

CAV Update

A monthly newsletter
on the CAV ecosystem

January 2022

From the Editors #1

As we were finalizing this issue of *CAV Update*, there was a large protest of truckers who drove hundreds of trucks from all parts of Canada to downtown Ottawa, the location of Parliament Hill and many government buildings. They were protesting against the government's COVID-19 vaccine mandate for truckers. Let's put to one side the arguments on both sides. However, my partner, Donna, raised an interesting question about the future: what happens when CAV trucks with nobody in them are used in protest convoys and end up blocking key highways and roads? I told Donna that was a very interesting question, but I did not know the answer.

From the Editors #2

One of the most frequent questions we get is "when will we see fully-automated cars on the road?" The next article reports on a study from the **University of Waterloo** and **University of Toronto**. The title is *Why autonomous vehicles won't be taking over Ontario's city streets in 2022*. Not surprisingly, we agree 100% that autonomous vehicles will not take over Ontario's roads this year. But when will we see them?

The answer is nuanced. We forecast that the 2020s will see broad deployment of *non-passenger* CAVs for logistics, deliveries, off-road use-cases such as mining and farming, grass-cutting, snow-plows, etc. The reasons for this are solid business cases , and easier safety considerations for low-speed and/or off-road use-cases. Later in the 2020s, we will see automated trucks on inter-city highway routes. For *passenger* CAVs, we forecast widespread deployment in the 2030s.

However, another input to this discussion is Mary Barra, **GM's** CEO. Later in *CAV Update*, we report on her speech at CES in which she said that GM plans to sell autonomous vehicles to individuals by the middle of this decade. We predict a gradual start and stand by our forecast of widespread deployment in the 2030s.

As the article by the two universities points out, there are technological and other challenges that are being worked on. Also, there will be no "light-switch" moment: the improved technologies will be deployed incrementally with different deployment scenarios for the various use-cases.



Canadian CAV News

In an article titled *Why autonomous vehicles won't be taking over Ontario's city streets in 2022*, experts from the **University of Waterloo** and **University of Toronto** inject some realism into the autonomous vehicle hype. They posit that replicating how a human brain works when driving a car is a very difficult task. This is specially so in the so-called edge cases, i.e. situations that are unusual or occur rarely. An example would be children in Halloween costumes. To tackle a case like this, Waymo had its employee's children dress in costumes and parade in front of their cars so its sensors could collect more information and to train its AI. Another example would be subtle cues drivers give to each other such as signalling their intention by inching forward at an intersection to make a right turn. More information is at [this link](#). A short video can also be viewed at the same link.




In early January 2022, **Transportation Association of Canada** (TAC) published a 12-page document titled *Connected & Automated Vehicles: A Primer for Canadian Municipalities*. This is an update to the previous primer published in January 2021. The updated primer provides a high-level overview of CAVs. It attempts to dispel some myths around CAVs and provide some essential information, so that municipal stakeholders can make informed decisions on planning for a future with CAVs.



Furthermore, it shines a spotlight on many uncertainties surrounding CAVs, including how and when this technology will be commercially deployed, and the benefits and drawbacks of CAVs for a city's transportation network, economy and society as a whole. More information on TAC's site at [this link](#). A copy of the document can be viewed/downloaded at [this link](#).

On February 15, **The Conference Board of Canada** in partnership with **Transport Canada** is hosting a roundtable event: *Scaling-up New Mobility Innovations in Canadian Cities*. The roundtable brings together policymakers from all three levels of government, practitioners, and private sector leaders. The goal is to foster a cross-Canada dialogue about the most exciting opportunities to re-imagine sustainable city-building.





Canadian cities are embracing the opportunities presented by new mobility innovations. They are electrifying bus fleets, investing in charging infrastructure, launching micro-mobility pilots, testing autonomous vehicles, and exploring new approaches to modal integration. But there are challenges. The pace of technological change and commercial innovation places considerable strain on local resources and makes proactive planning difficult. As a result, cities are struggling with how best to deploy new mobility technologies and align them with sustainable planning visions. To register, please see [here](#).

