

CAV Update

From the Editors

As you can see from the masthead, we have re-branded our newsletter to “CAV Update”. Although connectivity has always been associated with AVs, that synergy is accelerating. Also, it is increasingly apparent that the trend in the terminology is towards “CAV” and away from “AV”, “AV/CV” or “C/AV”. So, welcome to the first issue of **CAV Update**.

We are also pleased to announce that **Nicola McLeod**, CASPI’s Project Manager for the Student Snow Plow Competition, has passed her exam and is now an official *PMP Certified Project Manager*. Congratulations Nicola – excellent news!

Canadian AV News

Electric Mobility Canada is holding a virtual 2-day conference called *Work, Commute and Travel during... and beyond COVID-19* on July 7-8. The conference offers a broad and diversified perspective on the way we work, commute and travel during AND after the COVID-19 crisis. How will things change... if they do change? How can electromobility be a part of the economic recovery? EMC has over 200 members ranging across the full EV ecosystem. The conference details are [here](#).

The Canadian ACE Vehicle Ecosystem is a webinar presented by the **Information and Communications Technology Council (ICTC)**. Dr. Peter Taillon, Senior Data Analyst, ICTC is joined by Barrie Kirk, Executive Director, **CAVCOE**, Daniel Breton, President and CEO, **Electric Mobility Canada**, and Pierre Ducharme, President, **Marcon-MiraTech**.

The webinar will be on July 15, 2020 at 11:00am EDT. The topics include:

- The overall CAV ecosystem in Canada, including research, development, testing, pilots, government initiatives, and the activities in the private sector to prepare for the CAV era.
- The current state of electric mobility in Canada, and recent advancements in research, development, and adoption.
- Results from a recent report prepared by MARCON-MIRATECH for Propulsion QC, that forecasts the combined adoption of EVs and AVs in Canada to 2050.

For more details and to register, please click [here](#).

OTTO Motors is a successful Ontario-based developer and manufacturer of *Autonomous Mobile Robots (AMR)* for deployment in industrial, manufacturing, and warehousing types of environments. With a deployed base of over 3,000 AMRs

worldwide, the company is enjoying a boom in orders due to high demand for such systems brought about by the COVID-19 pandemic. So far, OTTO Motors has raised US\$83 million in funding. The company is a subsidiary of Kitchener-based **Clearpath Robotics** which was formed in 2009 by a group of University of Waterloo graduates. More information is at [this link](#).



Image Credit: Otto Motors

Drone Delivery Canada (DDC) is a pioneer of commercial drone delivery services in Canada. On June 10, 2020, the company announced that it has successfully developed and tested a *payload drop* system for its *Sparrow* line of drones. This new functionality allows a package to be loaded at the point of origin, fly to a destination, hover at a lowered altitude, drop a payload without landing, and return to the point of origin. The Sparrow has a total flight range of up to 30 Km with a maximum payload capacity of approximately 4.3 Kg. The company has an agreement with **Air Canada Cargo** to complement Air Canada Cargo's services through its delivery drones in Canada. More information on DDC's site is at [this link](#).



We have previously featured **DOT Technology**, based near Regina, which specializes in fully-automated agricultural equipment. The company is now a fully-owned subsidiary of U.S. based **Raven Autonomy**.

For the first time, a DOT Technology automated platform has been sold to a Canadian farmer in south-western Ontario and put to work on his farm. The cost of the machine is about \$500,000. CBC Radio conducted an interview with the farmer about his experience with the DOT platform, and the farmer is pleased with the machine's performance. The CBC Radio report can be read or listened to at [this link](#).



CASPI News

Last month, we promoted the June 17 webinar from the **Ontario Good Roads Association (OGRA)**: "*Is the 'New Normal' Autonomous?*". The recording of this webinar is now on YouTube. You can listen to experts in the CAV field discuss the what, where and why's of autonomous vehicles breaking into the main stream, to allow people to continue their day-to day-lives in this contact-less world.

