

CAV Update

From the Editors

KPMG Global published its **2020 Autonomous Vehicles Readiness Index (AVRI)** at the end of June 2020. This index ranks 30 countries on 28 different criteria. **Canada** is still in 12th place, the same as last year. General information about the 2020 report can be viewed at [this link](#). The 70-page report can be downloaded from KPMG's site at [this link](#).

On the one hand, we are disappointed that Canada's position in the AVRI has not changed. A country like Canada which promotes itself as a leader in the CAV ecosystem should do better than #12. On the other hand, we recognize that the KPMG methodology seems to favour nations with small land areas: the top two countries are Singapore and The Netherlands.

This also ties in with the opinion pieces we have published several times that Canada is clearly excellent on the global stage in CAV innovation, research, development and testing, but we are not as prepared as we should be for CAV deployment, with a few exceptions such as Ontario and the City of Toronto.



Canadian CAV News

BLG has published a summary and analysis of the report *Advances in Connected & Autonomous Vehicles: Current State and Trends* that was prepared by **CAVCOE** and the **Information and Communications Technology Council (ICTC)**. The summary and a link to the full report are available [here](#).

To enact regulations for autonomous and semi-autonomous vehicles, **Canada** and 50+ other countries have signed up with the **United Nations Economic Commission for Europe (UNECE) World Forum for Harmonization of Vehicle Regulations**. The agreement initially applies to the *Automated Lane Keeping Systems (ALKS)* which is a Level 3 feature of autonomous vehicles. As part of this regulation, a *Driver Availability Recognition System* is required to ensure the driver is always ready and alert to resume control of the vehicle if/when needed. Details are at [this link](#).

We have previously reported on how **Drone Delivery Canada (DDC)** is making inroads in delivering commercial drone delivery services in Canada by partnering with **Air Canada Cargo** and the global logistics company **DSV**. Now DDC has set its sight on entering commercial drone delivery services in the United States. It has applied to the **Federal Aviation Administration (FAA)** for type certification of its *Sparrow* drone vehicle with the aim of offering *Beyond Visual Line of Sight (BVLOS)* services in the U.S. More information is on DDC's site at [this link](#).

Staying with drones, a collaboration between Alberta's **Stoney Nakoda Nation**, the **University of Calgary**, and the **Southern Alberta Institute of Technology (SAIT)** has deployed an advanced drone owned/operated by SAIT to fly live viral test kits from rural and isolated areas to urban centres. This is believed to be the first such delivery in Canada. Depending on how this project goes, it can later expand to delivering medical supplies, testing kits, medication, and personal protective equipment. Details are at [this link](#).



6 / 17 Stoney Health Authority officials participate in the pilot project attaching live viral test kits to the bottom of the \$650k Swiss drone. The drone flew to the Ghost Lake Reservoir and back for the launch. JENNA DULEWICH RMO PHOTO

Winnipeg-based **New Flyer Group** in collaboration with **Robotic Research**, the **Center for Transportation and Environment (CTE – a non-profit)** and **Connecticut Transit (CTtransit)** is deploying several Level 4 automated electric buses in the Hartford, Connecticut area. These are full-size 40-foot transit buses running along a dedicated 9-mile BRT busway ([CTfastrak](#)) in that state. The automation system was developed by Robotic Research based in Maryland. CTE will act as the project manager and technical consultant. More information is on New Flyer's site at [this link](#).