Magna, based in Aurora, Ontario, has announced that it has added more than 120 employees of *Optimus Ride*, a provider of autonomous vehicle and mobility solutions located in Boston. This will enhance Magna’s capabilities in the field of advanced driver assistance systems (“ADAS”). “Growing our engineering bench strength in sensing hardware and software helps accelerate our path forward in a rapidly growing ADAS market,” said John O’Hara, President of Magna Electronics. The contributions expected from the Optimus Ride employees will be valuable as Magna builds on its strengths and position as a global ADAS provider with comprehensive capabilities. The full media release is [here](#).




Winter Weather Testing

Autonomous Vehicles International reports that US-based **Embark Trucks** has created a roadmap to develop and deploy technology that would allow Embark-equipped trucks to operate autonomously in snowy conditions. By the end of winter 2022, the company plans to have developed and publicly demonstrated a capability that leverages Embark’s Vision Map Fusion (VMF) technology to enable trucks to navigate snowy conditions autonomously. More details are [here](#).



Photo credit: Autonomous Vehicles International

Staying with Embark Trucks, it has come under the scrutiny of firms specializing in short-selling. According to NASDAQ’s site, the short position for Embark more than doubled from December 15th to December 30th.



And some items about winter weather testing in **Thompson, Manitoba**:

- We are seeing significant interest in using Thompson, Manitoba for winter weather testing, and we were hoping to announce in this issue of *CAV Update*, a couple of new users. But the timing is not quite right, so next month!
- The Thompson winter weather testing team has been expanded with four new people. Next month, we will introduce them to you.
- And finally, look out for an announcement about new branding for the Thompson WWT site.

International CAV News

In a surprise move, **Dan Ammann**, the CEO of **Cruise** was dismissed in mid-December 2021. According to media reports, Mr. Ammann did not agree with Mary Barra, **GM's** CEO and GM's Board of Directors on the strategic direction for Cruise. While Mr. Ammann's priority was to establish a commercial robotaxi business and take Cruise public in the near future, Ms. Barra and the board wished to delay the IPO and apply Cruise's autonomous drive technology to GM's own products. GM has appointed Cruise Founder - Kyle Vogt as the interim CEO. Bloomberg has a detailed report on what led to Ammann's dismissal. It can be viewed at [this link](#).

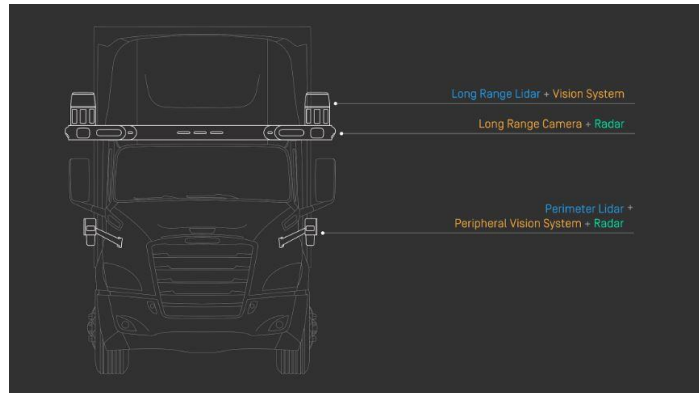


On December 23, 2021, **The New York Times** published an article titled *Public Streets are the Lab for Self-Driving Experiments*. The article delves into how a lack of federal regulations has allowed numerous companies to deploy their experimental automated vehicles on public roads. Partly due to high number of incidents with Tesla vehicles, the **National Highway Traffic Safety Administration** (NHTSA) issued a directive to Tesla and 108 other companies active in automated driving development to report any incidents when their vehicles were operating in an automated mode. Safety advocates are asking for tougher regulations for testing of AVs on public roads. AV developers counter by saying more regulations stifle the pace of innovation in their industry. The article can be viewed at [this link](#) or [this one](#).

