# AVIN SPECIALIZED REPORTS

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## AUTONOMOUS VEHICLES RESHAPING THE FUTURE

Cross-Sector Opportunities and Considerations

Ontario Centres of Excellence

Where Next Happens

# TABLE OF CONTENTS

# INTRODUCTION

The adoption of fully autonomous vehicles (AVs) is undoubtedly among the largest technology shifts that will be realized in the future. Today, players in the automotive and mobility spaces worldwide have been investing billions of dollars and hundreds of hours of research and product development in the area of AV technologies. Although, it is not yet clear how soon fully autonomous vehicles will operate on public roads, the opportunities and preparation plans for AVs are starting to come to fruition.

Most of the analyses on the adoption of AVs mainly focus on their impacts on people mobility and transit. However, since the use of vehicles is linked to other sectors, the level of considerations, opportunities, and disruption of the adoption of AVs will be much broader.

Although it may sound not directly related to the adoption of AVs, the **health care** sector is one of the major sectors that will experience transformative opportunities through the use of AVs. Eliminating the dependency on human drivers will boost people safety, offer expedited care to patients, and bring more efficiency to the medical supply chain.


As well, by removing the need for human drivers to control vehicle operations, all vehicle occupants will become passengers. Considering this fact, new use and service channels will potentially open up for the players in the **media and advertising** sectors.

The adoption of AVs is also anticipated to have implications on the **urban planning** sector. For example, street parking will be less of a necessity with the ability of AVs to drop passengers and move on. This will also reduce the need for parking lots to be heavily distributed in the city centre. This freed-up space will have impacts on land use and road structuring.

In the past few years, **delivery services** of food, goods, and postal parcels have been experiencing AV pilots and deployments in different jurisdictions across the globe. Some companies have also started to design AVs solely for delivery purposes. This has urged some retailers to establish partnerships with automakers and AV technology companies to expedite their autonomous delivery plans.

Furthermore, shifting the liability of vehicle collisions from humans to automated machines has posed considerations related to the **auto insurance** sector. Players and regulators in the sector have started to think about these liability considerations, the new sources of risk that may be introduced with the adoption of AVs as well as the new sources of driving data that these vehicles can bring to the assessment and pricing processes.

**Motivated by the noteworthy opportunities and considerations that AVs can bring to these vital, mobility-linked sectors, in this report, we focus on drawing attention to these anticipated shifts as we prepare for these transformations**. We believe that proactive readiness plans and activities are necessary to harness the advances of AV technologies to ensure that we are ready to leverage and embrace these future vehicles once they become a reality.


# HEALTH CARE

AVs will disruptively reshape how people travel from point A to B. People will manage to have safer and more seamless mobility with zero to limited reliance on human interaction. This is advantageous for the health care sector, yielding opportunities for patients, medical care staff, and medical equipment providers.

The most direct opportunity of AVs in health care is that **AVs are anticipated to greatly decrease injuries as a result of collisions, lowering the demand for related health care**. According to the Canadian Motor Vehicle Traffic Collision Statistics, in 2017 alone, Canadian roads experienced 154,886 reported injuries[1], imposing a burden on the national health care budget. The U.S. National Highway Traffic Safety Administration (NHTSA) estimates that automated driving can reduce traffic fatalities by 94% by eliminating the root cause of road collisions; human error[2], resulting in significant savings on health

[1] **Government of Canada. (2019). Canadian Motor Vehicle Traffic Collision Statistics: 2017. Retrieved from** https://www.tc.gc.ca/eng/motorvehiclesafety/canadian-motor-vehicle-traffic-collision-statistics-2017.html

[2] **The National Highway Traffic Safety Administration. (2017). Automated Driving Systems: A Vision for Safety. Retrieved from** https://tinyurl.com/y87nzq3q


care costs. Such savings can be spent by governments and the health care industry on improving their health care systems and expanding coverage.

The second major opportunity of AVs in health care is improved and expanded patient mobility. **Eliminating the dependency on a human driver brings freedom and expedited care to patients and injured people**. With the adoption of AVs, the elderly, disabled, and non-driver patients can independently have access to convenient, always-available, door-to-door means of transportation. For more convenience, care providers can partner with mobility as a service (MaaS) providers to automatically schedule autonomous rides for their patients based on their scheduled appointments. Furthermore, the interior of an AV can be customized to include health care amenities such as medical tools and equipment to provide live communications with care providers and basic connected medical devices such as a heart rate monitor.

