City of Toronto AV Tactical Plan: Charting a Path Forward

June 26, iCity-CATTS Symposium

City of Toronto and AVs

The City of Toronto does not have an official policy or position on automated and/or autonomous vehicles. City Council discussion is anticipated for Fall 2019.

The views and opinions contained in this presentation do not represent those of the City of Toronto.

Status of AVs in Toronto

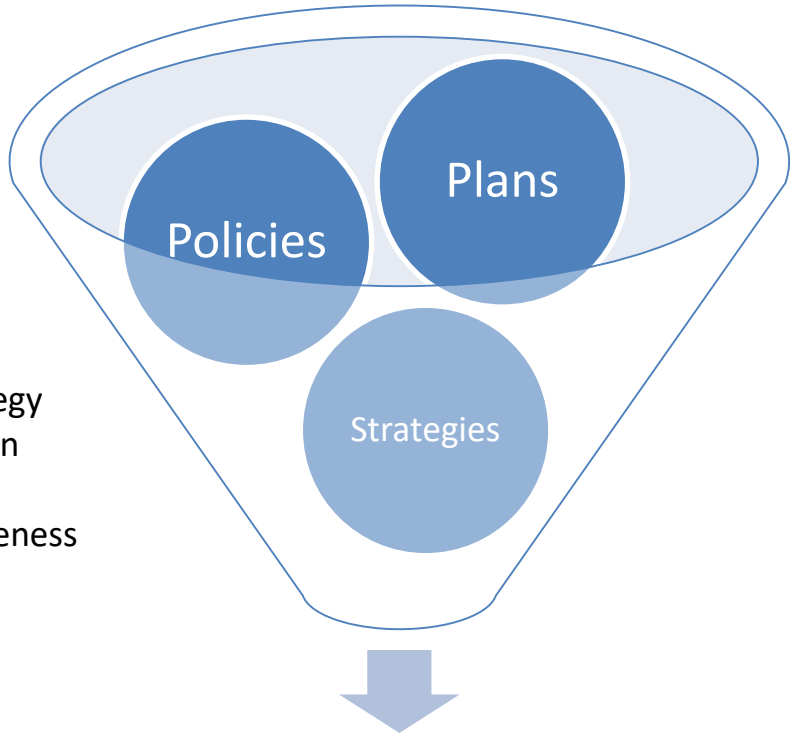
- Staff discussions and strategizing
  - Interdivisional Working Group
- City Council direction
  - 2016: Request to staff to report on staff preparations, potential implications, public acceptance. http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2016.PW13.14
  - 2018: Report to Public Works and Infrastructure Committee & City Council
    - Explore partnerships with other governments
    - Join Municipal Alliance for Connected and Autonomous Vehicles in Ontario
    - Request Federation of Canadian Municipalities to include in annual conference
    - Explore opportunities to collaborate with Sidewalk Toronto
    - Report back on Automated Vehicle Tactical Plan
    - http://app.toronto.ca/tmmis/viewAgendaItemHistory.do?item=2018.PW26.4

Interdivisional Working Group on AVs

- City Clerk's Office
- City Manager's Office
  - People, Equity and Human Rights
  - Office of the Chief of Staff
    - Civic Innovation Office
    - Strategic and Corporate Policy
    - Transformation Office
- City Planning
- Corporate Finance
- Economic Development & Culture
- Engineering & Construction Services
- Environment & Energy
- Exhibition Place
- Financial Planning
- Fire Services
  - Office of Emergency Management
- Fleet Services
- Information & Technology
- Legal Services
- Municipal Licensing & Standards
- Revenue Services
- Social Development, Finance & Admin
- Solid Waste Management
- Toronto Building
- Toronto Employment & Social Services
- Toronto Office of Partnerships
- Toronto Paramedic Services
- Toronto Parking Authority
- Toronto Police Service
- Toronto Public Health
- Toronto Transit Commission
- Transportation Services

