AV Update

From the Editors

In the international news section of this newsletter, there is an article about a new 300 km test route in the UK. There are a wide variety of stakeholders including the private sector, government, and academia. This is an excellent project that will help move the technology from secure test sites to extended stretches of public roads.

We propose that Canada does something similar. There are two existing proposals on the table that could achieve this.

As we reported in the March 2020 issue of AV Update, the **Ontario Good Roads Association** (OGRA) has created a new group of municipalities under the brand of *Municipal Alliance for Connected and Autonomous Vehicles in Ontario.* MACAVO intends to create the world's longest CAV corridor. MACAVO's most recent project is called the *Windsor-Ottawa Preferred Corridor.* 33 municipalities participated and collectively identified over 5,000 km of municipal roads - the longest known network of municipal roads in the world today.

A second potential platform is **ENCQOR 5G** (Evolution of Networked Services through a Corridor in Québec and Ontario for Research and Innovation). ENCQOR is a tool for accelerating the transition to the digital economy and will strengthen the competitiveness of Canada, Québec, and Ontario in the global economy. Although ENCQOR's current purpose is focused on 5G, it could be expanded to include CAVs.

Canada is competing in a global CAV ecosystem. To be globally competitive, these and other initiatives need to cooperate, create synergies, and recognize that the real competition is in other countries.

Canadian AV News

Under its *Road Safety Research Partnership Program*, the **Ministry of Transportation of Ontario** (MTO), has awarded a grant to the **University of Windsor** (UoW) to conduct an 18-month study into the benefits and risks of *Advanced Driver Assistance Systems*. The findings of this research will be used by MTO for formulating policy for autonomous vehicles. UoW's Departments of Kinesiology and Electrical & Computer Engineering will collaborate on this research. The former on human factors aspects, and the latter on physiological data processing and machine learning. More information is at this link and UoW's site at this link.

Drone Delivery Canada (DDC) is the drone delivery partner of **DSV** - a global Danish transport and logistics company offering transport services by road, air, sea, and train. In a press release dated May 11, 2020, DDC announced that it has conducted approximately over 400 drone flights per month on behalf of DSV. DDC states that the goods it has delivered for DSV are *time-sensitive cargo*. Previously, DDC had also signed an agreement with **Air Canada Cargo** to complement Air Canada Cargo's services through its delivery drones in Canada. More information is on DDC 's site at this link.

In related drone news, on April 23, 2020, **Transport Canada** announced a revision to its rules for drones operating *Beyond the Visual Line of Sight* (BVLOS). The 28-page *Notice of Proposed Amendment* details new rules for operating ***Remotely Piloted Aircraft Systems*** (RPAS, also known as drones or UAVs) with weights from 250 g to 650 Kg in BVLOS mode. The new rules also expand on drones operating in the *Visual Line of Sight* (VLOS) mode for the same weight range. This is positive news for the Canadian UAV industry for making cargo deliveries, surveillance, and monitoring activities (pipelines, power transmission lines, forestry, etc.) and other areas of application. A copy of Transport Canada document can be viewed/downloaded from their site at this link.

In common with many other organizations, the **Canadian Automobile Association** (CAA) has recognized the importance of automated vehicles in the future transportation system. Accordingly, CAA has devoted part of its website to providing general information on AVs and demystifying some of the myths associated with this technology. The CAA website for AVs can be viewed at this link.

In April 2020, the Canadian law firm of **Borden Ladner Gervais** (BLG), published a blog post titled *Autonomous transportation in the time of COVID-19.* It delves into the many ways automated vehicles have helped with the different aspects of the COVID-19 pandemic. The blog covers five broad areas: CAVs, Logistics, Maritime, UAVs and containment, and the Gig Economy. The blog can be viewed on BLG's website at this link.

BLG has also published a briefing note on its review of UL 4600, the first safety standard for fully-autonomous vehicles. The briefing note is at this link.

Previous issues of AV Update have included articles about **DOT Technology**, based near Regina SK and the developer of fully-automated agricultural equipment. We have reported that **Raven Autonomy**, based in the US, had purchased a majority share of DOT. The latest news is that Raven has announced that it is acquiring all of DOT.

For us, this is bitter-sweet. It is wonderful that the Canadian-developed technology is being recognized in this way. On the other hand, we wish DOT ownership had stayed in Canada.

