Rapid Transit Implementation Working Group

Report

1st Meeting of the Rapid Transit Implementation Working Group
February 21, 2019
Council Chambers

Attendance   PRESENT: M. Cassidy (Chair), Councillors J. Helmer, S. Hillier, A. Hopkins, A. Kayabaga, S. Lehman, E. Peloza, P. Squire and M. van Holst, T. Khan, T. Park, S. Rooth; and P. Shack (Secretary)

ALSO PRESENT: K. Burns, J. Kostyniuk, D. MacRae, S. Maguire, K. Paleczny, A. Rammeloo, J. Ramsay, C. Saunders, S. Spring, B. Westlake-Power

The meeting was called to order at 4:30 PM.

1.   Call to Order

1.1   Disclosures of Pecuniary Interest

That it BE NOTED that no pecuniary interests were disclosed.

2.   Organizational Matters

2.1   Election of Chair and Vice Chair for the Term Ending November 30, 2019

That it BE NOTED that the Rapid Transit Implementation Working Group elected M. Cassidy and M. van Holst as the Chair and Vice Chair, respectively, for the term ending November 30, 2019.

3.   Scheduled Items

3.1   Autonomous Vehicle and Ridesharing

That it BE NOTED that the Rapid Transit Implementation Working Group, held a general discussion, with respect to Autonomous Vehicle and Ridesharing; it being noted the attached presentations, were received:

- J. Kostyniuk, Traffic and Transportation Engineer, City of London;
- B. Kirk, B.Sc., P. Eng, Executive Director, Canadian Automated Vehicles Centre of Excellence;
- E. Olson, Ph.D., CEO May Mobility Inc.; and
- Dr. A. Shalaby, Ph.D. P. Eng., Associate Director of the iCity Centre for Automated and Transformative Transportation System.

4.   Consent

4.1   5th Report of the Rapid Transit Implementation Working Group

That it BE NOTED that the 5th Report of the Rapid Transit Implementation Working Group, from its meeting held on November 8, 2018, was received.

4.2   Municipal Council resolution adopted at its meeting held on December 5, 2018, with respect to the Appointments to the Rapid Transit Implementation Working Group

That it BE NOTED that the Municipal Council resolution adopted at its meeting held on December 5, 2018, with respect to the Appointments to the Rapid Transit Implementation Working Group, was received.

5.   Items for Discussion

None.

6.   Deferred Matters/Additional Business

None.

7.   Adjournment

The meeting adjourned at 7:20 PM.

Slide 1

Autonomous Vehicle and Ridesharing Background Information

Rapid Transit Implementation Working Group
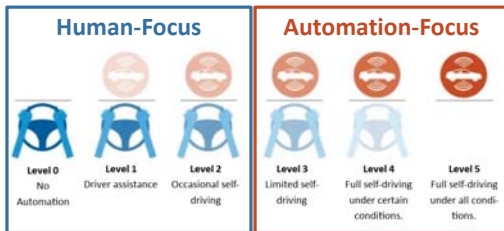
February 21, 2019

Slide 2

Autonomous Vehicles

- Ideally, **Autonomous Vehicles (AVs)**:
  - Are capable of **"sensing" the surrounding environment**;
  - Use AI, sensors, and GPS to **successfully and safely navigate a transportation system**; and
  - Provide **major improvements to road safety** by eliminating human driver error and distraction.

Slide 3

Automation Levels Defined

- The **Society of Automotive Engineers (SAE)** international standard that classifies vehicles automated driving systems from:
  - **Level 0 = No Automation** to **Level 5 = Full Automation**

Human-Focus

| Level 0 No Automation | Level 1 Driver assistance | Level 2 Occasional self-driving |

Automation-Focus

| Level 3 Limited self-driving | Level 4 Full self-driving under certain conditions. | Level 5 Full self-driving under all condi-tions. |

Slide 4

Connected Vehicles

- Interrelated with AVs, **Connected Vehicle (CV)** technology provides up-to-date information to vehicles through a **variety of communications channels**.
- Types of CV technology include:
  - **Vehicle-to-Vehicle (V2V)**
  - **Vehicle-to-Infrastructure (V2I)**
  - **Vehicle-to-Everything (V2X)**