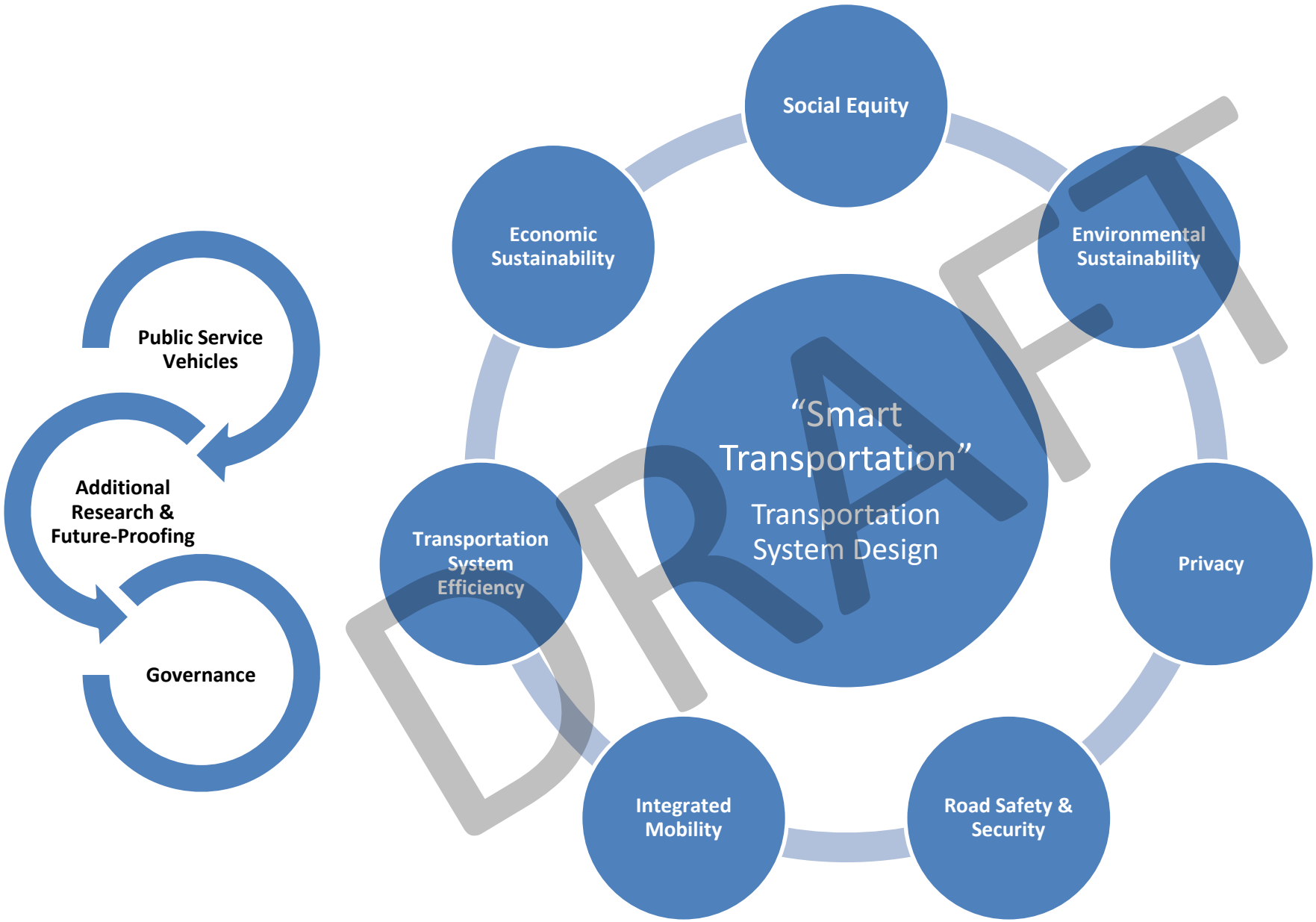
Vision & Dialogue: A Tactical Plan on AVs

City's Strategic Plan
Official Plan
Complete Streets
Curbside Management Strategy
Congestion Management Plan
eCity Strategy / Smart City
Collaborating for Competitiveness
Green Fleet Plan
TransformTO



Public Health Plan
Vision Zero
Equity, Diversity & Human Rights Plan
Working as One
Seniors Strategy
Strong Neighbourhoods Strategy
Economic Growth & Job Creation
Poverty Reduction Strategy

Automated Vehicles "Position" and Tactical Plan Framework


Social Equity
Economic Sustainability
Environmental Sustainability
"Smart Transportation"
Transportation System Design
Transportation System Efficiency
Privacy
Integrated Mobility
Road Safety & Security
Public Service Vehicles
Additional Research & Future-Proofing
Governance

