

## Public Works and Infrastructure Committee Meeting

City of Toronto

Friday, January 19, 2018

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### Introduction

- As the Staff report “Preparing the City of Toronto for Automated Vehicles” notes, automated vehicles have the potential to reshape our transportation system, impacting road safety, traffic congestion, mobility equity, economic opportunity and environmental health.
- The Staff Report also notes the pervasive implications for many departments and divisions, including City Planning, Environment & Energy, Equity, Fire, Police and Fleet Services, Employment Parking, Public Health, TTC and Revenue, among others.
- Beyond the impact on City services, the advent of AVs is going to have a profound impact on almost every aspect of people’s daily lives.
- Transportation Services and the University of Toronto are collaborating in a research project to help the City of Toronto prepare for the advent of AV.
- We would like to explain that collaboration, why it is important, and how it will help the City achieve the goals defined in the Tactical Plan.
- Transportation Services work to date places Toronto at the forefront of thought leadership but we have a long way to go and there is some urgency to stay ahead of the wave of disruptive change that is coming our way. We would also like to recommend actions the Committee can take to establish Toronto as a thought leader and engage with other levels of government.

## **Centre for Automated and Transformative Transportation Systems - CATTs**

- Last July, UTTRI launched a new Centre for Automated and Transformative Transportation Systems (CATTs).
- The research mandate of CATTs is precisely to investigate and quantify the impacts of AVs under various alternative future scenarios with the explicit goal of helping policy and decision makers in our cities and regions to prepare for the pervasive impacts and disruptions of AVs.
- Modelling and simulating alternative futures will provide insight into the impact of policies on increasing or decreasing road and parking capacity, transit fares and road charges. All of which affect travel times and costs, and thus demand, and therefore vehicle-kilometres travelled, and resulting congestion and emissions.
- The modelling will account for both the movement of people and freight, by drone deliveries and sidewalk robots, as well as the ubiquitous delivery vehicles dropping off online purchases.
- The Dean of Engineering at the University of Toronto has made an initial investment of \$450,000 to launch this multidisciplinary, collaborative research centre.
- Its first achievement was to create a collaborative research vision with partners that include the Cities of Toronto and Mississauga, Regions of York and Peel, Waterfront Toronto, MaRS Discovery District, Esri Canada and GM Canada.
- This vision became the basis of a grant proposal submitted to the Ontario Research Fund for a \$12.5 million, five-year research project. We will learn in March if that application was successful. We continue to seek additional partnerships and funding in support of this work.
- There are many questions but the most important is “What do you want the future to be?” I suspect that you would agree with me that it needs to be equitable, sustainable, and prosperous. This is the future we have to plan for.
- CATTs research will help decision makers to explore how the policy levers they control can be used to achieve that future. CATTs researchers will work with our municipal and regional colleagues to design alternative future scenarios that help decision makers design the policies, programs and services we need to maintain and enhance the liveability of our city.

## History of UofT Expertise in Modelling, Simulation and Data

- UofT has a long history and extensive expertise in modelling, simulation, data and analytics in support of evidence-based decision-making. We are exceedingly well positioned to undertake this work.
- UTTRI has over 30 years of experience in developing models of the demand for travel, from place to place, by time of day, by different modes that, in the aggregate, describe how travel patterns in the region will change in response to proposed government policies.
- It is the home of the Demand Modelling Group (DMG), which has administered the Transportation Tomorrow Survey (TTS) from 1986 to 2011 and is now developing survey methods for the next generation of surveys that will exploit new technologies such as smartphones to collect travel behaviour information. TTS provides the fundamental data needed by the Province and all municipalities in the Greater Toronto Area, notably including the City of Toronto, to undertake transportation planning analysis, modelling and decision-making. As far as we are aware, the TTS data collection program is the largest urban travel survey program in the world, and the DMG-public sector collaboration is a world-leading example of sustained government – university collaboration in support of improving the evidence base for transportation planning and decision-making.
- Building upon the TTS data, we have also been the developer of the GTAModel series of travel demand forecasting models that City Planning has used for all strategic transportation planning studies over the past 20+ years. The current version, GTAModel Version 4.0, was brought online in late 2015 for use in the SmartTrack Ridership study, and has been in operational use by City Planning ever since, with literally thousands of model runs being undertaken to analyze the Relief Line, SmartTrack and every other major transportation initiative under consideration by the City.
- UTTRI has expertise in Intelligent Transportation Systems, transit planning and operations, pedestrian and cyclists' travel, the environmental, public health and social impacts of access to transportation and the impact of land use, urban goods movement and more.

## Why is this work important?

- Most of the current interest in AV in government and industry focusses on advancing AV technology and creating opportunities for economic development in related industry sectors.
- Traditional automotive manufacturers and new entrants like Google have spent billions on developing the technology. Their singular focus is on the bottom line.

