



## Ottawa Ecosystem and Players Engaged in Connected Cars (CV)/Autonomous Vehicles (AV)

Canada has a long history of leadership in innovative communications technology, and as our city continues to grow it is very clear that Ottawa has the resources, brainpower, and an appetite to play a leading role in developing a sophisticated autonomous automotive vehicle industry and advanced next-generation networks in Ontario. In addition to BlackBerry QNX's leadership in automotive software, Ottawa provides key elements for the establishment of a successful connected and autonomous vehicle ecosystem and center of excellence. Ottawa is home to a vibrant technology industry with world-class talent in software development and information & communications technology. Invest Ottawa has identified **over 60 companies providing technology specific to connected/autonomous vehicles**. Ottawa's post-secondary academic institutions have strong computer sciences and related faculties that are key to creating the innovations necessary to allow connected and autonomous vehicles reach their full potential. They are also a key source of new talent that is needed to fuel private sector companies in this space. And finally, the municipal leaders in Ottawa have shown great support and forward thinking in allowing the City to become a partner with the private sector in exploring and demonstrating the capabilities of connected and autonomous vehicles.

Innovation and collaboration among all players in the new automotive supply chain is necessary. Beyond the traditional car manufacturers and their Tier 1 and Tier 2 suppliers, the supply chain will include software providers, wireless network providers and module vendors, semiconductor vendors, cloud service providers, and app and app platform providers. Other key contributors include research institutions and multiple levels of government.

It was in recognition of this need for collaboration that BlackBerry QNX, together with Prime Minister Trudeau, announced the establishment of the BlackBerry QNX Autonomous Vehicle Innovation Centre (AVIC) in December 2016. Located in Ottawa, the AVIC aims not only to enhance the work that BlackBerry QNX is doing, but also to create opportunities for private sector, public sector and academia to collaborate on solving the challenges and embracing the opportunities that connected and autonomous vehicles present.



## Sample of Key Ottawa Players Supporting a Burgeoning AV Ecosystem

### *Industry:*



QNX Software – major player in connected cars (CV) / autonomous vehicles (AV) domestically and internationally with its vehicle related technology already inside over 60 million cars worldwide. In January 2016, the company revealed significant advances in technologies that lay the groundwork for semi-autonomous and autonomous vehicles.



Quanergy Systems – California based with a small R&D group in Ottawa. Company developing 3D LiDAR (Light Detection and Ranging) for advanced driver assistance systems (ADAS), autonomous vehicles, and 3D Mapping.



Lixar – specializes in aftermarket connected car products, with experience in building car-to-cloud enterprise strength systems and mobile iOS and Android applications for automotive use. Within the automotive space it has worked on vehicle diagnostics, geo-fencing, geo-location, mileage tracking, Bluetooth Key Fob connectivity, fleet management and automotive data analytics. Company works closely with QNX Software and a number of automotive OEMs.



NGF Geomatics – This company offers airborne surveying technology utilizing smart sensors and data visualization/sensor interface software with applications in clean-tech and energy. They are actively investing in research, development and sales of unmanned aerial vehicle (UAV) in Canada which can be used in applications for Autonomous Vehicles.



ING Robotics – ING Robotic Aviation designs, manufactures, and operates Industrial Drones. They are focused on providing Data-Centric Robotic Aviation Complete Solutions (products/services/training/R&D). ING Robotic Aviation Inc. has been leading the Unmanned Aviation Sector in Canada since 2001 with deep sector knowledge. ING is unique in its ability to deliver solutions that span aviation, data collection and data analytics. Customers include blue-chip corporations and governments such as the United Nations, TransCanada Pipelines, Telus, Environment Canada, Natural Resources Canada and National Defence. Due to the company's excellent aviation safety record, ING Robotic Aviation has authority by Transport Canada to fly (through blanket Special Flight Operations Certificates) in every region in Canada and throughout the US with our FAA Section 333 Authority. ING has also been instrumental in driving Canadian civil aviation drone rules and regulations in Canada for over 15 years.



Deep Logic Solutions – specializes in geographic information systems (GIS) related transportation solutions. It recently received funding from The Connected Vehicle/Automated Vehicle (CVAV) Program CVAV program for a Driver Assistance Panel project to assess the feasibility of adjusting truck driver behavior to use their combination of vehicle, engine and transmission.

## *Post-Secondary Institutes:*

Carleton University and the University of Ottawa are part of the NSERC – DIVA Network (Developing Next Generation Intelligent Vehicular Network and Applications) targeting the development and integration of communication systems, vehicular technologies and applications for enabling nationwide deployment of vehicular ad hoc networks (VANets) and intelligent transportation systems (ITS). Supplemented by expertise that is also arising from the local colleges, Ottawa's talent pipeline is robust and ready for the next wave of innovation.

