

# CAV Update

A monthly newsletter  
on the CAV ecosystem

June 2021

## From the Editors

One topic that we have addressed before but which is still important is the messaging around CAV safety that needs to be addressed. A future with zero collisions and fatalities on our roads is a wonderful objective but is not realistic. We have been saying for years that all governments need to do a better job of managing the public's expectations about CAV safety.

We have forecast that full deployment of CAVs will lead to collisions and fatalities falling to 20% of current levels. At a national level, this means there would be an average of one CAV-related death per day. Does this fit any government's definition of "safe"? We doubt it. And the public is not ready for any fatalities because they think the technology will be perfect. The first few CAV-related deaths on Canadian roads will happen, although we do not know when. This will result in a significant public outcry and calls for the suspension of CAV deployment, and this would be very unfortunate.

Messaging from all governments and others needs to set the public's expectations to a realistic level.

## Canadian CAV News

Toronto-based **Almon Equipment Ltd.** has partnered with Canadian AV company **X-Matik**, the **University of Waterloo, Mechatronic Vehicle Systems Lab** and **The Miller Group** to develop an *Automated Truck-mounted Attenuator* (TMA, aka *crash truck*) which is used for highway maintenance work to protect motorists and the work crew. Funding for this project was provided by Ontario's *Autonomous Vehicle Innovation Network* (AVIN) and private sources. More information is at [this link](#). A short YouTube video can also be viewed at [this link](#).



**Cableshoppe Inc.** (CSI) is another Toronto-based technology company working on connected vehicle (CV) technology. In partnership with **WeTraq**, **Spark Innovation Centre**, and **Durham Region's Regional Technology Development Site** (RTDS) and Korea's **DaeChang Motors**, CSI will provide CV technology to electric vehicles manufactured by DaeChang whose primary customer is **Korea Post**. The constant connectivity allows Korea Post to manage its fleet, optimize routes, monitor driver behaviour, gather car diagnostic and other useful information. More information is at [this link](#).

Toronto-based **NuPort Robotics** is a developer of automated trucking systems. The company is collaborating with **Canadian Tire** for deploying automated trucks for the *middle-mile*, i.e., the short distances between warehouses and retail stores. NuPort is focused on this particular area of automated trucking. Part of the reason is the fact that the routes are relatively short, repetitive and have high volumes of cargo. This makes it easier to map out the route and design for the automated driving system for these particular routes. **Loblaw** is also experimenting with the *middle-mile* automated driving with another AV company. More information at [this link](#).



In a coup for Canadian AV industry, **University of Toronto** professor Raquel Urtasun was able to raise US\$83.5 million for her AV startup called **Waabi**. Previously, she had headed up Uber Advanced Technology Group's R&D activities in Toronto. Waabi's focus will be on application of advanced AI and simulation techniques to reduce the need for the real-world road testing and manual tuning. Waabi has indicated that it will first focus on long-haul trucking aiming to address the industry's driver shortage and safety issues. More information is at [this link](#).

The **UBC Medical School** and **Drone Delivery Canada** (DDC) have teamed up to initiate drone delivery of medical supplies to the remote B.C.'s **Stellat'en First Nation**. The project is known as *Remote Communities Drone Transport Initiative*. This will include providing health care supplies and services, PPE, other equipment, medications, laboratory services such as COVID-19 testing and diagnostics and other services. The project is funded by a \$750,000 grant from **Toronto Dominion Bank's TD Challenge** program. This is the fourth such project that DDC has undertaken with various First Nation communities in Canada. More information is at DDC's site at [this link](#) and UBC's site at [this link](#).



On June 14, 2021, the federal government announced a \$10m funding for a new research centre known as **iHub at McMaster University**. iHub's focus is on automotive and aerospace sectors. This includes research on electric and autonomous vehicles. The plan is to assist 230 *Small & Medium Enterprises* (SME) in southern Ontario to develop technologies that can be useful for large automotive and aerospace companies such as **Ford, Honda, Bombardier, Stellantis** (formerly Fiat-Chrysler) and **De Havilland Aircraft**. More details are at [this link](#).

The **Ministry of Transportation of Ontario** (MTO) has issued a *Request for Proposals* (RFP) titled *Review of Impacts of Automated Vehicles on Ontario Transportation Regulatory Environment*. Briefly, this is a study into what rules & regulations need to be in place to allow AVs on Ontario roads in the future. Closing date for submissions is July 6, 2021. Details are at [this link](#).

## **Winter Weather Testing**

A new section in *CAV Update* is winter weather testing. We plan to combine several topics into this section.