Patients will not be the only beneficiaries from the adoption of AVs. Automated mobility can also greatly affect the medical supply chain. **With access to faster, autonomous, and expanded mobility, clinical supplies can be moved faster and more efficiently from distribution channels to the end health care users**. Combined with real-time analytics, autonomous supply chain distribution can also dynamically optimize routes[3].

With such anticipated opportunities, stakeholders and providers in the health care sector need to re-evaluate their strategies and business models to accommodate and benefit from the disrupting future of mobility.

[3] **Deloitte. (2018). New roads to the health care of tomorrow. Retrieved from** https://tinyurl.com/y588qego

# MEDIA AND ADVERTISING

With fully autonomous vehicles, drivers will become passengers. **This shift in vehicle control will transform how media and advertising can be delivered and consumed in the vehicle compartment**. With the extended time many people spend in their vehicles, opportunities will arise for media and advertising companies to provide expanded content and make use of the new media channels coming to vehicles.

**Audio** media content will not be the dominant in-vehicle media type anymore. **Video**, **gaming**, and **social media** content will significantly redefine the vehicle compartment. Video on-demand and mobile gaming applications will acquire new, disruptive use channels with anticipated revenues that will potentially exceed those from their current platforms. This can be supplemented with virtual reality, transforming the vehicle interior to a theatre, or an interactive gaming environment, for example. Accessing social media platforms while on the move will also bring new and expanded content channels, allowing passengers to share their trips and interact with family, friends, and followers in real time.


Media content coming to AVs is not only about entertainment media.

**Productivity media**, such as teleconference, e-mail, and calendar content, is also anticipated to be enormously consumed inside AVs.

**Education** media such as online courses and podcasts can also be brought to AVs to optimize the use of transit time.

In-vehicle **advertising** is another type of content that can alter and enhance the autonomous, in-vehicle experience. With the possibility of having multiple, big screens on-board, dynamic billboards can be brought to the vehicle compartment. This can be enhanced with an augmented and/or virtual reality experience, bringing the ability to discover the advertised product or service and make purchases while in transit.

With the development of AVs in progress, players in the media and advertising industries need to start to seize these opportunities and seek **partnerships** with automakers and MaaS providers. For example, by collaborating with ride hailing and sharing providers, media companies can extend the media experience over **MaaS** vehicles based on user profiles and preferences, which can be collected in advance by the MaaS company per the user's approval. Based on the trip length, the type and duration of the offered media content can also be optimized. Furthermore, content can be customized based on if and with whom the rider is sharing the trip (e.g., sharing with their own family or friends vs. with strangers). In terms of advertising, personalized ads can be played in the MaaS vehicle based on, for example, the trip destination and purpose, and in the preferred language of the rider. To accommodate having multiple riders with different interests on board, some media companies started to provide personally isolated media zones for vehicle passengers[4].

On their end, **automakers** need to keep the expanded media and advertising experience in consideration while designing the vehicles of the future. Vehicle interiors should allow for an enhanced advertising, entertaining, productive and relaxing experience, with flexibility to adapt based on passengers'

[4] **Cunningham, W. (2015). Harman creates personal audio zones for your car. Retrieved from** https://www.cnet.com/roadshow/news/harman-creates-personal-audio-zones-for-ces-2015/


preferences and needs. The possibility of customizing each passenger's experience independently of the others will be an optimal model.

While seizing these opportunities, media providers should consider addressing the challenge of providing a seamless streaming experience if consumers change their mode of mobility during a single trip. For example, a media consumer may use their own AV in the first segment of the trip (e.g., from home to an in-city train station) and a ride-share AV for the last segment of the trip. A seamless media experience should be guaranteed moving the media session over different mobile devices as available to the consumer in the different segments of the trip.

Without a connectivity infrastructure, none of that immense online content can be brought to vehicles.

## Telecommunication companies

should consider such revenue-boosting opportunities, providing high-bandwidth, fast, and reliable connectivity plans for use by AVs. According to a consumer analysis by Deloitte[5], by 2030, vehicle passengers are expected to consume more than 52 billion hours of media content annually. With the adoption of smart mobility, in-vehicle annual media consumption is expected to escalate to 95 billion hours by 2040.

[5] **Deloitte. (2017). Experiencing the future of mobility: Opportunities for the media and entertainment industry. Retrieved from** https://www2.deloitte.com/us/en/insights/focus/future-of-mobility/opportunities-for-media-and-entertainment-industry.html

# URBAN PLANNING

The future of mobility, including the adoption of AVs, has started to significantly draw the attention of governments in terms of the impacts on urban planning and restructuring. Shared and autonomous mobility is anticipated to disrupt the demand and distribution of traffic flows and parking facilities. This has called for planning of how roads should be restructured accordingly, and how the potential freed-up urban space can be efficiently utilized.

