Ontario

RoadTalk

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# Ontario Leading the World in Connected Vehicle Technology

## *Supporting Innovation in Transportation Technology*

Ontario is helping the province's transportation industry become a global leader in connected vehicle technology. This year the Ontario Ministry of Transportation (MTO) added an additional $500,000 to the $2.5M previously provided by the Ontario government to the Ontario Centres of Excellence Connected Vehicle/ Autonomous Vehicle (OCE CVAV) Program to support innovative and commercially viable projects by Ontario industry in this emerging field.


*The connected vehicle prototype is an Ontario made Lexus 350 F-Sport.*

While the predominant view of connected vehicles is of vehicles communicating with each other or to the infrastructure supporting safety systems, there are actually three levels of service emerging in the market that have different connectivity approaches, and meet different needs:

1. Safety systems allow communications between vehicles (V2V) and with infrastructure (V2I) providing opportunities to reduce collisions and optimize network operations (e.g., traffic signal timing dynamically accommodating vehicles or vehicles connecting with each other to convey hazard information). This requires millisecond level latency in the communications available on dedicated short-range communications devices (DSRC transponders)
2. Vehicle data mining will provide information from the increasing number of sensors (e.g., GPS, speed, direction of travel, temperature, roughness, light levels, traction control and slippage, occupancy, rain…) being incorporated into modern vehicles. If access en masse can be achieved, then this can be used as a source of very fine grained real-time information on traffic flows, travel demands and road conditions
3. Navigation systems and mobility applications are also becoming pervasive on modern vehicles providing a second mechanism to send information back to the vehicle that could assist with demand management. For example, information about the vehicle's location, status and destination are constantly evaluated and possible adjustments are then sent back to the vehicle's device to help the driver optimize its route or to make the driver aware of hazards ahead. From a demand management perspective, the system is able to tell a driver to choose a different route that is less congested, or advise that the next train is leaving from a nearby train station in 15-minutes, and also that it has a parking spot on the third parking level that can be reserved for the driver.

To achieve these service levels, a connected vehicle is equipped with communications capabilities ranging from cellular based internet access through to dedicated short range communications, and an on-board wireless local area network (LAN), allowing the vehicle to share wireless data with other devices both inside and outside of the vehicle. This technology uses advanced telecommunications to wirelessly connect drivers, vehicles, mobile devices, infrastructure, and roadside

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devices. Information collected from a connected vehicle is delivered wirelessly to telecommunications infrastructure, aggregated and then delivered in real-time to travellers and road authorities. Developing leading-edge connected vehicle technology in Ontario has the potential to help increase road safety, reduce traffic congestion and minimize driver distraction.

Eligible OCE CVAV program applicants include private companies, partnerships among private companies, and Ontario-based academic research teams developing and manufacturing in-car systems to make driving safer and to enhance the driving experience. Projects demonstrating strong potential for commercialization were selected for funding by the Ministry of Economic Development and Growth and the Ministry of Transportation.

"Ontario is already a leader in auto manufacturing, but with this support, we are poised to also be a leader in connected car technology. In this highly competitive global economy, investing in people's talents and skills to create new and innovative technologies is not only good for business, but it means safer roads and the easier movement of goods and services across the province." affirms Brad Duguid, Minister of Economic Development & Growth.

Through the OCE fund, Ontario has supported 26 connected and/or automated vehicle projects. One of the most exciting is in association with the Automotive Parts Manufacturers Association (APMA) (Canada's national association representing 90 per cent of Canadian auto parts production). This project has produced a tangible proof-of-concept vehicle demonstrating some of Ontario's new connected vehicle technologies. As well as being used for demonstrations at Ontario car manufacturers' facilities, the vehicle has toured as far as Silicon Valley, California, and was featured at the International Suppliers Fair Conference (IZB) in Wolfsburg, Germany in 2015. In April 2016, the AMPA vehicle visited MTO's St. Catharines offices to demonstrate the range of technologies on-board. These are detailed below.

**"Ontario continues to lead innovation on the future of transportation and automated technologies. We look forward to continued participation with the industry." states Steven Del Duca, Ontario's Transportation Minister.**

## Safety Features in the Connected Car of the Future

- It is estimated that 25 per cent, or three minutes of the average 12 minute emergency response time, is attributed to driver delay in pulling over for emergency vehicles. The B.R.A.K.E.R.S. (Broadcasting to Radios Ahead Keeps Emergency Responders Safe) System, designed by Tim Newman, of Brakers Early Warning Systems Inc.,attempts to address this delay.

  When installed in an emergency vehicle this software sends an automated alert to motorists in its path and is designed to accompany existing lights and sirens. This system works when drivers have installed the system, or downloaded the software in their own vehicles.