- However, governments at all levels must continue to plan for and manage policies, programs and services in the best interests of residents with diverse needs, which even under a “business as usual” scenario is a challenging task.
- An AV future will be far from “business as usual”, but so far there is only speculation about whether or not AVs will increase or decrease congestion; improve or exacerbate social equality; have a net positive impact on access to employment opportunities; increase or decrease mobility and transit ridership; be supportive or not of climate action plans like TransformTO.
- Why this uncertainty?
- Think about how you chose to travel to work today – did you drive and park? Walk or take transit? And how did your children get to school? Do they have access to a car? Did you drop them off? Did they walk or take transit? Do you have an elderly parent with mobility issues, who perhaps should not be driving, but cannot use transit, who wants to access social events and needs to get to medical appointments?
- Travellers decide what mode of travel to take to get to work, to school, to shopping, based on the mode choices available to them: Do they have a car? Do they live near transit? Then, they choose the option that is “cheapest” for them, through a very personally derived calculation of their “cost” in terms of actual dollar costs, time, comfort and in rare cases, social good.
- It turns out that people do not do a good job of accurately assessing the costs of travel. They don’t count the cost of the vehicle, insurance and most maintenance. They do consider “out of pocket costs” like gas, parking and tolls, which they compare to transit fares, and will compare to cost of using AV vehicles, through ownership or “sharing”.
- The introduction of AVs will change their perceptions of those costs and with it the choices they make.
- If I can relax on my commute, work, sleep or watch a movie, will I be willing to lengthen my commute and relocate in search of cheaper housing?
- If travel by AV is perceived as cheaper, faster and more comfortable than walking, biking or transit, will there be a “modal shift” away from active modes of transportation and transit and towards private or shared AV travel?
- People who have fewer choices due to age, ability or location will have more choices, creating additional travel demand. Increased mobility is a good thing; increased traffic is not.
- Providing people with more options is a good thing; falling public transit ridership and increased congestion is not.

- We may not have more cars, but we will certainly have increased demand and increased vehicle-kilometres travelled. The promise is that AVs will reduce congestion. What performance is required of AV technology, in terms of speed, following distance and manoeuvring, so that AVs relieve, rather than exacerbate, congestion?

### **Supportive of the City of Toronto's Tactical Plan**

- CATTS research aligns with the issues raised in the Staff Report and will help the City of Toronto achieve many elements of the Tactical Plan described in the Report.
- For example, the report says “The City of Toronto will encourage the adoption of advanced driver assistance systems in a manner that improves social equity.” That’s an important goal, but how will we improve social equity? We first need to define social equity, then understand the drivers of social equity, then design policies on services and their prices to improve equity and the metrics to measure change. The CATTS research program will simulate the performance of the transportation system under candidate policies and measure the impact on social equity. And likewise, other scenarios can measure the impact on health, the environment, economic development and other important outcomes.
- The Tactical Plan states that the City of Toronto will adopt AV technology that improves the reliability, efficiency, safety, and seamlessness of transit and gives transit priority. Computer model simulations can identify which policies achieve these improvements and increase the transit modal split.
- Insights achieved through our collaboration will help the City of Toronto design the policies it needs to achieve its vision and goals with respect to city building, economic vitality, environmental sustainability, social development and fiscal sustainability in an AV future.

### **Recommendations**

- **Preserve access to data.** Data privacy issues are important, but data ownership and access to data are also concerns. The City must preserve its access to the data it needs for planning and delivering services.
- **Take a leadership position.** The City should continue to build partnerships to create a larger coalition among GTA municipalities and regions, and higher levels of government.
- As the Staff Report notes, jurisdiction over vehicles and roads is shared by Transport Canada and the Ministry of Transportation of Ontario.

- The Federation of Canadian Municipalities' mandate is to monitor and influence policy issues at the federal level. We recommend that Toronto City Council make a resolution to include a discussion of autonomous vehicles on the agenda of an FCM meeting.
- The FCM's Big City Mayors' Caucus is the voice of Canada's biggest cities. We recommend that Toronto City Council make the Caucus aware its work.
- The City should take a leadership role in the Municipal Alliance for Connected and Autonomous Vehicles in Ontario, established by the Ontario Good Roads Association.
- **Creating opportunities for academic collaboration.** Steve Buckley, ex-General Manager of Transportation Services, created an opportunity for his division "to engage in research initiatives or projects that contribute to achieving the mission of the City of Toronto, Transportation Services."
- Our collaboration with Transportation Services to prepare the City for automated vehicles is possible because Mr. Buckley had a by-law passed that permits Transportation Services to collaborate with a post-secondary educational institutions in Canada that can provide objective, qualified and professional expertise..
- The contract we have used refers to Schedule "A" of the City of Toronto Municipal Code Chapter 71, Financial Control by-law 541-2014.
- We ask the Committee to request that City staff to report back to the Committee on how they can amend this by a by-law to expand the scope of collaboration opportunities to other City divisions, agencies, boards and commissions so they can also benefit, if they so choose, from academic collaborations.
- At a recent meeting with UTTRI, TTC leadership expressed interest in being enabled by such an agreement.
- **Memorandum of Understanding.** On October, 2, 2017, the University of Toronto and the City of Toronto signed an MOU to work together to identify opportunities to meet our shared goals, including making Toronto a better place to live, learn, work and prosper. An MOU describes a mutual intention. A by-law enabling other divisions, agencies, boards and commissions to partner with UofT's vast expertise – as well as with other universities, both locally and national -- would move this from intention to opportunities for action.