



## Developing Intelligent Transportation Systems to Ease Traffic Congestion, Reduce Pollution and Support Emergency Response

Over the past 20 years, traffic on our roads has increased by 60 percent, and the average Canadian now spends the equivalent of twelve days a year commuting to and from work. Although gridlock causes frustration, our increasingly congested transportation systems are contributing to much larger problems, including air and noise pollution, increasing product delivery costs, and the inability of first responders to quickly reach an emergency site.

ONE-ITS (Online Network Enabled-Intelligent Transportation Systems), a collaborative research project with leadership from the Universities of Regina and Toronto, aims to create a real-time, pan-Canadian and internationally connected network that accelerates the discovery and development of new transportation solutions. This includes ways to ease highway congestion, reduce carbon emissions from idling cars, and enable fast and effective evacuations during a crisis. Despite the wealth of transportation information gathered today, it is broadly distributed and often inaccessible. Researchers require ways to gather, view and mine this data, and use it in their work.

Together with Transport Canada and the Ministry of Transportation Ontario, the team is developing a Web-based environment that pools transportation data, assets and expertise from across the country. It will allow researchers in geographically distributed locations to process, analyze and exchange very large volumes traffic information in real time, and collaborate on common challenges as a virtual team.

“Leveraging the advanced networking capabilities provided by CANARIE and ORION (Ontario’s Research and Innovation Optical Network), compute power from high-performance computing resources across Canada, and a critical injection of \$700 000 from CANARIE’s Network-Enabled Platforms (NEP) program, we are creating an online hub of resources that can provide everything from real-time streaming video to emergency simulations,” says Dr. Mohamed El-Darieby, researcher at the University of Regina and Co-Principal investigator of ONE-ITS. “We are building a framework where scientists can access this interactive repository in order to source and contribute blog entries, algorithms and experimental results.”

The platform includes key features such as a virtual video wall for traffic surveillance, vehicle tracking and integrated traffic control. With development about 50 percent complete, the team successfully demonstrated a beta version of the platform in October 2009. The first official release of ONE-ITS is expected within the coming months.

The future application of intelligent transportation systems could impact Canadians in many ways. For example, it could enable drivers to use a smart phone to view streaming videos of traffic and other potential disruptions, and make decisions about the fastest route to their destination. It could help governments to better manage delays and safety concerns at border crossings by streamlining vehicle flow during high traffic periods. It could also put critical information at the fingertips of first responders, enabling them to safely evacuate an area, quickly arrive on the scene of an emergency, and take action that saves lives.

“ONE-ITS relies on the capability provided by CANARIE as researchers need to exchange vast amounts of data across the country or around the world,” says Dr. Baher Abdulhai, Canada Research Chair in ITS at the University of Toronto and Co-Principal Investigator on the project. “We have successfully piloted the platform using traffic information from major arteries in Toronto, and plan to incorporate data from highways in Calgary and Vancouver over the next six months.” This research team is truly driving the novel development and application of intelligent transportation systems in Canada.