**One of the significant opportunities of the adoption of AVs is the anticipated decrease of required parking spaces**. In a 2018 study by the World Economic Forum, in collaboration with the Boston Consulting Group, it was found that the adoption of AVs will require about half of the city of Boston's current parking[6]. Such a significant reduction in the required parking space is mainly attributable to the fact that AVs will eradicate the demand for

[6] **World Economic Forum. (2018). Reshaping Urban Mobility with Autonomous Vehicles: Lessons from the City of Boston. Retrieved from** http://www3.weforum.org/docs/WEF_Reshaping_Urban_Mobility_with_Autonomous_Vehicles_2018.pdf


parking close to the destination through their ability to drop off passengers at their destination and move on. This is anticipated to free up significant urban space that used to be dedicated to street parking. This freed-up capacity can be better used to accommodate other modes of transportation such as bikes and scooters, and to further enhance an active lifestyle by offering wider sidewalks to pedestrians to freely walk and run.

**AVs will also affect where parking lot facilities are offered and how they can be distributed**. AVs can reduce the demand for city-centered parking lots through the ability of dropping off passengers and moving on to parking lots at neighboring suburban areas. This will result in tremendous spatial replacements of such urban parking lots and improvement of in-city public spaces. Because AVs can be parked so close to one another, since there is no need to open doors while parked, parking lots are also anticipated to accommodate more vehicles in a significantly smaller space. This freed-up parking capacity can be utilized for creating and expanding green areas and public plazas, building shopping and recreational centres, and for expanding housing development per the city's needs.

Another consideration in reshaping urban planning is **accounting for the pick-up and drop-off zones of AVs**. Eliminating the need for street parking will not waive the need to allow for passenger pick-up and drop-off. AV loading zones should be offered and structured in a way that ensures the convenience and safety of AV passengers and takes into account accessibility for disabled people and vulnerable users[7]. These zones can be also used as in-city **safe harbours** for AVs in case they encounter a malfunction or an unusual situation that requires them to park and wait for assistance or repair.

With such disrupting opportunities and considerations of the adoption of AVs on urban planning and land use, municipalities have started to adapt their urban planning strategies accordingly. For example, in their 2019-2021 Draft Automated Vehicles Tactical Plan[8], the **City of Toronto** officials outlined how the city plans to

[7] **Gavanas, N. (2019). Autonomous Road Vehicles: Challenges for Urban Planning in European Cities. Retrieved from** https://www.mdpi.com/2413-8851/3/2/61/pdf

[8] **City of Toronto. (2019). The Draft Automated Vehicles Tactical Plan. Retrieved from** https://tinyurl.com/yyaexzpy


prepare for AVs. This included considerations of the impacts of AVs on land use planning regulations, standards, and guidelines. In 2018, the **City of Chandler**, Arizona, became one of the first U.S. cities to introduce an ordinance to amend parking and loading regulations in the City's zoning code to accommodate the impacts of AVs and ride sharing[9].

[9] **City of Chandler. (2018). Chandler first in the nation to include autonomous vehicles and ride sharing in zoning code. Retrieved from** https://www.chandleraz.gov/news-center/chandler-first-nation-include-autonomous-vehicles-and-ride-sharing-zoning-code

# DELIVERY SERVICES


The common means of how things are moving from senders to receivers are shifting. In particular, delivery services have experienced major opportunities and changes through the initial deployment of AVs.

According to a study by KPMG[10], autonomy manages to enable cheaper, faster, and more convenient delivery services. McKinsey predicts that semi and fully autonomous last-mile delivery will reduce delivery costs by approximately 10-40%.[11] This is mainly attributed to eliminating human labour, which will result in reducing shipping costs and expanding availability of delivery facilities for overnight and weekend pickups.

These opportunities are also facilitated through the introduction of new concepts and technologies for **last-mile delivery**. Delivery **droids**, also referred to as **bots**, are examples of such technologies. These droids are AVs specially designed for driverless delivery. They come in different sizes to accommodate different types and sizes of packages. Some droids can offer the possibility of delivering multiple packages at once by, for example, being partitioned into many secured lockers.

