpillar dealer – **Finning**, Imperial has now transitioned all of its 81 heavy haul trucks to autonomous (driverless) technology. This transition has not resulted in the wholesale elimination of truck driver jobs according to company officials. Former truck drivers have been redeployed to work in the control room or other parts of the company's operations. Imperial is aiming at cost savings of

$1 per barrel from its investment in autonomous haul technology. Given that Imperial is producing 280,000 barrels of oil per day on average, the savings are substantial. In addition to driverless trucks, Imperial is working to deploy other new technologies across its operations including big data analytics, virtual reality, robotics and automation and drones More details are at this link. An 11-minute YouTube video of Imperial's autonomous haul efforts can be viewed at this link.

On October 17, 2023, **Ontario Vehicle Innovation Network** (OVIN) signed a Memorandum of Understanding (MOU) with Germany's State of Baden-Württemberg **e-mobil BW GmbH** agency to collaborate on various automotive technologies. This agency is active in developing automated, connected and electric mobility systems. Ontario and Baden-Württemberg State are two of the largest automotive jurisdictions globally and home to a combined total of nearly 2,000 suppliers. It is hoped that this strategic partnership will result in collaborative R&D, technology acceleration, testing and demonstration, talent development, manufacturing and customer development in line with the evolving demand for connected and autonomous driving, electrification, and other emerging technologies. More information is at OVIN's site at this link.

Invest Ottawa and **Four DRobotics** have announced a free webinar on December 13 at 1:00pm ET. The webinar addresses the power of 3D mapping and simulation in autonomous vehicle software development. **Area X.O** and Four DRobotics Corp. will provide an overview of a recent project at Area X.O that tested AVaaS vehicle control software on an autonomous vehicle. In this project, Four DRobotics Corp. and Area X.O codeveloped an environment simulator using Area X.O's high-resolution 3D mapping of its real-world 1,866-acre site. You can register at this link.

Dell is a name normally associated with personal computers, laptops and servers. However, Dell is also a manufacturer and developer of advanced telecommunication equipment. Given the abundance of telecommunication expertise in the Ottawa area, Dell selected **Kanata North** to establish its telecommunications development centre in Canada. Now employing over 400 people in hardware design, software development and system integration, Dell is focused on developing advanced 5G private networks for a wide range of

applications; including connected and autonomous vehicles. Furthermore, 5G technology will enable significant productivity gains in robotics, remote surgery and augmented reality. More information is at this link.

Ontario-based **BlackBerry Limited** and **L-SPARK Corporation** have jointly created an *Accelerator* program to give a boost to companies that are developing solutions for connected vehicles. The solutions are based on BlackBerry's *Intelligent Vehicle Data Platform* known as the *BlackBerry IVY* ecosystem. The joint-venture has recently admitted four new companies into its *Connected Car Accelerator Program* which was co-founded in 2018. They are Montreal-based startup **Deeplite** with expertise in artificial intelligence, Calgary-based **Wedge Networks** with expertise in real-time cybersecurity, **Raven Connected** with expertise in video telematics and **Sensor Cortek** with expertise in neural networks. Both Raven and Cortek are based in Ottawa. These four companies were selected from 25 applicants and will receive $50,000 in matched funding through the program's partnership with the National Research Council of Canada's *Industrial Research Assistance Program* (NRC-IRAP). More information is at this link.

International CAV News

The **Society of Motor Manufacturers and Traders** (SMMT) is the trade association for the United Kingdom motor industry. Its role is to promote the interests of the UK automotive industry at home and abroad. In October 2023, SMMT published an 18-page report titled *Connected And Automated Mobility - The UK Economic And Market Opportunities*. The report is quite bullish on the prospects of *Connected and Automated Mobility* (CAM) for the UK. The report was prepared by **KPMG** and forecasts a £66 billion (approximately US$81 billion at the current exchange rate) benefit to the UK economy by 2040. Other cited benefits are the creation of up to 12,250 new jobs in automotive manufacturing and up to 342,000 additional jobs in various sectors. SMMT calls on the government to introduce new legislation to pave the way for achievement of these goals. More information at the SMMT's site at this link. A copy of the SMMT report can be viewed/downloaded at this link.

As we reported in the October 2023 edition of *CAV Update*, **Cruise**'s permit to operate driverless robotaxis in California was revoked on October 24, 2023 by the **California Department of Motor Vehicles** (DMV) following a pedestrian collision in San Francisco where the robotaxi dragged the injured pedestrian (who was pinned under the car) for 20 feet due to deficiencies in the robotaxi's *Collision Detection Subsystem*. On November 7, 2023, Cruise filed a *Part 573 Safety Recall Report* with the **National Highway Traffic Safety Administration** (NHTSA) where it voluntarily withdrew 950 of its automated vehicles from service pending investigations

and updates to its *Automated Driving System* (ADS). As a result of this incident, Cruise has announced plans for hiring a *Chief Safety Officer* as well as retaining a law firm and a third party engineering company to review what exactly happened in that fateful collision on October 2, 2023. Cruise posted a blogpost explaining these steps and others on November 8, 2023. The blogpost can be viewed at this link. More details from Forbes magazine are at this link. Cruise's 4-page filing with the NHTSA can be viewed/downloaded at this link.


Not that long ago, the automated vehicle community believed that automated trucks might be the first widely deployed AVs on public roads, on a commercial basis. The reason for this optimism was the ever growing truck driver shortage, and the trucking companies desires to lower their operating costs by going driverless. Some believe that up to 40% of the operating cost of a truck is the wages of the driver. These beliefs led to developers of automated truck technology being lavishly funded by venture capitalists in the billions. Although the dream is still alive, reality has set in and some of the companies have not survived, and some others like **Waymo** have drastically cut back their activities in this particular niche. The publication **freightwaves.com** has produced an article detailing who is still in, who is out, and the prospects of all companies still working on this technology. The article can be viewed at this link.

