

*“The traffic is a mess with summer road constructions and closures... Is there a way to alert when my bus will arrive more efficiently... I spend 2 hours every day in traffic and it’s just getting worse... I rather walk to work because I never know what’s happening on the roads... Parking in downtown? Forget it!”*

These are the words lingering on the mind of Sam Smith following a Town Hall meeting 5 weeks ago.

## **Background**

Just two months ago, the Special Committee on Transportation Planning appointed Smith as the new Executive Director of the Ontario Transportation Management Centre. In the wake of record commute times, increasing road accidents, motor vehicle collisions, and the cost of traffic congestion in major urban centres in Ontario, the first challenge was to develop a 10-year Integrated Transportation Plan to enhance the safety and efficiency of surface transportation in Ontario. In an early test of Smith’s leadership, a Town Hall meeting composed of city dwellers, traffic operators, drivers, engineers, transport analysts and emergency services personnel all came together to express their frustrations at the lack of communication and information flow among citizens, institutions, and transport infrastructures.

Transportation is the vital lifeblood of our interconnected and globalized economy; however, with Toronto’s population growth rate occurring above North American levels, the existing transportation infrastructure in place and provincial investments to support this growth are severely lagging behind. Combined with the fiscal constraints of government budgets, and environmental and land use policies, it is widely understood that Canada will need to accelerate its adoption and implementation of smart initiatives to manage dense urban centre’s transportation infrastructure through advanced technological integration aimed at moving people and goods more efficiently.

In response to the town hall and other pressures Smith’s senior advisors have recommended a large-scale overhaul of the existing disparate transportation information systems in order to improve communication and information flow among the systems, operators, decision makers and citizens. Smith’s advisors developed an Intelligent Transportation Systems (ITS) strategy to guide this comprehensive upgrade, which is aimed at integrating transit, roads, maintenance operations and emergency services into a general traffic management system using advanced computers, sensors, electronics and communication technologies. Four strategies underscore the direction for employing the next generation ITS<sup>1</sup>:

1. Reducing urban congestion and commute times;
2. Making public transit more effective;
3. Improving vehicle and passenger safety; and,
4. Delivering ITS services effectively.

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<sup>1</sup> *Moving Forward with Intelligence: The ITS Vision* <http://www.mto.gov.on.ca/english/engineering/its/strategy.shtml>

Smith's advisors are convinced of the numerous economic and social benefits of an ITS. They have determined that an ITS has the potential to reduce vehicle accidents, improve public health (through reduced fuel consumption and pollutant emissions) and improve traffic flow (which will result in better safety and security). Both Smith and Smith's advisors strongly believe that their envisioned ITS will also provide value-added information to drivers and travelers for better decision making. In their view, a viable ITS will reduce government expenditures, enable movement of goods and people for economic vitality, promote the long-term sustainability of city regions and contribute to the overall quality of life for citizens. Furthermore, they believe that there is an opportunity to strengthen and re-structure the cultural and social dichotomies of the public, institutional agencies, and other data providers by improving coordination, communication and collaboration among stakeholders.

### **Toronto and Transportation**

Among all major quality of life rankings, the City of Toronto leads global ranking as a great place to live. It is Canada's largest metropolitan centre with over 2.5 million people<sup>2</sup>. As the business, entertainment, media and technology capital of the Province of Ontario, Toronto is a gateway city for international businesses, visitors and immigrants. Given its significant urban centrality and as one of the most rapidly growing city centres in North America, Toronto is challenged to expand its urban footprint while intensifying its existing transportation infrastructure. In 2007 alone, the Greater Toronto Area experienced an annual increase of over 100,000 people and 50,000 cars<sup>3</sup>, and those numbers have continued to increase. The annual global benchmarking study<sup>4</sup> of 24 metropolitan areas worldwide produced by the Toronto Board of Trade ranked Toronto as the 6<sup>th</sup> overall high population growth region and 5<sup>th</sup> in terms of international visitors. Torontonians spent upwards of 80 minutes per round trip to commute to work, which is 24 minutes longer than people living in Los Angeles, 12 minutes longer than New Yorkers, and 32 minutes longer than Barcelonans. In fact, the Board's statistics point to a pressing need to address our transportation system: Toronto is ranked 19<sup>th</sup> out of 23 global city regions on the transportation lens; sits in last place for commute time; is ranked 15<sup>th</sup> out of 24 on public transit ridership (but 3<sup>rd</sup> in North America); and 15<sup>th</sup> out of 21 cities on per capita investment in public transit. In August, 2011, a research article<sup>5</sup> released by Statistics Canada revealed that Toronto's average daily commute was 33 minutes in 2010, which is the longest out of six largest census metropolitan areas in Canada.