CASPI News

CASPI is pleased to announce that *Team VAUL* from **Laval University** is the winner of the technical paper portion of the **2020 Student Snow Plow Competition**. Congratulations!

The photo below shows Maxime Vaidis, President of VAUL (Véhicule Autonome Université Laval) and the winning team.

Six student teams participated in the competition: Team VAUL and:
   Carleton Autonomous Rovers - Carleton University
   Fanshawe Falcons - Fanshawe College
   McMaster Autoplow - McMaster University
   OC Autoplow - University of Ottawa, Carleton University
   Team Caribou - University of Ottawa, Carleton University

They submitted comprehensive technical papers detailing their autonomous vehicles at the end of April - despite the challenges of working as a team during the Covid-19 pandemic. A panel of judges systematically reviewed the technical papers for technical rigour in a number of areas: propulsion system, communications system, system safety, etc. and general technical writing skill. The judges held the papers to a very high professional standard and provided feedback accordingly to the student teams.

Unfortunately, due to Covid-19, the on-site competition phase of the competition was cancelled and will be rescheduled.

The **Ontario Good Roads Association** (OGRA) and the **Canadian Automated Snow Plow Initiative** (CASPI) are pleased to announce that they have signed a Memorandum of Understanding (MOU). OGRA is a non-profit association that represents the transportation and infrastructure interests of Ontario municipalities.

The MOU recognizes the various ways that OGRA and CASPI can cooperate in Connected and Automated Vehicles (CAVs), particularly in automated snow plows for sidewalks and trails. Under the MOU, OGRA and CASPI will:
• Jointly develop programs of mutual interest, such as webinars
• Cross-promote the two organizations in our newsletters
• Be involved in each other's annual conferences
• OGRA will participate in the Student Snow Plow Competition

We have known OGRA and their excellent work for many years. We look forward to working with them more closely in the months and years ahead.

International AV News

It is often cited that one group of beneficiaries of future autonomous vehicles are people with disabilities. Recognizing their special needs, the **U.S. Department of Transportation** (USDoT) has initiated a national competition titled the *Inclusive Design Challenge*. The main aim of this competition is to seek design solutions for making automated vehicles more accessible to people with disabilities to help them access jobs, healthcare, and other functions that able-bodied people take for granted. The

budget for this competition is US$5 million. More information is available at USDoT's site at <u>this link</u>.

A consortium of UK companies including **WMG**, **MIRA**, **AVL**, **Transport for West Midlands**, **Costain**, **Amey**, **Wireless Infrastructure Group**, **Vodafone**, **Coventry University** and **Highways England** has commenced work on creating a 300 Km test environment called *Midlands Future Mobility*. This new test bed will be available for the CAV industry and others to test their vehicles along this route which spans urban, inter-urban and rural roadways. **Siemens Mobility** is the main contractor for the project. Initially, the route will be used for testing connected vehicles. Later on, the testing will include autonomous vehicles. Funding for this project comes from UK's **Centre for Connected and Autonomous Vehicles** and coordinated by **Zenzic**. More information at <u>this link</u>. A short YouTube video can also be viewed at <u>this link</u>.

It has long been recognized that a major challenge for the CAV industry is to get the various levels of governments on board to put in place the new regulations or revise the existing ones to accelerate the deployment of AVs. This requires strong connections to lawmakers and certain amount of lobbying. To this end, the automation arm of **GM** – **Cruise**, has hired a high-profile lawyer (Jeff Bleich) as its **Chief Legal Officer**. Previously, Bleich had served as a White House advisor in the Obama administration and had served as ambassador to Australia. More information is at <u>this link</u>.

The Coronavirus pandemic has seriously disrupted the economy and investment in high tech ventures such as automated vehicles. **Bloomberg**'s *Hyperdive* surveyed a number of key experts and executives in the AV industry to get their takes on four specific areas: the role of simulation in AV development, consolidation in the AV industry, effect of the pandemic on the auto industry, and the fate of the sharing economy. The people providing input were: Dmitri Dolgov (CTO at **Waymo**), Chris Urmson (CEO of **Aurora Innovation**), Oliver Cameron (CEO of **Voyage**), Grayson Brulte (consultant on AVs), Ryan Chin (CEO of **Optimus Ride**), Brian Collie (automotive lead at **Boston Consulting Group**), Ro Gupta (CEO of **Carmera**) and Anuja Sonalker (CEO of **STEER**). The Bloomberg article can be viewed at <u>this link</u> or at <u>this link</u>.