  This system was first piloted in Belleville, Ontario, with Belleville's fire and police departments, starting in August 2015. The B.R.A.K.E.R.S system also includes various customized messages serving numerous purposes, including addressing concerns such as speeding within a school zone; Amber alerts for missing children; and special traffic instructions for construction sites and flooded areas.
- Cameras and sensors are installed in the demonstration vehicle, which are used in a similar way to today's in-dash display. However, this system, produced by Invotek, divides the in-dash screen into four segments which correspond with the sensors and cameras on each quadrant of the vehicle. When a driver should be alerted to activity in one of the quadrants (for example if a dog is running toward the vehicle) that quadrant will populate the entire screen for the driver's attention, potentially reducing the likelihood of collision or incident. The technology also has the ability to offer a wider angle of vision to the driver when on front or rear camera by panning left and right showing a nearly 180 degree view.
- Weather Telematics transforms data collected from sensors on travelling vehicles into relevant information, or mobile intelligence for drivers. Weather Telematics uses the sensors on a connected vehicle to collect micro-zone level road condition information. It integrates this information with that from other cars and weather stations and then provides a variety of services including real-time alerts of road condition risks and dynamic vehicle routing. These services are available in the vehicle, for weather stations, transportation authorities and fleet dispatchers.

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## The Driving Experience within the Car of the Future

- The GestureSense system, when installed, has the capability to use hand gestures to adjust volume or skip to the next track on a device. This system uses reflective hand/object sensing. No technology is needed on the hand/object that is being sensed. The Gesture-Sense system was presented in 2012 as part of the Department of Foreign Affairs and International Trade Canada Connected Car Program at the Consumer Electronics Show.
- Alcolock alerts the vehicle's ignition system when a potential driver has been drinking before they begin driving.
- Intelligent Mechatronic Systems (IMS) provides a telematics system for user-based insurance (UBI), also known as "pay as you drive" insurance. The system assesses an individual's driving habits. In turn, a UBI-subscribed insurance company receives that information to customize an individual's insurance rates based on those habits.

  Even before enrolling in UBI insurance, this system allows a driver to use Drive Sync on an in-dash touch screen. The individual uses Drive Sync to see how the UBI system evaluates their driving skills for an assessment period, giving the individual opportunity to adjust their driving to meet UBI-insurance company driving benchmarks, for example: driving within the speed limit.
- PRAVALA has the capability to use multiple sources of internet from within a vehicle to provide an internet hot-spot for each passenger. The vehicle constantly searches, evaluates and connects to the strongest signal with the least expensive data plan. It automatically switches between the different sources during travel without interruption. Also, internet users within the vehicle don't experience any buffering or interference from other users within the same vehicle.
- TE-Connectivity has contributed ambient lighting to the car interior that varies for each passenger in both color and intensity. Ambient lighting helps to define space perception within a vehicle increasing vehicle safety by dimming passenger area lighting to reduce driver distraction. For example, pin spot lighting products accent and illuminate in-vehicle application areas such as door release and grab handles, map pockets, foot wells and glove boxes.
- Leggett-Platt has developed software that charges hand-held devices without wires while they sit in the vehicle. Helios® is an award-winning, wireless charging technology that is intended to transform living, working and driver spaces by reducing the clutter of wires.

These technologies require a robust technological platform that provides consistent and safe operations for users.

LIXAR is a software warehouse who took the technologies supplied by all of the participating companies and made them compatible with the QNX operating system. Much of the software supplied with each connected technology was written in a language incompatible with QNX, therefore LIXAR developed compatibility language so that each system would interact to each other within the vehicle.

LIXAR took the "emergency notification" of each separate technology and integrated it into QNX technology. QNX is a subsidiary of Blackberry, a Waterloo Ontario based company. Its platform provides development teams with a variety of options for building reliable world-class systems that keep pace with ongoing advancements in mobile device markets.

The integration of different software platforms is always a challenge. The ability for the QNX operating system to support the integration of products from many different companies is a unique feature of this car.

## The Future of Connected Cars in Ontario

The features promoted on the demonstration vehicle, are not sold as a package. Automakers may choose these systems a la-carte. This connected vehicle prototype is the only car designed to include every available feature listed above. It is used to demonstrate each option to automakers and provides a platform to showcase the systems Ontario companies are currently working on for a connected vehicle future. This concept car promotes good connectivity and a viable solution to the connectivity challenges experienced on the road.

When APMA presents the connected vehicle prototype to automakers, the goal is to secure a business opportunity with them. The intent is to keep manufacturing jobs and companies in Ontario. The next step for the AMPA Connected Lexus is to test the vehicle in Stratford, Ontario, one of the newer connected cities in Canada. A connected city is one where all relevant city systems–transportation, utilities, employment, health care, public safety, education, and others, are capable

# *Ontario Leading the World in Connected Vehicle Technology, continued*

of communicating with each other to allow coordination, enhance efficiency and reduce waste. Testing in Stratford is anticipated for the fall of 2016.

In future, with connected vehicle technology, the ministry will have vital data for most of the province's key roads, including municipal arterials. This technology will assist road authorities in coordinating detours and making better use of available highway capacity for routing vehicles around congestion. For instance, when an incident occurs on a major route, MTO and local municipalities will be able to coordinate a bypass for traffic on adjacent routes, significantly reducing traffic impact and improving driver safety.

Two other demonstration vehicles are in development in Ontario, an automated car and a vehicle promoting "next energy" for emissions reduction.

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Ensuring Ontario is a world leader in innovation in the auto industry is part of the government's plan to build up Ontario. Read about the Connected Vehicle/Autonomous Vehicle (CVAV) Research Program. •

## For more information, please contact:

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