The webinar was hosted by Scott Butler, **OGRA**, and the panel comprised Barrie Kirk, **CASPI**; Edona Villa, **BLG**; Richard Steiner, **GATIK**, and Fahad Shuja, **OGRA/MACAVO**. You can watch the webinar [here](#).

Harmonize Mobility has announced another webinar in their series on *Automated Vehicles at the Sidewalk and Kerb*. Sidewalks and curbs/kerbs are a growing focus for our cities due to the steep rise in eCommerce, ride-hailing, active transportation, and micro-mobility. The post-COVID period is expected to sustain an especially sharp rise in eCommerce potentially pushing the envelope for the adoption of automated delivery vehicles and bots.

The panel will discuss the standards being developed to manage this next reality both for pre-automation goods delivery and taxi systems, and in a few years as these vehicles and systems are gradually automated requiring a new form of sidewalk and kerb management from that commonly used today.

The webinar will be on July 8 at 9:00am EDT. The link to register is [here](#).

We have reported that **OGRA** and **CASPI** have signed an MOU. One of the joint projects will be a webinar in September. This will be dedicated to *automated sidewalk winter maintenance*. We are working on the details and will announce them next month.

Sadly – but not surprisingly – the *2020 Western Canadian Snow & Ice Management Summit* has been cancelled. It was to have been held in Calgary. We at CASPI look forward to attending in 2021, supporting it, and developing synergies with stakeholders. The website for the 2020 Summit is [here](#).

Finally, here is a way that you can help the new automated snow plow initiative. We are looking for stories and leads about who is doing what in Canada in automated winter maintenance. If your organization is working towards this, or you know any organization that is, please let us know at info@caspi-icda.com

International AV News

The Economist magazine of June 13, 2020 devoted its entire *Technology Quarterly* section to the current state of Artificial Intelligence (AI) and its many applications. One of these applications is how to teach a car to safely self-drive. This has proved much more difficult than AV developers were thinking a few years ago. One of the experts is quoted as saying “*A lot of people thought that filling in the last 10% would be harder than the first 90%, but not that it would be ten thousand times harder*”. The main problem is that AI in its current state has hit a wall on how much it can achieve. A breakthrough is needed to take it to the next level. Apparently, the AI technology available today is good enough only for simpler autonomous applications such as low-speed shuttles in geofenced areas such as airports or retirement villages and slow-moving delivery robots under remote supervision by a human. The *Economist* article can be viewed at [this link](#).

A June 10, 2020 article in **Forbes** magazine titled *Toyota Looks Pretty Smart Right Now On Autonomous Vehicles* echoes the Economist magazine’s views on the formidable challenges in developing fully self-driving cars. Forbes believes the incremental approach **Toyota** has taken in developing driver-assist technology and autonomy may be a smarter one. The article states that although 1% of deaths in the United States are due to car crashes, the figure rises to 34% among teenage drivers. Accordingly, Toyota has put more of its vehicle automation effort in developing driver-assist systems to address this issue. For example, a young driver intends to make a left turn against traffic that’s initiated by a turn signal and a leftward move of the steering wheel, and the car replies, “*I don’t think so.*” It sees an oncoming vehicle at high speed and cancels the

left turn or slows the car down until the oncoming car has passed by. The Forbes article can be viewed at [this link](#).

The Brazilian airplane maker **Embraer** is looking out to the next 50 years when an autonomous plane and an autonomous vehicle can be seamlessly integrated. It has developed a concept vehicle dubbed the *Pulse Concept* leveraging its experience in building executive jets and outfitting them with pleasing interiors. The main fuselage which Embraer calls a pod is made of transparent glass and see-through aluminum known as *Alon*. The vehicle is electrically powered and transforms from an aircraft to an AV without the passengers having to get out of the pod or changing vehicles. More information about this futuristic plane/car concept at [this link](#). There is also a short YouTube video available at [this link](#).