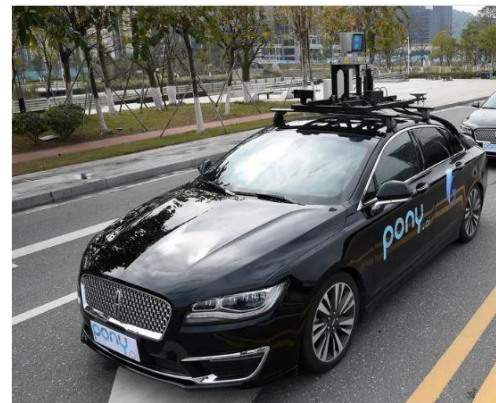




A recent blogpost by **Waymo** delves deep into the intricacies of making an 18-wheeler (Class 8 truck) self-driving. Waymo makes its own custom sensors for the task. This includes the core sensors such as long-range and short-range LiDAR, vision cameras, thermal cameras and radar. Waymo states that this hardware is the 5th generation of its sensor suite. Although the dynamics of an 18-wheeler are quite different than a passenger car, the same core software known as *Waymo Driver* are used in cars, trucks and other vehicles. Trucks travelling on highways are pelted with dust, road grime, bug splats, and bird scat. All of these have a negative impact on the proper functioning of the sensors. Waymo has therefore created a sophisticated sensor cleaning technology using custom nozzles, wipers, coatings and more to keep the sensors clean and working at peak efficiency. The sensor cleaning tech detects and dictates when and how to clean the sensors and under what conditions, all without human intervention. The Waymo blogpost can be viewed at [this link](#).



Pony.ai is a Chinese-American company active in the development of AVs and robotaxis. It is only one of the eight companies granted a licence by California's **Department of Motor Vehicles (DMV)** to operate a driverless vehicle on California's public roads. In December 2021, Pony.ai's permit was suspended by the DMV due to the crash of one of its driverless vehicles in Fremont. The crash occurred sometime in October 2021. The company is still allowed to test its AVs as long as there is a *safety driver* behind the wheel. California is among the stricter states, with its 132-page standards document for autonomous operation covering permits, insurance, data sharing and a requirement for a driver competent to operate the vehicle. More information at [this link](#). For a current list of California DMV permit holders, check DMV's site at [this link](#).



One of the darker sides of automated systems is the *autonomous weapon systems*. The **United Nations (UN)**, the **International Committee of the Red Cross (ICRC)** and numerous countries are concerned about the rapid pace of development in this area. In one of the latest developments, the UN convened a 5-day conference in Geneva in December 2021 to consult with all interested parties on this matter. The UN Secretary-

General **Antonio Guterres** called for new rules covering the use of autonomous weapons. For the past 8-years countries have been discussing limits on *Lethal Autonomous Weapons* (LAWS). The weapons are fully machine-controlled and rely on artificial intelligence and facial recognition to identify, select and attack targets. There are reports that such weapons may have actually been used in drone attacks in the Libyan civil war. Some countries have called for a total ban on LAWS while some others point to the benefits of such weapons which might be more precise than humans in hitting targets. The UN work on LAWS continues. More information at [this link](#).



Automotive companies have been actively participating in the **Consumer Electronics Show** (CES) in Las Vegas in the past few years. Partly for this reason, the U.S. Secretaries of Transportation also make an appearance at this event. For the 2022 show, the current U.S. Secretary of Transportation, **Pete Buttigieg**, was on hand to talk about some big picture transportation issues his department is dealing with. This includes initiatives in vehicle electrification and automation. Secretary Buttigieg is in charge of spending many billions of dollars on transportation initiatives as part of U.S. government's \$1 trillion infrastructure plan.




To this end, *The Verge* conducted a 30-minute interview with Secretary Buttigieg and touched on a few topics including electrification and automated vehicles. Building a nationwide and equitable electric vehicle charging network is high on the Secretary's list of priorities. As for automated vehicles, he jests that it always seems to be *just five years away!* The (audio) interview and its transcript can be accessed at [this link](#).

Staying with CES, Mary Barra, **GM's** CEO, also participated in this year's show. She announced GM's plans to sell autonomous vehicles to individuals by the middle of this decade. She was not specific as to what vehicle type or which GM model. Her stance is somewhat contrary to predictions of many in the CAV industry that future AVs will be in the form of large fleets of shared vehicles owned and operated by existing or new companies such as Uber and Lyft, or even by the automakers themselves. More information is at [this link](#).