CASPI News

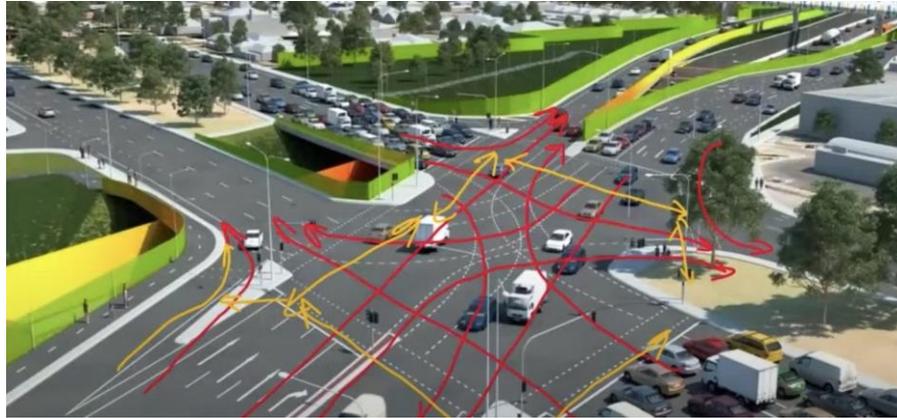
The Canadian Automated Snow Plow Initiative (CASPI) team has been busy developing our plans for the next 6-12 months. In the next couple of months, look for more details on a number of initiatives:

- We are finalizing our membership details, including the types of research reports, other deliverables as well as the membership fees.
- In September, there will be a webinar on automated snow clearing / winter operations.
- We will also announce CASPI's first members.
- Watch out for an announcement about a new Canadian winter weather test site.

International CAV News

Many companies are in the race to develop self-driving technology. Each has its own proprietary approach. **Tesla** and **Waymo** may be the fiercest competitors in this race. Tesla's approach is primarily based on *computer vision* whereas Waymo's is based on *LiDAR* and high-resolution maps with centimeter level accuracy. In a recent presentation, the head of Tesla's AI team compared the two approaches. Naturally, he believes the computer vision technique is superior and the only one that can be scaled to millions of cars and large geographic areas. The article and presentation can be

viewed at [this link](#). Another article and an impressive narrated video of how Tesla's vision-based system works can be viewed at [this link](#). The image below is also of Tesla's vision-based Autopilot system.



A recent article titled *Self-Driving Tech Is Becoming a Game of Partnerships* in **Wired** magazine delves into how many automakers have partnered with companies developing self-driving technology. The exception is Tesla which makes its own cars and is developing its self-drive technology. The article states that the cost of entry for a start-up into self-driving space is a hefty US\$1 billion these days. Venture capital funders have somewhat cooled to lavishing money on the tech companies in the space. This has spurred the frenzy of partnerships and consolidation that we see today. The Wired article can be viewed at [this link](#).

Staying with partnerships, **Volvo Cars** (a subsidiary of China's **Geely**) has signed an exclusive agreement with **Waymo** to use Waymo's Level 4 self-drive technologies in some models of its cars under the Volvo brand as well as other brands made by Geely such as **Polestar** and **Lynk**. Details are at [this link](#).

By contrast, an AI company called **Helm.ai** believes that teaching cars to self-drive can be greatly simplified through a technique known as *Deep Teaching*. Instead of feeding massive amounts of training data into machine learning algorithms to improve their pattern recognition, Helm.ai advocates defining *sophisticated priors* and *compressive sensing* for the machine learning algorithms in the same fashion as young humans go through learning. For example, if a car is obscured by a truck, it does not mean that it has ceased to exist as conventional algorithms may assume. The company claims its technology is 100,000 more efficient than current techniques. Details are explained at [this link](#).

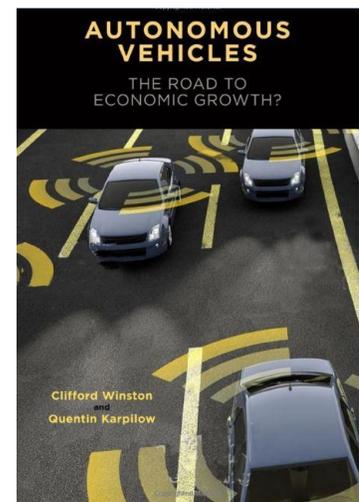
The **Covid-19** pandemic has shown that many people have shunned ride sharing and public transportation for fear of getting infected and have reverted to using their own private vehicles. Capitalizing on this, Sweden's **National Electric Vehicle Sweden** (NEVS) has come up with designs for AVs where the cabin of the vehicle can be

configured for private, social or family travel by configuring movable seats and raising and lowering *privacy walls*. More information is at [this link](#).