[10] **KPMG LLP. (2018). Autonomy delivers: An oncoming revolution in the movement of goods. Retrieved from** http://tiny.cc/l2c7az

[11] **McKinsey & Company. (2018). Fast forwarding last-mile delivery – implications for the ecosystem. Retrieved from** http://tiny.cc/l0c7az


**Last mile delivery** refers to the last phase of the delivery journey where the ordered item(s) are delivered to their final shipping address.

Realizing the need for accommodating and benefiting from this delivery revamp, some retailers and automakers have started to adapt to autonomous delivery, and have introduced their own autonomous delivery vehicles. In June 2017, **Ocado**, the British online supermarket, started to pilot driverless delivery vans in London[12]. In the U.S., **Amazon** has officially rolled out autonomous delivery bots, called 'Scouts', on the streets of California[13]. The bots will autonomously follow their last-mile delivery route from urban distribution points to Amazon Prime customers, and initially be accompanied by an Amazon Scout Ambassador. In China, the e-commerce companies **JD**[14] and **Alibaba**[15] have started to test driverless delivery bots to help ship goods purchased online.

Alibaba's bots can also deliver fresh food that can be kept warm or cool, depending on the temperature adjusted remotely by the customer.

Other major players have also been active in establishing partnerships to complement and expedite their autonomous delivery plans. **Walmart** and **Udelv** have partnered to test autonomous delivery in Arizona[16]. Walmart has also recently partnered with **Gatik** for middle-mile autonomous delivery. Gatik's autonomous vans have started to deliver online grocery orders from Walmart's main warehouse to its neighborhood stores in Arkansas[17].

**Middle mile delivery** refers to the middle phase of the delivery journey where goods are moved from warehouses to distribution stores.

[12] **Kleinman, Z. (2017). Ocado trials driverless delivery van in London. Retrieved from** https://www.bbc.com/news/technology-40421100

[13] **Scott, S. (2019). What's next for Amazon Scout? Retrieved from** https://tinyurl.com/yxsfnadx

[14] **Matsuda, N. (2018). JD.com rolls out fleet of AI-equipped delivery robots. Retrieved from** https://asia.nikkei.com/Business/China-tech/JD.com-rolls-out-fleet-of-AI-equipped-delivery-robots2

[15] **Liao, S. (2018). Alibaba made a driverless robot that runs 9 mph to deliver packages. Retrieved from** https://tinyurl.com/ybzpqhs6

[16] **Korosec, K. (2019). Walmart taps startup Udelv to test autonomous grocery deliveries in Arizona. Retrieved from** https://tinyurl.com/ya8s48w7

[17] **Davies, A. (2019). This robo-van startup will handle Walmart's 'middle mile'. Retrieved from** https://www.wired.com/story/robo-van-startup-handle-walmarts-middle-mile/

Some automakers have been also tapping into partnerships to offer autonomous delivery using their AVs. For example, in 2017, **Ford** and **Domino's** started consumer research and testing of self-driving cars for pizza delivery[18]. Ford has also partnered with **Walmart** and **Postmates** to test autonomous grocery delivery[19]. In January 2018, **Toyota** unveiled its **e-Palette** concept[20], presenting autonomous vehicles in three sizes to suit a wide range of autonomous delivery and mobility solutions. Toyota has also formed the **e-Palette Alliance** with partners such as Amazon, DiDi, and Uber to explore the various uses of the e-Palette concept.

Beyond the retailer and automaker delivery activities, **postal delivery** service providers have also started to tap into autonomous delivery. For example, the **US Postal Service** (USPS) and **UPS** have

[18] **Ford Motor Company. (2017). Domino's® and Ford begin consumer research of pizza delivery using self-driving vehicles. Retrieved from** https://www.ford.ca/innovation/dominos-and-ford-consumer-research/

[19] **Korosec, K. (2018). Ford partners with Walmart and Postmates to test autonomous grocery delivery.**

**Retrieved from** https://tinyurl.com/y6oarssm

[20] **Toyota Canada. (2018). Toyota unveils e-Palette concept at CES 2018. Retrieved from** https://tinyurl.com/y44wmoey


started pilot programs to deliver mail and cargo using self-driving trucks[21,22]. In February 2019, **FedEx** unveiled its "SameDay Bot". This autonomous robot is designed to travel on sidewalks and along roadsides to deliver small shipments to customers' homes and businesses on the same business day[23].

To bring delivered packages to customers' doorstep and fill the gap of autonomous home delivery, **Ford** has recently released its vision of a **two-legged delivery robot** called "Digit." This robot will be able to climb steps and is equipped with lidar and stereo cameras to navigate its pathway to customers' front doors[24].

