

AV Update

Canadian AV News

The **Information and Communications Technology Council (ICTC)** and **CAVCOE** have announced a new white paper on *Advances in Connected and Autonomous Vehicles: Current State and Future Trends*. It explores the latest advancements in connected and automated vehicles -- a fundamentally transformative technology that will impact virtually all facets of Canadian life - public, business and government.

It also provides key insights to all stakeholders as to the tech infrastructure and inter-vehicle communication that will be needed, Canada's state of readiness for autonomous vehicles, deployment challenges, social implications, regulatory requirements, and it makes policy recommendations.

The free report is available in both languages: [here](#) et [ici](#).

On April 15, 2020, Barrie Kirk gave a webinar to the **IEEE Vehicular Technology Society Chicago Chapter** on *Canada's Activities in the CAV Ecosystem*. This webinar is now on-line [here](#).

There are three parts:

- Canadian activities in CAV innovation, including research, development and testing of both AV and CV technologies.
- Status of Canada's activities to prepare for the arrival of CAVs on our roads, including work in the regulatory arena in all three levels of government.
- Ongoing activities in Canada to investigate the socio-economic impact on our personal lives, businesses and governments over the next 20 years.

The Version 3 Update for the *ITS Architecture for Canada* has very recently been completed and includes new sections on CVs and AVs.

The organizations behind this work in the Intelligent Transportation Systems ecosystem are **Transport Canada**, which provided funding via its program to *Advance Connectivity and Automation in the Transportation System (ACATS)*; the **Intelligent Transportation Society of Canada (ITS Canada)**; and **WSP** (a major transportation consulting company).

The ITS Architecture is a common framework for planning, defining, and integrating intelligent transportation systems. It describes the interaction among physical components of the transportation systems including travellers, vehicles, roadside devices, and control centres. It also describes the information and communications system

requirements, how data should be shared and used, and the standards required to facilitate information sharing.

The updated architecture re-aligns with the *U.S. Architecture Reference for Cooperative and Intelligent Transportation* (ARC-IT) and includes the integration of the *Connected Vehicle Reference Implementation Architecture* (CVRIA), which focuses on connected interfaces outside of the vehicle. For autonomous operations, the architecture also includes "service packages" for "Autonomous Vehicle Safety Systems" and "Automated Vehicle Operations".

The updated ITS Architecture for Canada is [here](#).

An interesting article by **Spare Labs** of Vancouver is called "How to design safer public transit in response to COVID-19". It explains that COVID-19 is presenting new challenges for transit agencies, including drastic ridership declines, reduced farebox revenue, and unpredictable ridership patterns. These factors are making it difficult for transit agencies to maintain routes, budget costs, and plan services.

One option is on-demand transit using a strategic mix of mass transit and micro-transit. Our view, of course, is that the future of micro-transit is driverless. The briefing note by Spare Labs is [here](#). You can read it in your spare time (their joke not ours!)

Drone Delivery Canada has announced that the **United States Patent Office** has granted it Patent 10,625,879 which covers aspects of DDC's drone delivery technology and processes relating to controlled access zones for UAV landing and takeoff. It provides protection for various aspects of DDC's controlled access zones, DRONESPOT®. DDC's full news release is [here](#).

The **Ontario Government's Autonomous Vehicle Innovation Network** (AVIN) has contributed \$913,689 to a consortium of Ontario-based mining companies for the development of an *autonomous mobile inventory management system* (ADMMIT) intended for dynamic environments such as open pit mines. The system tracks, delivers, and manages material movement in real-time, from purchase to consumption, and links to mine planning and inventory control systems. Total project cost is \$2,741,069. The balance of \$1,827,380 will be provided by the private sector. The funds were awarded to **SHYFT Inc.** based in Sudbury, **Cementation Canada**, **BESTECH** and **NORCAT**. More information at [this link](#) and SHYFT's site at [this link](#)

Unmanned System Canada (USC) has issued a call for presentations for its annual conference in Calgary in November 2020. The presentations are open to all professional operators, industry OEM suppliers, service providers, academics, as well as government, regulatory and business experts who are using, building or advancing Canada's unmanned and autonomous technologies. The deadline for submissions is **May 22, 2020**. Full details can be viewed at USC's site at [this link](#).

CASPI News

Although the May 2-3 *Canadian Automated Snow Plow Competition* was postponed due to the COVID-19 pandemic, work is underway to determine the best alternative date to host this 2-day event. While the uncertainty of the pandemic makes it impossible at this time to set a definite date, we are considering in the first part of 2021.

The competition is divided into two phases. Phase 1: Technical Paper, Phase 2: Technology Demonstration. Awards are presented to the teams based on accomplishments in two phases. Phase 1 and 2 are scored and prizes awarded separately.