AV Tactical Plan Structure

AV Tactical Plan Structure

Level	Sample		
Existing	Toronto Official Plan; Toronto Poverty Reduction Strategy; Toronto Public Health Strategy; Toronto Strong Neighbourhoods Strategy		
Direction	**1. Equity**: The City of Toronto will encourage the adoption of driving automation systems in a manner that improves social equity and health.		
2050 Goal	**1.2 Increase Mobility Equity**: In 2050, the City will have harnessed the widespread adoption of automated vehicles to ensure reasonably equitable service levels to all neighbourhoods regardless of trip type, vehicle class or ownership.		
Tactic	**1.2.1 Equitable Service Coverage**: Develop and implement a mechanism to coordinate mobility services to provide equitable service in terms of frequency, hours of service per day, and proximity across all neighbourhoods.		
Progress to 2022	Identify areas in Toronto with lower mobility service coverage and research the potential impacts to frequency, hours of service, and proximity across neighbourhoods from AVs.		
	0. Do Nothing 1. Research and learn **2. Identify the issues and scope** 3. Engage and consult with stakeholders	4. Generate policy options 5. Assess options and select preferred solution 6. Design and develop a solution	7. Test the solution 8. Implement the solution 9. Evaluate the effectiveness 10. Maintain the solution

AV Tactical Plan Structure

1.2.1 Equitable Service Coverage

Proposed Tactic: Develop and implement a mechanism to coordinate mobility services to provide equitable service in terms of frequency, hours of service per day, and proximity across all neighbourhoods for all trip types.

Torontonians live and work differently than they did when much of the transportation system was built. Changes in employment and land use patterns mean that fewer people have 9-to-5 workdays and suburb-to-downtown commutes than in the past.[18] For this reason, the City and TTC have invested millions of dollars in various initiatives such as the All-Day-Every-Day Network, Overnight Network, Express Bus Network, Service Reliability etc.

An affordable, accessible and reliable transportation system connects people to jobs, services and civic life.[3] AVs – whether operated by public transit agencies or ride-hailing companies – will be able to enhance the transportation network.

- *Proposed progress to 2022: Identify areas in Toronto with lower mobility service coverage and research the potential impacts to frequency, hours of service, and proximity across neighbourhoods from AVs.*

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1. Social Equity & Health		
1.1 Ensure Barrier-free Access *KPI: Percentage of AV services that are barrier-free for each group*		
1.1.1 Access for Individuals with Disabilities	1.1.2 Access to Transit for Individuals with Disabilities	1.1.3 Access for Unbanked Individuals
1.1.4 Access for Low-income Individuals	1.1.5 Access for Non-Anglophones	
1.2 Increase Mobility Equity *KPI: Median wait time for barrier-free AVs versus standard AVs by geographic area (neighbourhood)*		
1.2.1 Equitable Service Coverage	1.2.2 Equitable Performance Standards	1.2.3 Mobility Neutrality
1.3 Promote Health *KPI: TBD*		
1.3.1 Healthy Mobility		

Draft AV Tactical Plan – June 2019

2. Environmental Sustainability		
2.1 Reduce Vehicle Emissions *KPI: City-wide GHG emissions; Percentage of vehicles licensed through the City that use low- or zero-carbon energy sources; Percentage of City fleet that use low- or zero-carbon energy sources*		
2.1.1 Low or Zero-Carbon Energy Sources	2.1.2 Low or Zero-Carbon Energy Sources for Shared AV Fleets	
2.2 Vehicle Waste Reductions *KPI: Average fleet lifecycle; waste diversion rate*		
2.2.1 Vehicle Waste Reduction	2.2.2 Vehicle Waste Reduction for Automated Transit Vehicles	2.2.3 Vehicle Waste Reduction for Shared AV Fleets

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3. Economic Sustainability		
3.1 Expand Sectors *KPI: Total economic output of sectors related to AVs*		
3.1.1 Expand Investment and Employment	3.1.2 Testing 'Sandbox'	
3.2 Expand Employment Opportunities *KPI: Number of jobs created in AV-related sectors per 1000 jobs; Percentage of workers who have transitioned into a new role*		
3.2.1 Talent Development	3.2.2 Workforce Reskilling	3.2.3 Community Benefits
3.3 Demonstrate Sector Leadership *KPI: Global benchmarking*		
3.3.1 Global Competitiveness	3.3.2 Cross-Sector Collaboration	

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4. Privacy

4.1 Protect Public Privacy

KPI: Month-over-month percentage increase/decrease of privacy breaches that result in unauthorized data discovery and leakage of personal information

4.1.1 Data Privacy Standards	4.1.2 Privacy Standards: Automated Transit Vehicles	4.1.3 Privacy Standards: Shared AV Fleets
4.1.4 Privacy Governance and Oversight	4.1.5 Privacy Principles: Privacy by Default	4.1.6 Privacy Attestation Services