University of Ottawa – Prof. Azzedine Boukerche is the lead at UofO and the Scientific Director of NSERC – DIVA. He is also the university lead at the new NSERC TRANSIT Network (Training and Research in Advanced Network Systems for Intelligent Transportation Systems) related to CV / AVs which recently received \$1.65 million in funding.



Carleton University – Involved in the Connected Vehicle University Research Program since 2011 with other Ontario universities. The first project was around Cognitive Vehicle R&D and implications for Intelligent Transportation Systems. More recently, Carleton joined forces with Remotronic to receive government funding to develop 3D vehicle birdview systems.



Algonquin College - Hosts a new Big Data Analytics and Internet of Things Centre will be the first of its kind ecosystem for applied research, service and training at the college level in Canada. It will blend and deliver the technologies and skills needed to prepare the next generation of applied data professionals and foster growth across broad, horizontal sectors of the local economy such as 5G/NGN/AV.



La Cité collégiale - Students in Mechanical Engineering Technology and IT Technology programs are working collaboratively each year to build an electric car within the learning environment of the college. Plans are already in place to work with partners to apply and further knowledge of AV to this learning experience.





## *Government:*

Municipal- In November 2016, Ottawa City Council adopted a motion supporting the creation of a Centre of Excellence for Autonomous Vehicles in the Ottawa area, working alongside its many economic development partners. Ottawa's mayor Jim Watson is highly supportive in the synergy between Ottawa's world-leading telecom companies working on 5G research, together with Ottawa's leading software companies working on connected and autonomous vehicle research.

Ottawa is a leader in autonomous vehicle technology and artificial intelligence – QNX, Ford and Apple have R&D centres that are rapidly growing in the region. Ottawa is also the global centre of analytics for IBM.

Currently, Invest Ottawa, the City of Ottawa, and a number of other companies are developing a connected car/autonomous vehicle test circuit on public roads in the Kanata North Research Park, located in the west end of Ottawa. The test area will be fully equipped with the latest GPS and telecommunications technology, and will allow for the connected/autonomous vehicle to connect in real time to live city traffic lights and street lighting.

Provincial- In 2014, The Ontario Government (Ministry of Transportation / Ministry of Economic Development, Employment and Infrastructure / Ontario Centres of Excellence) created the **Connected Vehicle/Automated Vehicle (CVAV) program**. This program encourages partnerships between companies, and/or partnerships between companies and academic research teams to develop and commercialize innovations in connected and automated vehicle technologies that focus on projects demonstrating strong potential for commercialization. With the current phase of the program, OCE has allocated \$2M, leveraged by matching contributions from small, medium and large companies.

To date, 15 projects were funded including some Ottawa organizations.

Federal- The federal and Ontario governments are each spending more than \$100 million to help Canada's auto sector. Additional support has been shown with reference to Ford's Canadian establishment of which Prime Minister Justin Trudeau and Ontario Premier Kathleen Wynne announced conditional grants of up to \$102.4 million each directly to Ford Canada for an advanced manufacturing program in Windsor and a research and engineering centre in Ottawa.



## Ottawa Mayor and delegation champion high-tech growth in the Nations Capital during visit to Queen's Park

Mayor Jim Watson, and Sir Terry Matthews of Wesley Clover International, led a delegation to Queen's Park today to speak with Ministers of the Government of Ontario in support of high-tech initiatives and opportunities in Ottawa, particularly in the fields of autonomous vehicles and next generation networks.

The aim of the delegation was to brief the provincial government on recent developments in key high-tech industries, and to reinforce the value and economic growth potential these industries offer for Ottawa and Ontario. The delegation provided policy recommendations in support of their objectives, including:



With increasing technology and sector convergence, Ottawa is cultivating world-class expertise in fields such as cybersecurity, autonomous vehicles (AV), artificial intelligence(AI), machine learning, wearables and the Internet of Things. Not only does Ottawa host more than 60 companies that play a critical role in autonomous vehicles and next generation networks but the city continues to attract investment and global players, adding to a network of industry breaking technology.

## Recent Ottawa Highlights:

- BlackBerry QNX announced the opening of an Autonomous Vehicle Innovation Center in Ottawa, a move that will lead to \$100 million of investments and more than doubling its staff.
- Apple has also opened an office across from Ottawa's BlackBerry QNX and is secretly working on autonomous vehicles technology.
- Ford Motor Co. recently announced it will establish a \$338 million R&D centre over the next four years that will draw on Ottawa's tech expertise to deliver the next generation of connected car and AV technology (creating almost 300 new jobs in our region)
- Within the last year, Amazon launched an R&D and engineering office in Ottawa to develop key applications and solutions for Alexa, the AI assistant that powers Amazon's voice activated bluetooth speaker, Echo