As with most urban regions, Ontario transportation technologies, products and services have traditionally been pursued in isolation, often restricted by fiscal constraints, change in government power, and conflicting priorities. Different levels of government are working in silos to develop and manage disparate information systems with minimal information sharing and communication. The lack of synergistic efforts and planning among departments and divisions are affected by a series of concerns: desire for greater autonomy and control; competition for limited budgets; and cultural clash due to the number of organizations involved.

In Ontario, there has been some adoption of smart transportation technologies (e.g. ComboCard payment technology, in-car GPS) and transportation systems (e.g., Ministry of Transportation's COMPASS system, City of Toronto's RESCU system, Highway 407 ETR, Ontario's Advanced Road Weather Information System, and Automated Road Analyzer); however, Canada still lags behind some leading countries when it comes to smarter transportation initiatives. Generally, those technologies and systems that are in place

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<sup>2</sup> *The City of Toronto* [http://www.toronto.ca/toronto\\_facts/diversity.htm](http://www.toronto.ca/toronto_facts/diversity.htm)

<sup>3</sup> *Government Action Plan For Rapid Transit Will Move The Economy Forward (2007)* <http://www.premier.gov.on.ca/news/event.php?ItemID=4019>

<sup>4</sup> *Scorecard on Prosperity 2011: Toronto Board of Trade* [http://www.bot.com/Content/.../Policy/Scorecard/Scorecard\\_2011\\_Final.pdf](http://www.bot.com/Content/.../Policy/Scorecard/Scorecard_2011_Final.pdf)

<sup>5</sup> *Commuting to work: Results of the 2010 General Social Survey* <http://www.statcan.gc.ca/pub/11-008-x/2011002/article/11531-eng.pdf>

operate independently of each other with no centralized information system and a lack of information sharing.

### **Request for Proposal (RFP)**

In keeping with the ITS strategy there is a need to revamp, design and develop an integrated transportation system within the 10-year Integrated Transportation Plan. Smith, as the Executive Director of the Ontario Transportation Management Centre has issued a formal Request for Proposal (RFP) for a high-level Intelligent Transportation Systems Hub. According to the Intelligent Transportation Systems Society of Canada, ITS is broadly defined as “the application of advanced and emerging technologies (computers, sensors, control, communications, and electronic devices) in transportation to save lives, time, money, energy and the environment.”<sup>6</sup> The proposed system should be able to perform the following functions:

- *Monitoring:* The system should be able to monitor and take in information about road conditions, transit movement, vehicular travel patterns, and transportation demand management from the various sensors (i.e., video cameras, weather stations, infrastructure signals, and other vehicle signal transmissions) in a multimodal (private vehicles, public buses, trains, commercial vehicles, etc.), multi-agency, and multi-jurisdictional environment.
- *Processing:* The system should have the ability to process large amounts of data in real-time in order to detect patterns and anomalies to prevent congestions or collisions, predict road conditions based on weather forecasts and temperature sensors, and carry out other proactive analytics for early warning.
- *Responding:* The system should be able to notify relevant agencies (e.g. dispatch emergency, traffic control centres) to: change traffic signal timing; post messages on highway overhead signage; modify transit schedules and re-route buses; release information to the media and public electronically; plow and salt roads; and, send information to drivers/transit operators in real-time.
- *Planning:* The system will consolidate information gathered for short-term (e.g., protests, festivals, parades, or events) and long-term (e.g., road construction and maintenance) planning.