A recent article in **thestreet.com** titled *Engineering whistleblower explains why safe Full Self-Driving can't ever happen* cites a seasoned engineer on why the current *Automated Driving Systems* (ADS) are unlikely to match a human-level of expertise in driving a vehicle. The main issue considered is the necessity of achieving *Artificial General Intelligence* (AGI) for a driverless vehicle to be as good as a human driver. Current ADS systems almost entirely rely on *pattern recognition* via their various sensors such as cameras, Lidar, radar, ultrasonic and other sensors. And the pattern needs to be repeated thousands of times before the machine is *trained* properly. And since there are infinite number of patterns, the task is nearly impossible, and hence the argument for AGI. For example, it is argued that **Tesla**'s ADS needs to improve 100 to 1,000 times its current level to be as good as a human in operating a vehicle. The article can be viewed at this link.

Autonomy is not limited to just cars, trucks and service vehicles. Advances are also being made in both aviation and marine transport. Examples in marine transportation are the services offered by the Belgian company **SEAFAR NV** based in the City of Antwerp. The company has developed systems to assist fully-crewed vessels, reduced personnel vessels, and uncrewed autonomous vessels. The critical link in all three cases is a constant and reliable communication link
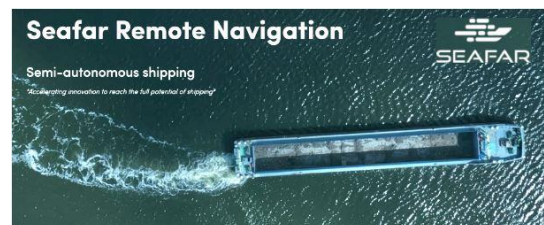
to the vessel at sea. This is done via 4G and 5G terrestrial connections when available, and through communication satellites when cellular services are unavailable. The communication systems transmit live video images as well as telemetry about the ship's location, heading, speed and other data. SEAFAR has integrated *neXat*, a satellite communications services platform, into its remote ship navigation solution for the *short sea shipping* (SSS) industry, which is mainly coastal. The project is co-funded by the **European Space Agency** (ESA) and is being tested at sea by a Belgian short sea shipping company which has vessels sailing in the Baltic Sea and from Spain to the UK and Antwerp. More information is at this link.

A recent article in **ITS International** highlights the critical importance of software code in modern cars, dangers of erroneous code and cybersecurity vulnerabilities of software designed for regular cars as well as connected/automated ones. In the past, many of the functions of an automobile were monitored or controlled through mechanical means. The mechanical systems used ignition timing, fuel, air and engine rotation to monitor and control the vehicle. By contrast, these functions are now controlled by software code embedded in tiny computers known as an *Electronic Control Unit* (ECU). A modern vehicle can have up to 150 ECUs controlling different functions of the vehicle. Any bug in the software code of these ECUs can impact the vehicle's expected behaviour. This becomes even more critical in automated vehicles equipped with a wireless connection, where hackers could exploit any flaws in the software to take control of the vehicle. Extensive testing is required to ensure the software is as perfect as possible. The testing techniques currently used are known as *Software in the Loop* (SIL) and *Hardware in the Loop* (HIL). The ITS International article can be viewed at this link or this one.

While the world is still in the process of transitioning from 4G to 5G cellular technology, the **Next G Alliance** has already outlined the development roadmap for **6G** in a report in February 2022. The 6G technology is in the early stages of development with deployments forecasted by 2028. A research project in Finland is already looking into how 6G technology and autonomous vehicles can be combined to take advantage of this future technology. The project will run until May 2026. More information at this link.

ITS America's *Automated Vehicle Standing Committee* has recently published a couple of documents that will prove valuable to the AV industry. The first document is titled *The Automated Vehicle Resource Database*. It provides the AV industry with a one-stop shop for everything that can help the industry thrive. These include information on passenger mobility, logistics, utility, education & training, planning & development, safety best practices, and regulations. The other resource is a 27-page report titled *Addressing*

the Patchwork – A State by State Analysis for Autonomous Trucking in the US. This report paints a picture pf the current landscape of State policies and regulations impacting the deployment of autonomous trucks and convoys. It helps identify potential barriers and inconsistencies resulting from a "patchwork approach" of policies across the United States. More information is at this link.

And finally, a recent article on **National Public Radio** (NPR) titled *Horseless carriages were once a lot like driverless cars. What can history teach us* looks at the public attitudes 100-years ago towards *horseless carriages* (automobiles) and draws a comparison with today's worries about how driverless cars can impact jobs and social norms. For example, a hundred years ago, many of the members of **Teamsters Union** drove teams of horses for a living. Today, the same Teamsters Union is very concerned about job security for its members driving a truck should driverless trucks go mainstream. In fact, the Teamsters has strongly lobbied the U.S. Congress to put the brakes on legislation on driverless technology to safeguard the jobs of its members. The NPR article can be viewed 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 inquire about a speaker for your event, please write to speakers@cavcoe.com

Upcoming CAV-Related Events

December 14, 2023	CCAV Cohort Event – Shape the Future of Connected and Autonomous Vehicles, Wheatley Campus of Oxford Brookes University, UK
January 9-12, 2024	CES 2024, Las Vegas NV
January 16-17, 2024	Maritime Autonomous Ship Systems (MASS) – MASSive Developments, virtual conference
February 1, 2024	J.D. Power Auto Summit, Las Vegas NV
March 20-21, 2024	Connected Places Summit, London UK
March 26-27, 2024	VTM Vehicle & Transportation Innovation Meetings, Torino, Italy

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 *(aka 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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