UK AV developer **Oxbotica** is using simulation in its development work. Oxbotica believes that the same software engines behind popular video games such as *Fortnite* and *Call of Duty* are quite suited for simulating autonomous vehicle operations in a virtual setting. Robust coding principles and a focus on CPU efficiency are cited as two of the reasons for Oxbotica adopting video game technology. More information is at <u>this link</u>.

Should we design for self-driving cars - or for people? is the title of an interesting *TED Talk* by **Sam Schwartz** who was a long-time traffic engineer with the City of New York. In this 15-minute talk, Sam gives an overview of the last 100 years of cars and traffic and cautions about how the development of AVs could end up benefiting cars rather than the people they are supposed to serve. His talk can be viewed at this link.

In the April 2020 edition of *AV Update*, we highlighted how ground autonomous shuttles are being used in Florida to assist in the fight against **Covid-19** by delivering test samples for the **Mayo Clinic**. In a similar move, **UPS** has partnered with **CVS Health Care** to use drones to deliver medicines from CVS pharmacy locations in South Florida to **The Villages** retirement community (pop. 135,000). This service saves the residents of this community the trouble of visiting the pharmacy in-person to procure their medicines. **FedEx** is engaged in a similar program with CVS's main competitor **Walgreens**. Details at this link.

In a related story, U.S.-based start-up **Zipline** has deployed its delivery drones in **Ghana** to quickly deliver test samples from 1,000 rural areas to the laboratories in the capital Accra. The Zipline drone operation started on April 1, 2020. Zipline had previously operated fleets of drones in Ghana and Rwanda to deliver blood, vaccines, and other essential medical equipment to rural areas. More information is at this link.

The website **visualcapitalist.com** is very skilled in turning raw data into pleasing and easy to understand visuals and charts to get the point across. It has now done this with KPMG's 2019 data for *Autonomous Vehicle Readiness Index* (AVRI). It ranks 20 countries on four criteria: Technology & Innovation, Infrastructure, Policy & Legislation and Consumer Acceptance. The graphic and accompanying information can be viewed at this link.

The 2020 pandemic disrupted all transportations systems in a major way. This was most apparent by the dramatic drop in ridership for Uber and Lyft as well as public transportation. One might think that if we had driverless robotaxis at hand things might have been different. This is not necessarily the case. An article by **Brad Templeton** in **Forbes** magazine gets into some of the finer points of operating a robotaxi fleet in a pandemic environment. Among other things, ensuring that each robotaxi is properly sanitized after each use is a major challenge. The Forbes article can be viewed at this link.

Many jurisdictions have sponsored reports on the impact of automated vehicles on their city or state. One of the latest to do so is the **State of Hawaii**. The 20-page report titled *Hawaii's AV Future* envisions a future mobility system that is accessible, automated, connected, electric, and shared (A2CES). It recommends creating a regulatory framework and policies conducive for incorporating AV and electric vehicle considerations into future transportation plans and launching a program of A2CES-focused technology. More information is at this link. A copy of the report can be viewed or downloaded at this link.

In the past few years and in order to advance the development of automated vehicles, many automobile manufacturers (OEMs) have teamed up with high-tech companies. At present, the AV industry can be viewed broadly as three separate areas: robotaxi, OEM, and high-tech software platforms. In a substantive analysis by the market research firm **IHS Markit**, dominant players in each category are identified and partnerships among them discussed. The article can be viewed at this link.


(Source: IHS Markit)

The COVID-19 pandemic has forced many automobile manufacturers (OEMs) to reconsider where they should deploy their efforts and capital in the coming days. In the opinion of **Strategic Analytics** – a firm focused on high-tech, automakers may ditch plans for investing capital in automated vehicles, electric vehicles, and ride-sharing. It estimates that OEMs need to spend US$250 million or more per quarter to keep their AV programs going. By comparison, maintaining their connected vehicles programs costs a lot less. Conclusion: OEMs see benefits in their CV programs and will maintain the CV initiatives. The emergence of **5G** technology is an added incentive in this context. The article can be viewed at this link.

