# Signal Phase and Timing (SPaT) Data

# Policy Considerations

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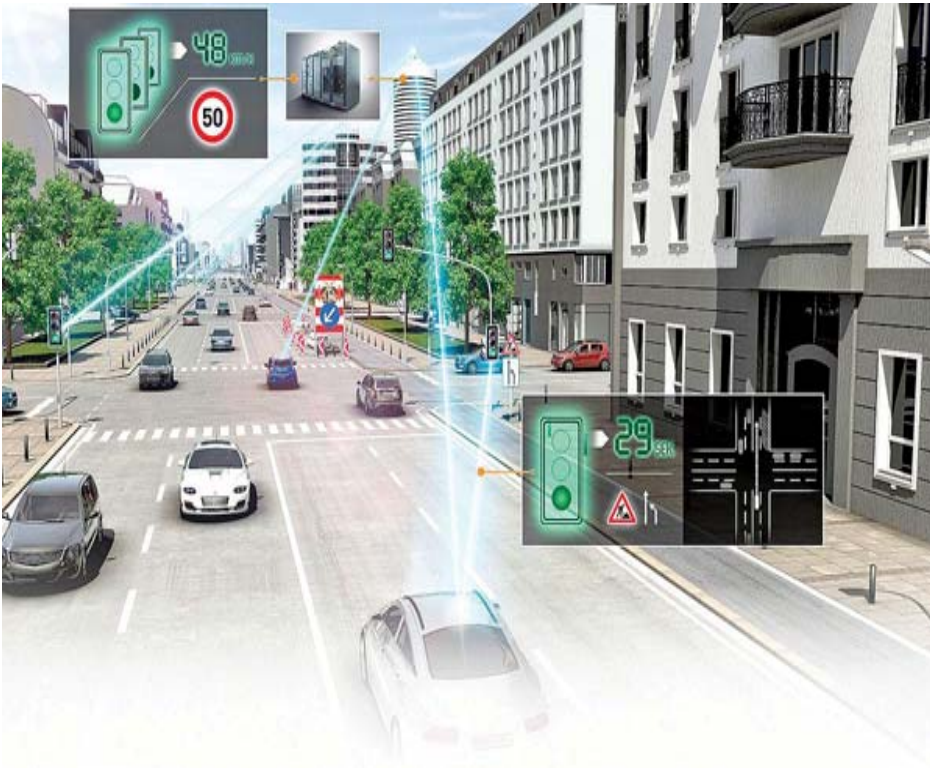**Phone: 416-525-9766**

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# Today's Presentation

- Introduction
- Toronto & SPaT
- Equity
- Security
- Privacy
- Legal
- Financial
- Next Steps



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# Introduction



SPaT = Signal Phase and Timing.

SPaT describes the signal state of the signalised intersection and how long this state will persist for each approach and lane that is active.

Generally used in conjunction with Map Data (MAP) which describes the physical geometry of one or more intersections.

# Toronto Traffic Systems

- Two traffic control systems:

    Traffic adaptive - SCOOT (Siemens)

    Traffic responsive  - TransSuite TCS (TransCore).

- 2356 traffic control signals

    87% on TransSuite TCS (2,054 signals)

    13% on SCOOT (302 signals)

- As mandated by City Council, City "sells" current signal timing data and intersection drawings to the private sector - $100.70 per signal timing and $268.56 per drawing.

- Potential value of City's signal timing data is $207,000 (TransSuite signals only)

- Potential value of City's MAP data is $552,000 (TransSuite signals only)
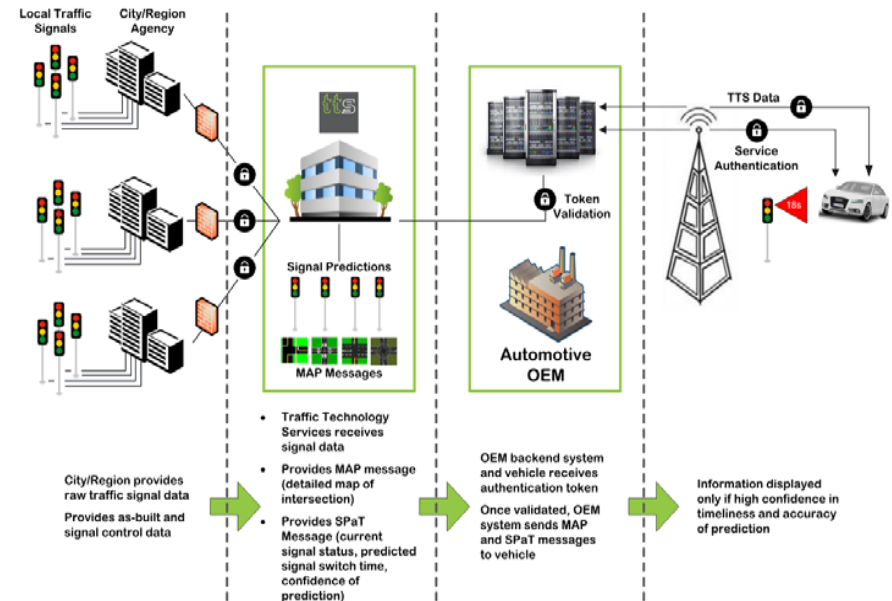
# Data Extraction