Leading up to the decision to postpone, there was considerable work completed by the 6 teams registered. The technical papers were submitted on schedule and will be reviewed by the judges with feedback provided to the students in May.

An Estonian company called **Lumebot** has developed an automated snow plow which has been in service with customers since November 2019 according to the company's website. No pricing or technical information is available on the company's website. More information can be viewed on Lumebot's site at [this link](#). A short video of the Lumebot snow plan in action can be viewed on YouTube at [this link](#).



We have reported on a pilot project using an autonomous snow plow at Winnipeg Airport. A similar pilot named *Yeti* has been conducted in Norway. **Yeti Snow Technology**, co-owned by **Semcon** and **Øveraasen** and Norwegian airport operator **Avinor** has conducted trials initially at Fagernes Airport in Norway and then at Oslo Airport. The

future objective is to maintain a fleet of ten autonomous snowplows that will keep runways clear of snow.

More information on *Yeti* is available [here](#)



International AV News

A recent report by the consulting firm **Frost & Sullivan** predicts that the autonomous vehicle market will be worth over US\$200 billion by 2030. The report titled *Future Business Models of Autonomous Vehicle Services 2030*. The report focuses on four areas: Mobility Services, Vehicle Services, Logistics Services and Peripheral Services. AVs are forecast to reduce operating expenses and larger profit margins. This may entice new entrants in the AV market. More information is at [this link](#)

On April 1, 2020, **Underwriters Laboratories** (UL) announced a new standard (*UL 4600*) titled *Standard for Safety for the Evaluation of Autonomous Products*. This is the first standard by UL for autonomous vehicles and related systems. Some of the topics covered by this standard include risk analysis, safety-relevant aspects of design process, testing, tool qualification, autonomy validation, data integrity and human-machine interaction. More information on UL 4600 is at UL's site at [this link](#). The list of the 34 organization involved in developing UL 4600 can be viewed at [this link](#).

Researchers at the **Massachusetts Institute of Technology** (MIT) have developed a new simulation system called the *Virtual Image Synthesis and Transformation for Autonomy* (VISTA). Based on a seed dataset collected by human drivers on real roads, VISTA can simulate unusual and dangerous driving situations which would be almost impossible to collect in the real world, e.g. swerving between lanes or recovering from near misses. These simulated scenarios are then used to see how the automated driving software would handle them and make a safe recovery from them. More information is at [this link](#).

Waymo is considered by many people to be the leading company in the race to bring automated driving to masses. Waymo calls its technology *Waymo Driver*. On March 25, 2020, Waymo released a video on YouTube titled *Designing the Waymo Driver*. The video shows the basic elements of automated driving developed by Waymo. The video is a bit on the long side (28 minutes) and can be viewed at [this link](#).

Volvo Cars (a subsidiary of China's **Geely**) has acquired one-half of Swedish AV software developer **Zenuity**. The new acquisition will focus on developing unsupervised autonomous driving software that will be introduced in the next generation of cars based on Volvo's SPA2 vehicle architecture, which will remain separate from Volvo Cars. The other half of Zenuity will focus on the development and commercialization of advanced driver assistance systems (ADAS) and will be integrated into **Veoneer**, the automotive safety equipment company. More information is at [this link](#).

The Covid-19 crisis has disrupted numerous businesses. This includes **Waymo** who announced on March 17, 2020 that it was suspending all its autonomous vehicle passenger services (*Waymo One*) in Arizona and elsewhere. The suspension applies to both AVs with safety drivers behind the wheel and fully driverless vehicles with no safety driver. No date was given by Waymo for resumption of service. More information is on Waymo's site at [this link](#).

Staying with Covid-19, the **Mayo Clinic** in Jacksonville, Florida has deployed a fleet of four Navya autonomous shuttles on its campus to transport test samples from its drive-thru collection point to different buildings on the campus. Mayo Clinic has partnered with the **Jacksonville Transportation Authority (JTA)**, **Navya**, **Beep** and **Bestmile** to implement this project. Unlike other autonomous shuttle deployments, the Mayo Clinic's shuttle does not have the usual human attendant onboard. More information is at [this link](#). A short YouTube video showing the shuttle in action can be viewed at [this link](#).

Since 2005, the **International Telecommunication Union (ITU)** has held an annual event in Geneva called the *Symposium on the Future Networked Car*. This event is normally held in conjunction with the annual *Geneva Motor Show*. The Motor Show was cancelled this year due to the Coronavirus pandemic, however, the symposium went ahead with its planned event with 81 participants. This is an important event for future connected and autonomous vehicles (CAVs). Among other things, the symposium explored the relationships between vehicle communications and automated driving by analyzing the crucial role of the latest 5G connectivity technologies in delivering safer and more effective transportation. More information at ITU's site [this link](#). The list of symposium participants can be viewed or downloaded at [this link](#).