It is anticipated that, in the future, autonomous delivery will not only be restricted to bots and commercial delivery vehicles. Privately owned AVs will also eventually enter the delivery market. Eliminating the need for a human driver will enable utilizing these AVs for delivery jobs in order to make profit instead of leaving them parked idle while not in use.

[21] **Somerville, H. (2019). Self-driving trucks begin mail delivery test for U.S. Postal Service. Retrieved from** https://tinyurl.com/y3u2q8vl

[22] **O'Kane, S. (2019) UPS has been quietly delivering cargo using self-driving trucks. Retrieved from** https://www.theverge.com/2019/8/15/20805994/ups-self-driving-trucks-autonomous-delivery-tusimple

[23] **FedEx. (2019). Delivering the future: FedEx unveils autonomous delivery robot. Retrieved from** https://about.van.fedex.com/newsroom/thefuturefedex

[24] **Naughton, K. (2019). Ford's way to finish driverless deliveries: package-carrying robots. Retrieved from** https://tinyurl.com/yyx5knau

# AUTO INSURANCE

Auto insurance is one of the major sectors that will be significantly disrupted with the adoption of AVs. Currently, auto insurance policies are based on the assumption that vehicle collisions are mainly caused by human error. With the adoption of AVs, human drivers will hand over the driving task to automated systems; hence, new factors and impacts should be taken into consideration. According to the **Insurance Bureau of Canada** (IBC)[25], such considerations can be summarized as:

I. Shifting the responsibility of vehicle collisions from humans to machines requires adapting the current auto insurance policies to redefine the liability and benefit rules. Other players such as the vehicle manufacturer and the automated technology provider will get into the equation.

II. AVs are anticipated to reduce collisions with the elimination of human error and distraction. However, since such a great benefit requires sophisticated and expensive systems, vehicle repair costs are anticipated to go higher. According to a 2015 study by KPMG[26], accident frequency could drop by 80% by 2040, while the

[25] **Insurance Bureau of Canada. (2018). Auto Insurance for Automated Vehicles: Preparing for the Future of Mobility. Retrieved from** https://tinyurl.com/ycrwfjsm

[26] **KPMG. (2015). Marketplace of Change: Automobile Insurance in the Era of Autonomous Vehicles. Retrieved from** https://tinyurl.com/yxtgh9ak


accident expense could increase from $14k to $35k.

III. Although AVs are anticipated to boost safety, new sources of risk will be introduced with the adoption of these future vehicles[27]. Examples include cyber attacks, and software and hardware malfunctions. Such a new risk vector should be taken into consideration when devising auto insurance policies.

IV. Equipped with an array of sensors and data loggers, AVs will have more access to driving data than the current, non-automated vehicles. According to Deloitte[28], such logged data will bring significant benefits to auto insurers utilizing it for reliable crash assessment and insurance premium pricing.

Based on these considerations, the IBC proposed an insurance framework that accommodates the use of AVs, while co-existing with current policies. This framework outlines three recommendations:

1. Developing a single insurance policy covering both driver error and the automated technology.
2. Developing a data-sharing arrangement with vehicle manufacturers, vehicle owners and auto insurers to help determine the cause of a collision.
3. Developing new federal vehicle safety standards that include technology and cybersecurity standards.

It is worth mentioning that AVs and the auto insurance sector have a mutual impact on one another. While AVs will affect auto insurance policies and lawsuits, auto insurance can affect the adoption of AVs[28]. Auto insurance companies can collaborate with governments and vehicle manufacturers to boost public acceptance of AV technologies by providing education and awareness channels and offering incentives and reduced premiums for owners of AVs.

[27] **European Parliamentary Research Service. (2018). A common EU approach to liability rules and insurance for connected and autonomous vehicles. Retrieved from** https://tinyurl.com/y56ovaj6

[28] **Deloitte. (2018). Connected and autonomous vehicles in Ontario: Implications for the insurance industry. Retrieved from** https://tinyurl.com/y5f8ahnn


# HIGHLIGHTS FROM CANADA

## HEALTH CARE

Ontario

**Cloud DX**, a start-up based in Kitchener, ON, has developed Vitaliti, a high-tech necklace that collects vital signs and other health data. The platform sends the collected data in real-time to cloud servers for data analytics and diagnosis. Vitaliti is a portable, out-of-the-box platform that can be easily integrated with connected and autonomous vehicles for mobile diagnosis.