Automated vehicles are more than just cars and shuttles. One of the promising application areas is in mining and construction where the work environment is often polluting and dangerous to humans. A California-based company called **SafeAI** has recently emerged from *stealth mode* in just such an area. It has partnered with South Korea's **Doosan**, the maker of popular **Bobcat** loaders and excavators, to incorporate its technology into this and other vehicles. More information at [this link](#).

Another book on autonomous vehicles was published on June 30, 2020. Titled ***Autonomous Vehicles: The Road to Economic Growth?***, the authors Clifford Winston and Quentin Karpilow explain that AVs will be a transformative technology benefiting the society and economy overall. They also argue that governments and policymakers must address these and other issues sooner rather than later. The book is available on Amazon for US\$29.99. A summary chapter review of this 176-page book can be viewed at the publishers' website at [this link](#).



One of the more successful firms specializing in self-driving trucks has been **TuSimple** based in San Diego and Beijing. The company recently announced new partnerships with **UPS**, **Xpress Enterprises**, **Penske Truck Leasing**, and **Berkshire Hathaway**-owned grocery and food-service distributor **McLane**. It intends to lay the foundation for a coast-to-coast autonomous trucking network from Los Angeles to Jacksonville FL. At

present, it makes 100 delivery runs a week in Arizona and Texas. The company has its eye on Europe and China if all goes well for its U.S. expansion plans. More information is at [this link](#).

The European customers of **Ford Motor Company** can now enjoy a multitude of connected vehicle features at no cost. Newer Ford vehicles made for European markets are equipped with the required connected vehicle hardware/software for this purpose. Using the *FordPass* app on Android or Apple phones, owners can do a number of remote services, including checking on vehicle health, fuel and oil levels, range, as well as locking and unlocking doors. Drivers can also start their vehicle engine remotely and climatize the cabin to a comfortable temperature. For Ford's *hybrid electric* vehicles, the *FordPass* will provide information on battery level and electric driving range as well as alert EV owners to the off-peak electricity tariffs to enable them to schedule vehicle charging at the lowest cost. More information is on Ford's site at [this link](#).

Another European initiative is a joint pilot project by five countries (**Finland, Norway, Netherlands, Estonia, and Greece**) to evaluate autonomous buses as part of a *last-mile* solution. The project known as *Future Automated Bus Urban Level Operation System* (FABULOS) will be run for 50 days in selected cities to assess the functionality, interoperability and security of the autonomous fleets. Three autonomous bus companies, **Sensible4-Shotl, Saga and Mobile Civitatem**, have received up to €1 million to pilot their autonomous buses in two cities. More information is at [this link](#).



The GACHA autonomous bus, developed by Sensible4-Shotl, is one of three prototypes being piloted through FABULOS.
Image: Forum Virium Helsinki

MIT's *AgeLab* at the **MIT Center for Transportation and Logistics** and the **Toyota Collaborative Safety Research Center (CSRC)** have jointly produced a novel dataset known as *DriveSeg* to advance development of automated vehicles. The novel aspect to this dataset is that it is a continuous video (as opposed to the usual static photos) which captures the entire environment seen by the camera and not just the artifacts such as pedestrians, bicycles, signs, traffic lights, curbs, etc. which have regular shapes as opposed to vegetation or road construction. The dataset is free and available to researchers and the academic community for non-commercial purposes. More information on MIT's site is at [this link](#). A 2.5 minute video of the data can also be viewed on YouTube at [this link](#).