On March 17, 2020, the U.S. **National Highway Traffic Safety Administration (NHTSA)** announced its intention to relax some of its occupant protection rules to accelerate the pace of innovation in automated vehicles. Presently, more than 60 federal standards govern vehicle design and manufacturing. Some of the functions up for review are

steering controls, glazing materials, door locks, seating systems, side impact protection, roof crush resistance and child restraint anchorage systems. Some of the rules will be applicable only to automated delivery vehicles which have no passengers. More information is on the NHTSA site at [this link](#). NHTSA also published a 135-page *Notice of Proposed Rulemaking* (NPRM) on March 16, 2020 detailing the proposed changes. The NPRM can be viewed or download at [this link](#).

To accelerate AV development, **Ford Motor Company** has offered to share some of its raw data collected by its fleet of autonomous test vehicles operating in the Detroit area. The datasets are from 2017-18 and represent a variety of seasonal variations, lighting conditions and different roadways such as freeways, regular streets, university campuses and suburban roads. The datasets are time-stamped and contain raw data from all the sensors, calibration values, trajectory, etc. More information is on Ford's site at [this link](#).

As we reported in the March 2020 edition of *AV Update*, the automated trucking startup **Starsky Robotics** announced that it was shutting down after 5 years. In an article titled *Starsky Robotics Failed. Does That Mean Automated Trucking Is Dead?* **Forbes** magazine expanded on Starsky's demise by saying that the automated trucking industry is far from dead and still thriving. This is based on the author's interviews with rival automated trucking startups, venture capital investors in that sector and others. The conclusion is that the failure was specific to Starsky as opposed to the entire automated trucking industry. Details are on Forbes site at [this link](#).



We have previously reported on the travails of one of AV industry's heavyweights - **Anthony Levandowski**. A brilliant engineer, he has been involved in the developments of AVs for more than a decade. Accused of intellectual property theft from **Google**, forming his own automated trucking company (**Otto**), getting hired and fired by **Uber**, he has had an eventful life to say the least. In the latest twist, Levandowski is alleging that

Uber owes him US\$180 million for breach of contract and other promises. Details are at [this link](#).

One of the challenges in AV technology is how to integrate AVs with the regular human-driven vehicles, the so-called *mixed fleets*. To research this issue, the **Virginia Tech Transportation Institute** (VTTI) has received a US\$7.5 million grant from **US DOT** to conduct a four-year study into how automated trucks can be deployed safely and efficiently into a mixed fleet. To this end, VTTI has partnered with some major organizations in technology, trucking and logistic companies. State DoTs and others. The partners are: **Virginia DoT, Nebraska DoT, Pennsylvania DoT, Tennessee DoT, Wyoming DoT, West Virginia Division of Highways, the I-95 Corridor Coalition, Pronto, Peloton, Schneider National, Hub Group, National Private Truck Council, Penske Truck Leasing/Penske Logistics, Travelers, MRIGlobal, and the Commercial Vehicle Safety Alliance**. More information is at [this link](#).

And finally, the ever-present question of how to make money from automated vehicles. One solution is the business model adopted by **Udelv** for its automated delivery vans (ADV). Udelv will sell their ADV outright for US\$150,000 and offer the buyer a choice of services (for a price) such as teleoperations, hardware upgrades, and technical assistance. The second option is leasing the ADV with a monthly lease payment with the same menu of services included. Udelv suggests 65% of the cost for delivery operations is the cost of the human driver. By eliminating this cost, the customers using Udelv's ADV service will be ahead financially over a 5-year period. This rationale is based on the cost of human drivers at >\$85K/year for 6 days/week (liability, turnover, recruitment, benefits). Over a 5-year period, cost is >\$400K for a human-driven delivery vehicle. Compare that to an ADV which can likely be done for closer to \$250K for a 5-year period. More information is at [this link](#).



Adriel Lubarsky, Udelv's director of business development, conducted walkarounds of Newton, an autonomous delivery van (ADV) during the conference.

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 3-5, 2020: [Unmanned Systems Canada's annual conference](#), Calgary AB

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

AV Update is a free, monthly roundup of news and analysis in the world of automated vehicles and their impact on the private sector, government and society.

Chief Editor: Ahmad Radmanesh

Contributors to this issue: Barrie Kirk, Glenn Martin

To subscribe, click [here](#). To unsubscribe, click [here](#).

We welcome all comments; please send them [here](#)

© CAVCOE 2020

CAVCOE (formerly the Canadian Automated Vehicles Centre of Excellence) provides advice to public and private sector organizations to help plan for the arrival of self-driving vehicles.

300 Earl Grey Drive, Suite 222, Ottawa ON K2T 1C1, Canada.

info@cavcoe.com

www.cavcoe.com