**Link:** https://www.clouddx.com/

## AUTONOMOUS DELIVERY

British Columbia

**Novex Delivery Solutions**, a same-day express courier and expedited freight company in Richmond, BC, has been testing driverless delivery vehicles in Metro Vancouver. The company has been experimenting with the autopilot features of the Tesla Model 3 with a safety driver behind the wheel.

**Link:** https://www.novex.ca/

## URBAN PLANNING

Ontario

In June 2019, the **City of Toronto** publicly released the 2019-2021 Draft Automated Vehicles Tactical Plan. The plan includes proposals across seven strategic directions that include considerations of the impacts of AVs on land use planning.

**Link:** https://www.toronto.ca/services-payments/streets-parking-transportation/automated-vehicles/draft-automated-vehicle-tactical-plan-2019-2021/

## AUTO INSURANCE

National

The **Insurance Bureau of Canada** (IBC) developed an AV insurance framework to accommodate vehicles at SAE level 3, 4 and 5 automation. The framework outlines three recommendations for preparing vehicle owners and insurance companies for the arrival of AVs.

**Link:**
http://www.ibc.ca/on/the-future/automated-vehicles


# CONCLUSIONS

In this report, we have discussed the opportunities and considerations of the adoption of AVs as for other vital, mobility-linked sectors. First, the opportunities of AVs in regard to the health care sector have been delineated, highlighting the significant results of the adoption of AVs on human safety, health care costs and accessibility, and the medical supply chain. Second, examples of the wide consumer and market opportunities that AVs can bring to the media and advertising sectors have been discussed, highlighting the impacts of using AVs on the quality and expansion of the user experience, and on the profits of media providers and telecommunication companies. Furthermore, we have discussed the considerations to be had with the adoption of AVs in regard to parking demands, road structuring, and land use, shedding light on examples of municipal efforts for consideration in governmental urban planning strategies.

Compared to the aforementioned sectors where the use of AVs is still considered futuristic, the food, goods and postal delivery services industry has been experiencing real deployments and uses of AVs. Examples of such uses in different jurisdictions and by different companies have been deliberated. Lastly, the impacts of AVs on the auto insurance sector have been also touched upon, drawing attention to the insurance framework proposed by the Insurance Bureau of Canada to accommodate the adoption of AVs.

Given these substantial shifts, it is remarkable that AVs will be a force for people-centered designs and strategic plans. With direct and significant influences on consumers, AVs have the potential to be utilized by governments, companies, and service providers as winning assets for a safer, healthier, and profitable future. To be able to realize their potential, these organizations have to navigate the rapid advances of the AV technological revolution, and adapt their product designs, business models and strategic plans to leverage and embrace its disruptive opportunities.

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# ABOUT AVIN

The **Autonomous Vehicle Innovation Network (AVIN)** initiative is funded by the Government of Ontario to support Ontario's competitive advantage in the automotive sector and to reinforce its position as a North American leader in advanced automotive and mobility technologies, including transportation and infrastructure systems.

This initiative capitalizes on the economic potential of connected and autonomous vehicle (CAV) technologies by supporting the commercialization of best-in-class, made-in-Ontario solutions that create jobs, drive economic growth and enhance global competitiveness. AVIN also helps Ontario's transportation systems and infrastructure adapt to these emerging technologies.

# AREAS OF FOCUS

AVIN programs focus on supporting the development and demonstration of CAV technologies in light vehicles (e.g., cars, trucks and vans), heavy-duty vehicles (commercial vehicles, trucks, buses and RVs), transportation infrastructure, intelligent transportation systems (ITS) and transit-supportive systems.

AVIN is administered on behalf of the Government of Ontario by Ontario Centres of Excellence (OCE). The initiative comprises five distinct programs and a central hub. The AVIN programs are:

- AV Research and Development Partnership Fund
- WinterTech
- Talent Development
- Demonstration Zone
- Regional Technology Development Sites

The AVIN Central Hub is a dedicated team that supports delivery and administration of AVIN programming, and provides the following key functions:

- Connect & Coordinate - a focal point to help coordinate activities among industry, academia, research organizations and governments, and connect interested stakeholders and members of the public;
- Opportunity Identification - knowledge translation, research, data/information, trend analysis, and acting as a bridge between technology and policy; and
- Awareness & Education - promote AVIN programs and Ontario's AV testing pilot and build awareness of Ontario's growing CAV community.

***AVIN has five Objectives:***


*We would like to thank the Government of Ontario for supporting AVIN programs and activities.*

*We would also like to thank the partner organizations that work with OCE to deliver AVIN programs, including the Regional Technology Development Sites and the Demonstration Zone.*