Slide 5

Ridesharing and MaaS

- An app that **creates, manages, and pays** for trips.
- Subscribe to **travel packages** tailored to customer needs.
- MaaS include services such as:
  - **Transit integration;**
  - **Ridesharing and taxi integration;**
  - **Car sharing/rental integration;**
  - **Bicycle sharing integration; and**
  - **Other third-party service integration.**

Traditional Mobility

Ownership • Competitive • Hierarchal

1 👤 = 1 mode [either/or]

New Mobility

Sharing • Collaborative • Networked

1 👤 = many modes [all]

Slide 6

Expert Speakers

Barrie Kirk, B.Sc., P.Eng.
Executive Director,
CAVCOE

Edwin Olson, Ph.D.
CEO, May Mobility

Dr. Amer Shalaby, P.Eng.
Associate Director,
iCity Centre

CAVCOE

Autonomous Vehicles and Ridesharing

Presentation to the City of London's RTIWG
Barrie Kirk, P.Eng.
Executive Director, CAVCOE
February 21, 2019

CAVCOE

A STUDY OF THE IMPACT OF **AUTONOMOUS TECHNOLOGY**

"One of the problems … is that there are too many people who are overhyping the technology," said Barrie Kirk, executive director of the Canadian Automated Vehicles Centre of Excellence near Ottawa. "All hardware, all software, fails occasionally."

Mr. Kirk said autonomous vehicle (AV) technology will be safer than human drivers, but not perfect, and warned that pitching it as a way to eliminate all road fatalities was a mistake. If expectations were not tempered, he has repeatedly warned, "all hell will break loose" at the first fatality.

January 2019

AV Update

From the Editors

Last month, we listed the top 10 AV-related news items as seen through our Canadian lens. This month, we are going to predict the 10 AV events of 2019 — again as seen through our Canadian eyes. Some of these are certain to happen and others are a bit more speculative.

1. The new Ottawa AV/CV test track will be formally opened – expected in March
2. A Canadian student competition to develop and test a model of an automated snow plow will be held in Ottawa in May. The contest is organized by **Unmanned Systems Canada**, sponsored by **Transport Canada**, and will be held at the new Ottawa AV/CV test track
3. The **CAV Canada 2019 Summit** will be held in Ottawa in September. This 2-day event

2

New York City 1900

3

New York City 1913

4

Deployment Timing

Now: 1st gen	• Advanced Driver Assistance Systems (ADAS) in commercial cars • Commercial, low-speed, fully-automated vehicles for applications in controlled environments
2020-2022: 2nd gen	• First street-legal, fully-autonomous cars • No steering wheel, pedals, etc. • Focus: driverless taxis, urban applications, limited rollout • In US first, then Canada
2020s	• Ramp-up in capability and deployment • AVs increasing part of total Vehicle Kilometres Travelled (VKTs)
2030s: 3rd gen	• Advanced fully-automated vehicles: go anywhere, any time in almost any weather

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Deployment Challenges

- Extreme weather
- Work zones, detours
- Traffic signals AND police officer
- Pedestrian prediction
- Hand gestures
- Reversing
- Regulations
- Insurance

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6

Fewer Collisions

- Driver error a factor in 93% of collisions
- AVs expected to be much safer than human drivers
- Hopefully we can reduce collisions by 80%

Ottawa Citizen

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motoring
News Lifestyle Vehicles Road tests Customs & Classics Bikes Motorsport
Volvo aims to make 'crash-proof' car

VISION ZERO NETWORK

CNN tech
U.S. government pushes to end traffic deaths as fatalities sharply rise
by Matt McFarland @mattmcfarland

ite
A Community of Transportation Professionals

- **Great goals but unachievable !!!**
- All hardware, software fails occasionally
- 7% of collisions have nothing to do with the driver
  – Will happen whether a human or computer is driving
- There will be collisions, fatalities, injuries - but far fewer

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Mobility-as-a-Service (MaaS)

- Aka "Transportation-as-a-service", "Personalized mass transit" or "Micro-transit"
- Trend to driverless taxis
  – Call one via smartphone
  – Slightly more expensive than premium transit ticket
  – Reduced personal car ownership
- Merging of business models: regular taxi, ride sharing, car rental, transit