Insurance *Claim Adjusters* have their own trade publication called **Claims Journal**. On December 28, 2021, it published an article titled *Subrogating Automated Driving Systems and Autonomous Vehicle Failures*. The article provided a foretaste of what



Claim Adjusters can expect to deal with in the era of autonomous vehicles. As the article states, when settling auto insurance claims, it will no longer be a matter of determining which driver ran a red light. The issue becomes more of a product liability issue and the skill sets needed to deal with such claims. The article suggests that resorting to expert product liability lawyers may be required to argue the finer points of automated driving in a legal dispute. It also suggests that the cost of repairs will be much more expensive for automated vehicles. The article can be viewed at [this link](#).



**CLAIMS
JOURNAL**

On December 31, 2021, **Newsweek** magazine published an article titled *Starting Autonomous Vehicles Isn't the Problem - It's Slowing and Stopping Them*. The main focus of the article is the role thermal cameras can play in automated vehicles as well as those equipped with Advanced Driver Assist Systems (ADAS). **Teledyne FLIR** is a U.S. company and a specialist in thermal

imaging systems. This includes thermal cameras designed specifically for automotive use. The Newsweek article



Newsweek

posits that thermal cameras can fill the gaps left by other sensors such as LiDAR and regular vision cameras. This is mainly because unlike LiDAR and vision cameras, a thermal camera is a *passive* device. Unlike LiDAR, it does not illuminate its surrounding with beams of light to construct a 3D image of objects around or in front of vehicles. Thermal cameras can also differentiate between an adult, a child or an animal based on their heat signature. Teledyne FLIR believes thermal cameras will become an indispensable sensor for future automated vehicles. The article can be viewed at [this link](#).

McKinsey & Company is a major consultancy. In January 2022, the *McKinsey Centre for Future Mobility* published a 9-page report titled *The road to affordable autonomous mobility*. The report is focused on future shared robotaxis (2 to 6 passengers) and larger automated shuttles (4 to 10 passengers). The study involved collecting data from more than 2,800 cities and rural areas across more than 110 countries. Along with data collection, a model called *Mobility Market Model* was developed which includes numerous modes of transport and takes into account miles traveled, light-vehicle sales, installed base, and environmental impact. The model estimates the size of shared transport through 2030 and beyond. Copy of McKinsey report can be viewed/downloaded at [this link](#).



**McKinsey
& Company**

And finally, Israeli researchers at the **Ben-Gurion University** have devised an experiment to demonstrate the cognitive abilities of the common goldfish by developing a *Fish Operated Vehicle* (FOV). The FOV has many of the sensors and actuators used in autonomous vehicles such as a LiDAR, cameras, electric motors, computers, etc. The fish are trained to *drive* the vehicle towards a certain target in a room. This is achieved by the vehicle driving in the same direction that the fish swims in its tank towards a target painted on a wall. The fish receive a reward for a successful navigation to that point. The experiment has proven that some goldfish are more alert than others and better navigators. It has also disproved the popular myth that the goldfish's memory only retains what happened in the past 10 seconds. Previously, similar experiments had shown that rats can also be trained to perform a similar feat. More information and a short video can be viewed at [this link](#).



Upcoming CAV-Related Events

Jan 31 – Feb 4, 2022	Intonomous Canada , GoExport's free virtual trade mission for Canadian and European SMEs. Registration required
Feb 27 – Mar 2, 2022	Ontario Good Roads Association , Fairmont Royal York, Toronto
June 20-23, 2022	HxGN LIVE Global , Las Vegas, Nevada
June 21-23, 2021	Autonomous Vehicle Technology Expo , Stuttgart, Germany
Sept 7-8, 2022	ADAS& Autonomous Vehicle Technology Expo , San Jose, California (postponed from March 2022)
Nov 16, 2022	North American Winter Weather Conference, Thompson, Manitoba, Canada



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.

Chief Editor: Ahmad Radmanesh

Contributors to this issue: Barrie Kirk, Nicola McLeod, Keith Fagan and Donna Elliott

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

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

CAVCOE (formerly the Canadian Automated Vehicles Centre of Excellence) advises the public and private sectors on planning for the arrival of self-driving vehicles.

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

info@cavcoe.com

www.cavcoe.com

© CAVCOE 2022