Most autonomous vehicles developed to date use one or more LiDAR sensors to construct a 3D map of the vehicle's surroundings. These sensors are costly and no production car has them at present. Bucking the trend, **Volvo** has announced that its 2022 XC90 SUV production vehicles will include a low-profile LiDAR unit integrated into the front windshield. Volvo also indicates that it is developing a self-driving highway feature named *Highway Pilot* as part of its next big platform update, the *Scalable Product Architecture* (SPA2). Volvo says that the combined LiDAR and *Highway Pilot* system will be able to drive completely autonomously on certain pre-selected highways without needing any driver intervention or monitoring. Details are at this link.

Volvo says Luminar's LIDAR will be "seamlessly integrated" into its vehicles. | Photo: Volvo

And finally, autonomous vehicles may appear to some to be a fairly new phenomenon kickstarted by **DARPA** in 2004. This in fact is not the case. The website mentalfloss.com details seven previous attempts starting in **1925** in the United States. Learn about these early attempts at this link.
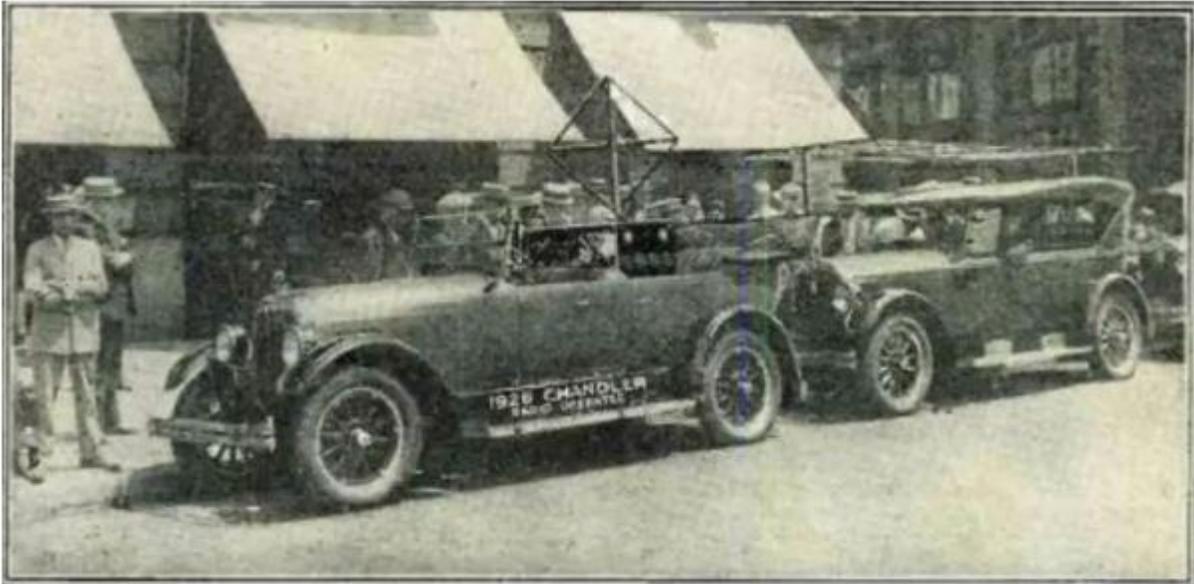
Francis Houdina's radio-controlled car, dubbed the "American Wonder," circa 1925.
WIKIMEDIA COMMONS // CC BY-SA 4.0

CAVCOE Speakers' Bureau

CAVCOE provides speakers for many different types of events across Canada, the US and overseas. This keeps us busy because everybody understands that CAVs will have an impact on almost everything. On the one hand, our presentations have core messaging on the status of CAVs, their deployment scenarios, 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 AV-Related Events

Aug 18-20, 2020: 2020 TU-Automotive Detroit, Novi MI

Oct 4-7, 2020: IEEE 92nd Vehicular Technology Conference, Victoria BC

Oct 4-8, 2020: ITS World Congress, Los Angeles CA

Nov 2-6, 2020: Unmanned Systems Canada's annual conference – on-line

Nov 16-17, 2020: Car.HMI and Tech.AD USA 2020, Detroit MI

Jan 6-9, 2021 Consumer Electronic Shows (CES), Las Vegas NV

Apr 2021: ADAS Sensors 2021, Detroit MI

Jun 20-23, 2021: ITS Canada 2021 Conference

TBA:
CAV Canada Conference, Ottawa ON

Canadian Automated Snow Plow Conference, Toronto ON

Canadian Automated Snow Plow Competition