In April 2020, the **Society of Automotive Engineers** (SAE) announced the creation of SAE Standard J3216 to advance *Cooperative Driving Automation* (CDA). This new standard is a marriage of vehicle automation and vehicle connectivity. SAE J3216 defines four classes for CDA: Status-Sharing, Intent-Sharing, Agreement-Seeking, and Prescriptive. CDA aims to improve the safety and flow of traffic and/or facilitate road operations by supporting the movement of multiple vehicles in proximity to one another. A typical CDA scenario may include one or more vehicles with driving automation feature(s) engaged, shared road users, e.g. drivers of manually driven vehicles, pedestrians, cyclists carrying personal devices and infrastructure owners/road operators, e.g. those who own/maintain/operate traffic signals and/or workzones. More information about SAE J3216 can be viewed at SAE's site at [this link](#).

On the vehicle connectivity issue, an article by *Michael Sena* in the May 26, 2020 issue of the **Dispatcher** titled *Two-way Vehicle Connectivity is a Three-sided Coin That Everyone Wants to Own* delves into the ongoing battle between the public and private sector for how vehicles are connected, what data is sent and received by the vehicles, who controls the data and its privacy and related issues. The article states that the auto makers consider an unconnected car as a lost opportunity for adding value to both their

customers and to their own business. For this reason, more and more new vehicles have the necessary connectivity devices installed at the factory. The article can be viewed at [this link](#).

On May 12, 2020, **The City of Seoul**, S. Korea launched a pilot program using ten different types of automated vehicles on its public roads. The automated vehicles include three buses, four sedans and three delivery robots. The intent is to test capabilities and operational performance of these vehicles in a real-world setting. Citizens of Seoul will be able to request free-rides on the buses along a 3.3 Km route by visiting City of Seoul's traffic information website. More information at [this link](#).

The **Covid-19** pandemic has forced auto makers to re-evaluate their priorities in tech-driven parts of their businesses such as automation, electrification, ride-sharing, etc. It appears that programs for developing more electric vehicles are getting priority over autonomy. The auto makers now believe electrification will have a quicker payoff than automation. The pandemic has also revealed that the demand for delivering goods via automated vehicles is higher than for carrying people. This too may change the course of how AVs are made and to what uses they are put. More information is at [this link](#).

One of the oft cited benefits of AVs is the reduction in automobile crashes. The hoped-for reduction may not be as high as previously thought. This is according to a new study by the **Insurance Institute for Highway Safety** (IIHS). The study suggests that perhaps one-third of crashes can be avoided by future AVs. This conclusion is based on analyzing the causes of over 5,000 car crashes collected by **National Highway Traffic Safety Administration** (NHTSA). These causes are in five categories: sensing and perceiving, predicting, planning and deciding, execution and performance and incapacitations. AVs may be better than humans in handling the perception, sensing and incapacitations categories. These account for only 34% of the crashes that were analyzed for this study. More detailed information at [this link](#). A copy of the 22-page report can be downloaded from IIHS site at [this link](#).

There is an ongoing debate in the AV community on whether future AVs will be individually owned or operated as fleets of shared vehicles. In an article titled *Who Will Own the Cars That Drive Themselves?*, the **New York Times** delves into this issue at some depth. The private ownership model has been very successful over the last 100 years. At present, companies like **Uber** or **Lyft** do not pay the upfront capital cost of owning a fleet of shared vehicles. If the shared model wins out, this will be a very significant cost to these companies in terms of capital costs. The Covid-19 pandemic has also shown that people are not too keen to use shared vehicles; be it ride-sharing kind or public transit. The article can be viewed at [this link](#).

The Chinese AV developer **Baidu** is claiming to have completed construction of the world's largest AV research and test facility. The new facility dubbed the *Apollo Park* and located in Beijing boasts an area of 13,500 sq. m (145,300 sq. ft) and is equipped

with various communication equipment for testing vehicle-to-infrastructure (V2I) as well as traffic signs, traffic signals, speed limit signs and cameras for both AV and CV testing. More information at [this link](#).