We reported in the June 2020 edition of *CAV Update* that **Amazon** was in negotiations to acquire self-driving start-up **Zoox**. On June 26, 2020, Amazon announced that it had reached a tentative agreement with Zoox to buy it out for a reported US\$1.3 billion. An interesting part of this deal is the conditions Amazon has imposed to retain key Zoox personnel. This includes US\$100 million cash incentive for Zoox employees to remain with the company and become Amazon employees. Apparently, Amazon can walk away from the deal if a certain number of these key employees are not retained. This perhaps demonstrates that *Intellectual Property (IP)* alone is not enough to make such alliances successful. Details are at [this link](#).

A year-long joint study by the **Boston Consulting Group (BCG)** and Switzerland's **St. Gallen University** into the impact of AVs on different cities of the world has been summarized in a 27-page report titled *Can Self-Driving Cars Stop the Urban Mobility Meltdown?* The answer according to the report depends on specific circumstances and characteristics of each city. For example, AVs can help reduce congestion and air pollution in a city like **Los Angeles** where private automobile ownership is very high. By contrast, in **Hong Kong** and similar cities; promoting micro-mobility and walking could deliver greater benefits than introducing AVs. **New York City** may be able to free up the equivalent of about 900 blocks of space currently reserved for parking if they were to create conditions in which robo-shuttles could thrive. More information is at [this link](#). A copy of the report can be downloaded from BCG's website at [this link](#).

Another facet of automated vehicles is the loss of vehicle-related revenues to various levels of government. Revenue sources such as parking fees, traffic law violation and fines as well as vehicle registration could dry up with the advent of AVs. In an article titled *The Political Economy of Autonomous Vehicles*, **Forbes** magazine delves into this very issue. One example is the **Texas Department of Motor Vehicles** which pulls in US\$4.5 billion annually in registrations, fees and sales. Another is the **State of Illinois** which collects about US\$60 million from parking garages. **Washington, DC**, annually budgets for US\$300 million in revenue from speed, red light, moving violation and parking infractions. All of these revenue sources could theoretically be in peril should AVs go mainstream. Electrification of vehicles can only exacerbate things further by eliminating fuel taxes collected by the three levels of government. The Forbes article can be viewed at this [link](#).

And finally, an article titled ***Everything you need to know to have an intelligent conversation about autonomous vehicles*** in venturebeat.com delves into the subject by examining six topics as follows:

1. When will cars truly be autonomous?
2. What can cities do to be ready for AVs?
3. Will AVs be connected vehicles?
4. Will AVs create more traffic congestion on our roadways?
5. Is safety really going to improve?
6. Is AV a revolution or an evolution?

To see the answers, have a look at [this link](#).

CAVCOE Speakers' Bureau

CAVCOE provides speakers for many different types of events across Canada, the US and overseas; we are now booking for 2021. This keeps us busy because people understand 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 CAV-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: CANCELLED

Nov 2-6, 2020: [UC20 Remote: Unmanned Systems Canada's annual conference](#) On-line.

Nov 16-17, 2020: [Car.HMI and Tech.AD USA 2020](#), Detroit MI

Dec 8-9, 2020: [Autonomous Vehicles 2020](#); Long Beach California

Jan 6-9, 2021 [Consumer Electronic Shows \(CES\)](#), Las Vegas NV

Feb 21-24, 2021: [Ontario Good Roads Association Annual Conference](#); Toronto ON

Apr 2021: [ADAS Sensors 2021](#), Detroit MI

Jun 20-23, 2021: [ITS Canada 2021 Conference](#)

Dec 14-17, 2021: [UITP Global Public Transport Summit](#); Melbourne, Australia

TBA:

CAV Canada Conference, Ottawa ON

Canadian Automated Snow Plow Conference, Toronto ON

Canadian Automated Snow Plow Competition

CAV 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.

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

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

CASPI (the Canadian Automated Snow Plow Initiative) is an association for all stakeholders involved in winter operations and maintenance of sidewalks and trails.

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