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5. Road Safety & Security

5.1 Prevent Collisions

KPI: Number of killed/seriously injured involving AVs per vkt (vs. non-automated vehicles); number of non-KSI collisions involving AVs per vkt (vs. non-automated vehicles)

5.1.1 Transition to AVs	5.1.2 Transition to AVs – Transit	5.1.3 Vehicle Collisions – Human Factors
5.1.4 Vehicle Collisions – Environmental Factors	5.1.5 Vehicle Collisions – Data Redundancy	5.1.6 Vulnerable Road Users
5.1.7 Reducing Traffic Infiltration	5.1.8 Shared AV Fleet Safety Standards	

5.2 Update Infrastructure

KPI: Number of infrastructure barriers to AV use eliminated

5.2.1 AV Integration	5.2.2 AV Integration – Transit	5.2.3 AV Integration – Connected Vehicles
5.2.4 New and Revised Standards		

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5. Road Safety & Security (con't)		
5.3 Update Emergency Response *KPI: Average response speed (specifically driving time)*		
5.3.1 Emergencies – Vehicle Priority	5.3.2 Emergency Response Policies	5.3.3 Emergency Response Protocols & Training
5.3.4 Enforcement	5.3.5 Emergencies – Shared AV Fleets	
5.4 Protect Data Confidential, Integrity & Availability *KPI: Month-over-month percentage increase/decrease of security breaches that result in unauthorized data discovery and leakage of personal information*		
5.4.1 Data Standards		

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6. Integrated Mobility		
6.1 Increase Space Efficiency *KPI: Throughput in persons per hour per unit area of public right-of-way; Percentage change in mode share for active transportation, transit, 2+ occupancy vehicles; combined-purpose vehicles; Urban goods movement TBD*		
6.1.1 Transit Priority	6.1.2 Active Transportation Priority	6.1.3 High-Occupancy AV Priority
6.1.4 Urban Goods Movement		
6.2 Design Smart Cities *KPI: Number of flexible curbside hours per 100m*		
6.2.1 Street Design	6.2.2 Road Classification & Use	6.2.3 Flexible Curbs
6.3 Increase System Seamlessness *KPI: Percentage of ridership satisfied with system seamlessness*		
6.3.1 Transit-Centric Mobility-as-a-Service (MaaS)	6.3.2 Microtransit	

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7. Transportation System Efficiency

7.1 Increase System Capacity

KPI: Annual average daily curbside access events per 100m; Number of open datasets on City of Toronto Open Data portal; Throughput in persons per hour per unit area of public right-of-way

7.1.1 Transition to AVs – Traffic Flow	7.1.2 Active Traffic Management & Coordination	7.1.3 Designated Loading Areas
7.1.4 Open Data		

7.2 Manage System Demand

KPI: Proportion of daily traffic outside AM/PM peaks

7.2.1 Curbside Fee	7.2.2 Transit Incentives and Pricing	7.2.3 Manage On-Street Parking Demand
7.2.4 Manage Off-Street Parking Demand	7.2.5 Manage the Peak	7.2.6 Manage Travel Demand

Toronto.ca/automated-vehicles

Consultation | Council Report & Mandate | Policy Background

The Draft Automated Vehicles Tactical Plan is posted for public consultation until Sunday, **June 23**. Individuals are invited to comment on sections they have an interest in from the links below, by sending an email to automatedvehicles@toronto.ca.

The Automated Vehicles Tactical Plan consists of seven broad Directions, and three additional sections for internal operations and further study. Each section is built on a foundation comprised of existing City policies, plans and strategies. The section breakdown includes an introduction with the direction statement and policy background; a summary of the key performance indicators and tactics (actions) for each section; followed by explanations of each tactic as well as the City's proposed progress on it for the next three years.

Select either of the links below for a PDF or AODA-compliant PDF version of the section. Individuals are welcome to comment on any and all sections as needed.

Part I (background research)

Part II Tactical Plan Introduction | AODA Version

The **seven** Directions that set the foundation of a new transportation system design are:

1. Social Equity & Health | AODA Version
2. Environmental Sustainability | AODA Version
3. Economic Sustainability | AODA Version
4. Privacy | AODA Version
5. Road Safety & Security | AODA Version
6. Integrated Mobility | AODA Version
7. Transportation System Efficiency | AODA Version

The **three** additional sections for further study and internal operations are Public Service Vehicles, Additional Research & Future-Proofing, and Tactical Plan Governance. These sections can be found under:

8. Enhanced Service Delivery & Organizational Capacity | AODA Version
9. Glossary & References | AODA Version

We look forward to your feedback.

Questions?

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