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WCMH-TV Columbus
NEWS ▾ VIDEO ▾ WEATHER ▾ TRAFFIC ▾ I-TEAM ▾ POLITICS ▾ SPORTS ▾ PROGRAMMING ▾ LOCA

Ohio Statehouse Newsroom

Bus drivers' union threatens strike over driverless buses

By: Jason Aubry
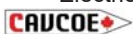Posted: Sep 18, 2018 04:58 PM EDT
Updated: Sep 18, 2018 06:00 PM EDT

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Impacts on City of London

- Charging infrastructure
- City economy (insurance sector)
- City revenues (traffic tickets, parking)
- City vehicles
- Data (ownership, privacy)
- Delivery robots on sidewalks
- Electricity
- Parking
- Policing
- Public
- Security / surveillance
- Traffic management
- Transit (reduced ridership, infrastructure, union)
- Transportation policies and regulations
- Urban planning, housing
- Zoning

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Conclusions

- AVs will lead to huge, disruptive changes to our personal lives and society
  – Key benefit: computers will be much better drivers than humans
  – Major municipal opportunities and challenges
- Changes to our world will start slowly in 2020
  – By early 2030s, our lives, cities will be very different

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Recommendations

- Have a vision for 2050
  – Plan for the future, not the past

- Appoint full-time in-house CAV expert

- Take city-wide approach
  – City-wide working group (Scope of CAVWG ?)

- Ensure that all transportation / transit master plans assess impact of CAVs
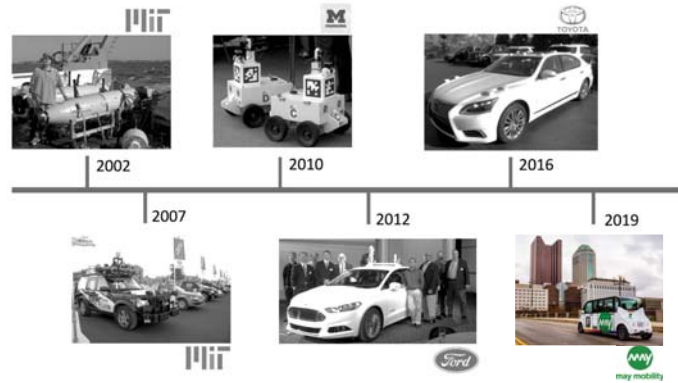
CAVCOE 13

Follow-up

- Barrie Kirk
  – bkirk@cavcoe.com
  – 613-271-1657

- *AV Update*
  – Free monthly newsletter with AV news from Canada and around the world
  – www.cavcoe.com for latest issue, subscription link

CAVCOE 14

Edwin Olson, PhD

CEO, Co-Founder, May Mobility
Associate Professor of Computer Science, University of Michigan

Edwin Olson, PhD

MIT — 2002
M — 2010
TOYOTA — 2016
2007 — MIT
2012 — Ford
2019 — may mobility

Opportunity

Increase access to healthcare, education, and economic opportunity to underserved areas. Provide cost-effective mobility options to the disabled and elderly.

Safety

Drivers are at fault in 81% crashes annually in the United States alone

Congestion

Traffic costs commuters hours each day and slows economic development. Many cities and regions also require more space allocated to parking than human adding 67% to building costs.

Taking an incremental path

- Safety
- Technology
- Regulatory
- Learning

Solving real problems today

MAJOR MILESTONES

2018 WAS A GOOD YEAR

Focusing on enterprise and government contracts, we have gained significant experience around the technology and service side

$33 million — Total funding through Seed and Series A rounds

1st Deployments — Our deployments were the first commercial and publicly available

40,000 Rides — Over 40,000 rides in less than eight months of service

+69 NPS Score — Quality service has increased ridership for our partners

Columbus, OH   Providence, RI   Grand Rapids, MI   Detroit, MI

Transit in the Era of Automated and Shared Mobility Technologies

Amer Shalaby, Ph.D., P.Eng.
iCity CATTS, Associate Director

RTIWG Meeting – City of London

February 21, 2019

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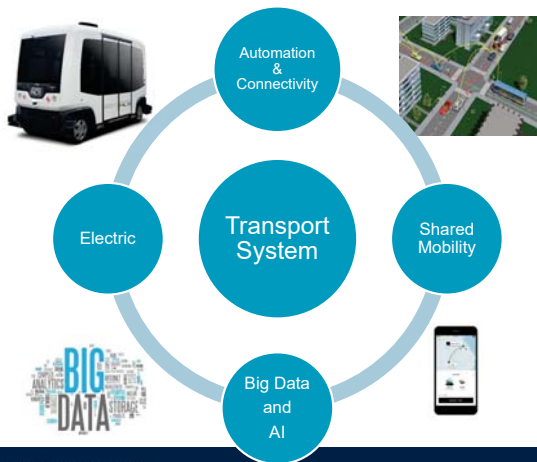Transportation Research Institute