First, there is the interest resulting from the work by the Canadian Automated Snow Plow Initiative (CASPI). This is a growing topic and municipalities and other users have shown interest in the use for robots for this application. Second, the annual student automated snow plow competition was – as we said last month – a big hit, despite the issues with COVID. And third, winter weather testing of CAVs of all types is an area of ongoing focus. Winter weather impedes the function of sensors etc. A short while ago, we were talking to an OEM that told us that their CAV testing was being conducted in the southern states for the time being to avoid the challenges of winter weather. Testing



CAVs for operation in the northern states and Canada is an essential future activity. This creates significant challenges and opportunities for stakeholders in the CAV ecosystem.

This month's issue is to introduce the topic to our readers. There will be significantly more information on winter weather testing in future issues.

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## **International CAV News**

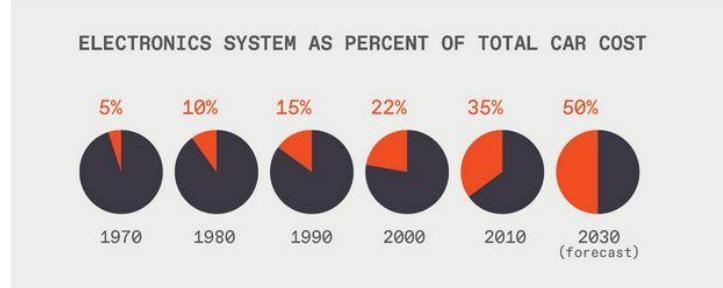
The AV technology is generally viewed as a *job killer* for anyone driving a commercial vehicle for a living. This includes truck drivers, bus drivers, taxi drivers, delivery drivers and others. Many of these drivers are represented by trade unions. One of the largest of these is the *Transportation Trades Department* (TTD) which is part of the **AFL-CIO**. On May 18, 2021, TTD submitted a 7-page written statement titled *Promises and Perils: The Potential of Automobile Technologies to the U.S. House of Representative's Subcommitte on Consumer Protection and Commerce*. The submission was squarely aimed at the impacts of the AV technologies on the members of this union and its 33 affiliates. It urges the subcommittee not to believe the happy talk of the AV industry about how the technology will improve the lives of the American citizens and the U.S. economy. As expected, the union is very worried about job displacement for millions of its members and is asking the federal government to take its concerns into consideration when drafting new laws for future AV deployments. A copy of the TTD submission can be viewed/downloaded at [this link](#).

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One of the CAV experts trying to bring realism to the hype surrounding the AV industry is Prof. Mary (Missy) Cummings at **Duke University** where she is the Director of the *Humans and Autonomy Laboratory*. In a recent interview, Prof. Cummings discussed some of the major technical challenges in bringing AVs to the mass market. For example, using thousands of STOP sign images an AI can be trained to recognize a STOP sign. However, if this STOP sign has leaves starting to grow across just the top 20% of it, that is enough to make that algorithm not recognize it, because it has never seen a stop sign with leaves across it. When asked about Waymo's driverless robotaxi service in Arizona, Cummings says each of those driverless cars has a team of four to six people managing each car by remotely monitoring and potentially intervening when a problems crops up that the driverless car cannot handle. For this reason, that sort of operation is not scalable with the current way of doing things. The interview can be viewed/heard at [this link](#).

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On June 7, 2021, **IEEE Spectrum** published an article titled *How Software is Eating the Car: The trend toward self-driving and electric vehicles will add hundreds of millions of lines of code to cars. Can the auto industry cope?* The article takes a deep dive into the ever-increasing complexity of software going into modern cars. A typical car these days has over 100 million lines of code running its various systems. This is expected to reach 500 million lines of codes as CAVs reach the mass market. The article can be viewed at [this link](#).

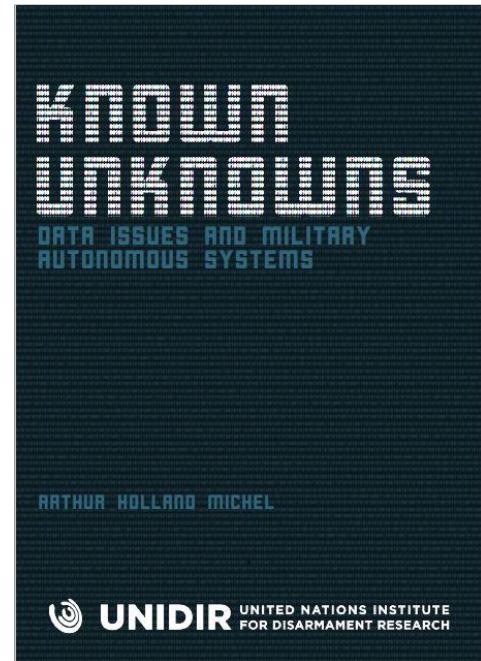


As connected vehicle (CV) technology proliferates, the cybersecurity of CVs and the infrastructures exchanging data with such vehicles is paramount. To this end, the cybersecurity firm of **Trend Micro** has published an 88-page report titled *Cybersecurity for Connected Cars: Exploring Risks in 5G, Cloud and other Connected Technologies*. The report suggests that high-risk cyberattacks such as a *Distributed Denial of Service* (DDoS) against a CV can be carried out by a 'low-skill' attacker. Trend Micro also believes that there are ample opportunities for attackers looking to abuse connected vehicle technology. However, currently there are limited opportunities for such attacks, and criminals have not found reliable ways to monetize such attacks. More information is at [this link](#). A copy of the Trend Micro report can be viewed/downloaded at [this link](#).