### **Looking Forward**

With the Ontario Premier and Toronto Mayor both eyeing on a bid for the 2020 Summer Olympics, they turned to the Transportation Management Centre for a plan that will set the benchmark for intelligent transportation systems among all G8 nations. The 10-year plan will be implemented in stages: 50% of the project to be completed by 2016; and 95% to be completed by 2020. It will likely result in improved transit trips, safer driving, and reduced carbon dioxide emission in Ontario, thereby elevating Toronto’s status as a world-class city for hallmark sporting events like the summer Olympics. Eager to impress the Special Committee on Transportation Planning, Smith, the team at the Transportation Management Centre and Smith’s senior advisors speculate whether your proposal will address the mounting concerns that the public have on the need for greater communication and information flow for improved transportation safety and efficiency. Given the complexity of this multi- modal, agency, and jurisdictional project, his team is looking for a proposal that will holistically integrate the various systems, people, and institutions.

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<sup>6</sup> The Intelligent Transportation System Society of Canada (2011). <http://www.itscanada.ca>

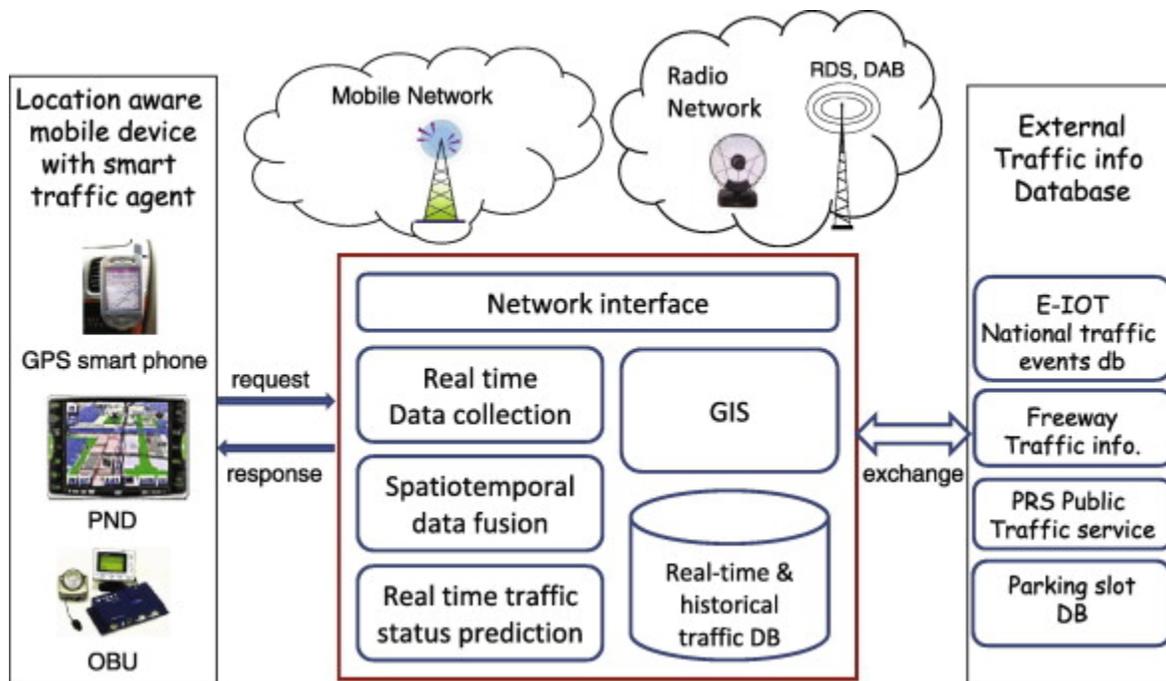
## References & Further Readings

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Lee, W.; Tseng, S. & Shieh, W. (2010) “Collaborative real-time traffic information generation and sharing framework for the intelligent transportation system”. *Information Sciences*, 180 (1), pg. 62-70

The Intelligent Transportation Systems Society of Canada. <http://www.itscanada.ca/english/index.htm>

## Appendix A – A *sample* collaborative traffic information generation and distribution framework



(Source: Lee et al., 2010)

*Note:* The names, agencies, and plans described in this case are fictitious and do not represent anyone or any government agencies. The context, however, in which this case is presented in, is applicable to Toronto, Ontario. The statistics presented are current as of August 2011.