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CATTS
Centre for Automated & Transformative Transportation Systems

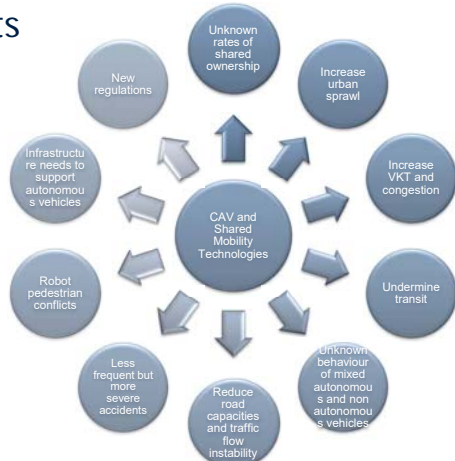- A new centre within UTTRI (University of Toronto Transportation Research Institute)

- Theme 1: Quantifying Transformation
- Theme 2: Enabling Positive Transformation
- Theme 3: Sustaining Transformation

Baher Abdulhai, Director
Khandker Nurul Habib
Marianne Hatzopoulou
Matthew Roorda
Amer Shalaby, Associate Director

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Major Trends

- Transport System
  - Automation & Connectivity
  - Shared Mobility
  - Big Data and AI
  - Electric

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The Promise

CAV and shared mobility Technologies
- Empower individuals by enhancing mobility choices
- Improve congestion and reliability
- Reduce accidents
- Reduce emissions and carbon footprint
- Reduce parking requirements
- Free up and reallocate road space
- Enhance accessibility and equity

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The Threat: Risks, Unknowns & Unintended Effects

CAV and Shared Mobility Technologies
- Unknown rates of shared ownership
- Increase urban sprawl
- Increase VKT and congestion
- Undermine transit
- Unknown behaviour of mixed autonomous and non autonomous vehicles
- Reduce road capacities and traffic flow instability
- Less frequent but more severe accidents
- Robot pedestrian conflicts
- Infrastructure needs to support autonomous vehicles
- New regulations

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The Evidence (thus far)

Effects of ride-sourcing on:

- Auto ownership and VKT
  - Negligible change in auto ownership
  - High rates of VKT increase due to latent demand and deadhead trips
- Traffic Congestion and GHG
  - Increase in congestion in large cities
  - Increase in commute times and congestion in cities with poor transit service
- Transit Ridership
  - Generally, ride-sourcing is competitive with transit, particularly in contexts characterized by low order transit
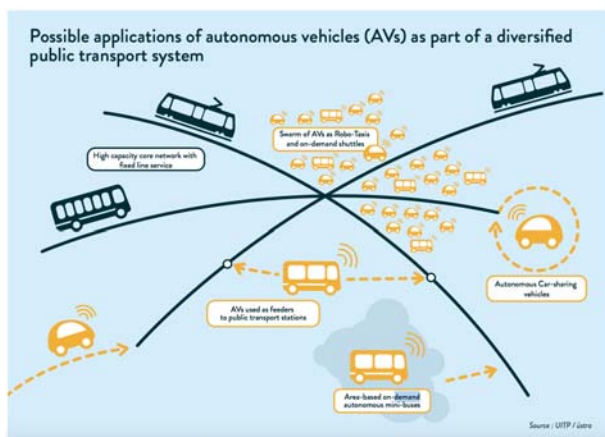 - Complements high order transit (e.g. metro) serving as a FM/LM service

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Higher order transit is the most space efficient of all modes, offering the highest person capacity

Higher order transit is the ultimate form of "Shared Mobility"

Source: Transport for NSW

The Transit Future

The Transit Future

Thank You!