On May 29, 2021, **The Economist** magazine published an article on the trend towards autonomous weapon systems and all the risks and pitfalls associated with these systems. The article draws on a recent 48-page report published by the **United Nations Institute for Disarmament Research** (UNIDIR) and titled *Known Unknowns: Data*

*Issues and Military Autonomous Systems.* The UNIDIR report delves into the data used to train AI behind these autonomous weapon systems. For example, an AI trained on recognizing Russian uniforms may not be able to recognize Chinese uniforms. Furthermore, conflict environments are harsh, dynamic and adversarial. Dust, smoke and vibration can obscure or damage the cameras, radars and other sensors that capture data in the first place. Even a speck of dust on a sensor might, in a particular light, mislead an algorithm into classifying a civilian object as a military one. The Economist article can be viewed/downloaded at [this link](#). The UNIDIR report can be viewed/downloaded at [this link](#).



Boston-based **Merlin Labs** is a startup founded in 2018. Its business is making existing aircraft autonomous. Its target market is both air cargo and passengers. It has managed to raise US\$46 million in venture funding so far. In some respects, autonomy in the air is somewhat easier than on land. This is because of ground based radar and the air traffic control network that allows for charting a safe course. And the onboard digital transponders help the planes understand where other aircraft in the sky are situated. These transponders are required as part of the **Federal Aviation Administration's NextGen** system. More information is at [this link](#). A short YouTube video about the company can be viewed at [this link](#).



Online UK grocery/delivery company **Ocado** has invested £10 million (US\$13.8 million) in Oxford-based **Oxbotica** for development of autonomous vehicles tailored to its needs. Some of the AVs will be deployed on Ocado's warehouses and yards and some will make actual deliveries to customers. More information is at [this link](#). An interesting YouTube video



shows one of Ocado's highly automated warehouses in action at [this link](#)

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We have reported on agricultural automation company **Raven Industries** on a number of occasions. Raven acquired Regina-based *DOT Technology* in May 2020. On June 21, 2021, Raven itself was acquired for US\$2.1 billion by the UK company **CNH Industrial N.V.**. Details are at Raven's site and at [this link](#).

And finally, at 4:00 AM on June 15, 2021, the **Mayflower Autonomous Ship** (MAS) started its trip across the Atlantic ocean from Turnchapel Wharf in Plymouth, UK. If all goes well, the Mayflower will make landfall in about three weeks at Provincetown, Massachusetts. It will then make its way to the U.S. port of Plymouth, MA. Mayflower is quipped with 6 AI powered cameras, 30 onboard sensors (including an *electronic tongue* to measure ocean water chemistry) and 15 edge devices. The ship has connectivity but is able to make its own decisions and navigation if connectivity is lost.



The crossing commemorates the sailing of the original Mayflower ship in 1620 to the New World. The distance covered is approximately 3,220 miles (5,180 Km). The \$1.3 million project was backed by **IBM** and a number of other firms. The Mayflower's progress across the Atlantic can be viewed at [this link](#). More information is at IBM's site at [this link](#). A short YouTube video about the Mayflower can be viewed at [this link](#).

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## **Upcoming CAV-Related Events**

- Sept 1-2, 2021      [Autonomous Vehicles 2021](#), Long Beach, California
- Sept 13-15, 2021      [MINExo](#), Las Vegas, Nevada
- Sept 27-30, 2021      [IEEE VTC2021-Fall](#).
- Oct 4-5, 2021      [UK CAV Infrastructure Symposium](#), London, UK
- Oct 11-12, 2021      [Auto Sensors 2021](#), Detroit MI
- Oct 11-15, 2021      [ITS World Congress](#), Hamburg, Germany
- Nov 23-24, 2021      [Monetizing the Digital Car](#), live virtual event, UK



Dec 1-2, 2021	<a href="#">Autonomous Vehicles Europe 2021</a> , Berlin, Germany
Dec 14-17, 2021	<a href="#">UITP Global Public Transport Summit</a> ; Melbourne, Australia
Feb 27 – Mar 2, 2022	Ontario Good Roads Association's conference; Fairmont Royal York, Toronto
June 20-23, 2022	<a href="#">HxGN LIVE Global</a> , Las Vegas, Nevada

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## About CAV Update

*CAV Update is a free, monthly summary of news and analysis in the world of connected and automated vehicles, and the impact on the private sector, government, and society.*

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**CAVCOE** (formerly 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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