**Street Level**

Getting SPaT from the local controller via DSRC (Dedicated Short Range Communication)

**Intercepting Data at the TMC**

Intercepting the data at the TMC via software or hardware

**Open Data**

Transferring data from the TMC to an Open Data portal

# SPaT Challenges

**Fixed time control -** Gives a pre-set green time to each movement in the intersection and use a pre-set cycle time.

- This makes it is easy to predict the signal state for a vehicle approaching in a certain direction.

**Traffic-actuated or adaptive control -** Can alter the green time for each movement either within a fixed cycle length or with a changing cycle length.

- Uncertainty of prediction:

    - Fixed time signals with callable/skippable left turn phases

    - Fully actuated or semi-actuated signals

    - Pre-emption (emergency response vehicles,TSP, rail, LRT)

    - Traffic adaptive systems (SCOOT)

Dependent on the traffic signal management philosophy, the SPAT information will be **definitive** with fixed time systems but only **indicative** with adaptive systems.

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# Toronto & SPaT

- Two companies have requested access to City's "live" signal data to provide SPaT through their platforms.

- Company A provides a device to interface directly to the City's TransSuite TCS to intercept the data – implemented in some US jurisdictions.

- Company B has worked with TransCore to extract the data via the Connected Vehicle Data Port (CVDP) in TransSuite – still at pilot stage.

- Toronto is concerned about dealing with individual companies.

# Equity Concern

- Is it fair to provide "free" data to only these two companies since they re-sell the data to high-end car companies?

- Rather than working with different vendors, City is considering placing the TransSuite SPaT on Toronto's OpenData portal so that the data is available to anyone who is interested.

- Given that there is no standardization of data, there is concern that SPaT on Open Data may be required in different formats - pose a burden on City to maintain.

- Our focus is on SPaT data – no consideration of MAP data at this stage.

# Security Concern

- What are the security issues surrounding the placement of a device to intercept field communications?

- What are the implications of providing data via the cloud, particularly if the cloud platform is hosted outside of Canada?

- Sharing the data of all devices that have IP address such as controllers and cameras could raise a security issue



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# Privacy Concern

Even though there is no identifiable personal data being provided, the City requires that a Privacy Impact Assessment (PIA) be conducted.

PIA required when:
- Proposal involving new technologies, for example, smart cards, wireless surveillance cameras, biometrics, etc.
- Data warehousing and/or data marts are being proposed
- Sharing City data with 3rd parties through contracting out or alternate service delivery models.

# Legal Concern



City's Open Data licence states:

"The Information is licensed "as is", and the Information Provider excludes all representations, warranties, obligations, and liabilities, whether express or implied, to the maximum extent permitted by law.

The Information Provider is not liable for any errors or omissions in the Information, and will not under any circumstances be liable for any direct, indirect, special, incidental, consequential, or other loss, injury or damage caused by its use or otherwise arising in connection with this licence or the Information, even if specifically advised of the possibility of such loss, injury or damage."

Is there a different level of responsibility for "live" data compared to static data?

What are the ramifications for the City if "massaged" data is incorrect and there are collisions or loss of life due to driver reliance on the data?

Who is liable if there is a system malfunction or inaccuracy of data?

# Financial Concern

Open Data licence:

"The Information Provider grants you a worldwide, royalty-free, perpetual, non-exclusive licence to use the Information, including for commercial purposes"

Potential loss of $207,000 in revenue from making data available on Open Data.  Need City Council approval. Need replacement revenue.

Need to develop a process to ensure that live SPaT (and MAP) is always current and correct – staff implications and reallocation of scarce staff resources.

# Next Steps

- Prepare Briefing Note for Senior Management

- Seek legal opinion on liability issues

- Complete PIA

- Undertake pilot project with a few signals

- Decide on full rollout

# QUESTIONS