The safety challenges of deploying AVs in large numbers was the subject of an article by Professor **Amnon Shashua** who is one of luminaries of the AV industry. He is a Senior VP of **Intel** Corporation as well as the President and CEO of Israel-based **Mobileye**. The article is titled *Challenge of Supporting AV at Scale: Non-obvious implications of Safety on system architectural design*. Prof. Shashua argues that AVs need to be 1,000 times better than human drivers when it comes to *Mean Time Between Failures* (MTBF). In his opinion, an AV being as good as a human driver is not good enough. To achieve such high MTBF, he suggests AVs must be designed to have redundant systems. This type of redundancy is different than sensor redundancy, i.e. the AV needs to have a system based on only cameras and another system based on LiDAR and radar. This is distinct from the current practice of *sensor fusion* preferred by most AV companies. The article can be viewed at [this link](#) or [this link](#).

Another high-profile figure in the AV world is John Lawler – a Vice-President of Ford Motor Company and the CEO of **Ford Autonomous Vehicles LLC**. In an article titled *What Volkswagen's Investment in Argo AI Means for Ford's Self-Driving Vehicle Business*, Mr. Lawler announces that the partnership with **Volkswagen** and **Argo AI** is now signed, sealed and delivered. Under this partnership, Volkswagen will invest US\$2.6 billion in Argo AI to advance development of self-driving technology for both Ford and Volkswagen. Ford has committed up to US\$4 billion for its own autonomous technology and believes the partnership with VW and Argo AI will be beneficial for all parties. More information is at [this link](#) or [this link](#).



In July 2019, Ford CEO Jim Hackett (left), Argo AI CEO Bryan Salesky (middle) and Volkswagen CEO Herbert Diess announced a collaboration to develop autonomous vehicle technology. Volkswagen's investment deal in Argo AI closed on June 1, 2020.

Japan's **SoftBank** has made several previous investments in AV companies (Cruise, Nuro and others). The latest AV investment by Softbank is a US\$500 million bet on China's Didi's freshly minted autonomous driving subsidiary. **Didi** is China's dominant ride-hailing company and believes robotaxis are the future for its business. One of the motivations for Didi is the difficulty of recruiting enough drivers for its current business model. More information at [this link](#).

It has long been argued that information sharing among AV developers would be beneficial to the whole industry. For competitive reasons, this has not been widely adopted. There is no federal requirement at present obliging the AV companies to do so. Now, USDoT's **National Highway Traffic Safety Administration (NHTSA)** has set up a new voluntary program to collect and share data from autonomous vehicle operators. The program is called *Automated Vehicles Transparency and Engagement for Safe Testing (AV TEST)*. So far, nine companies have signed on to participate in this voluntary effort: **Beep, Cruise, Fiat Chrysler, Local Motors, Navya, Nuro, Toyota, Uber, and Waymo**. Also, eight states are expected to take part as well, including California, Florida, Maryland, Michigan, Ohio, Pennsylvania, Texas, and Utah. More information at [this link](#) and NHTSA's site at [this link](#).

And finally, the CBC reports that **Amazon** announced on Friday June 26 that it is buying U.S. self-driving technology company **Zoox**, which is developing an autonomous vehicle for a ride-hailing service that people would request on their phones. Seattle-based Amazon did not disclose how much it is paying for Zoox, which was founded six years ago in Foster City, California. Analysts pegged the purchase price at over \$1 billion US. The online retailing giant said Zoox will keep running as a separate business and continue to develop its own autonomous vehicle. More information is at [this link](#).

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 CAV-Related Events

Jul 7-8, 2020: [Work, Commute and Travel during... and beyond COVID-19](#), Electric Mobility Canada webinar.

Jul 8, 2020: [Automated Vehicles at the Sidewalk and Kerb](#), Harmonize Mobility webinar.

Jul 10, 2020: [How should cities prepare for automated vehicles after COVID-19?](#) Harmonize Mobility webinar.

Jul 15, 2020: The [Canadian ACE Vehicle Ecosystem](#), ICTC webinar

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

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.

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

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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.

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