

## CAPITALIZING ON TECHNOLOGICAL INNOVATIONS IN TRANSPORTATION FOR THE BENEFIT OF CITIZENS

Montréal wants to be at the cutting edge of technological innovations in the field of transportation. The city intends to make a name for itself in the deployment of intelligent transportation systems (ITS) and to hold an enviable position among innovative cities, both in Québec and abroad. To achieve this, Montréal has adopted forward looking and ambitious strategic ITS plan.

### TRANSPORTATION IN THE AGE OF NEW TECHNOLOGIES

Recent developments in information technologies and communications have brought new opportunities for transportation. Cities can now gather, process, analyze and share information at high speed. This information helps planners and managers of transportation networks to make better decisions, optimize the use of infrastructure and ensure a more efficient, safe and sustainable movement of people and goods.

### WHAT ARE INTELLIGENT TRANSPORTATION SYSTEMS?

ITS refers to the application of new information and communication technologies that are related to transportation. These are, for example, traffic control centres, variable message signs, centralized management of traffic signals, electronic payment methods (public transportation, tolls, and parking), mobile applications for smartphones, etc. Measuring devices in the field, data control, processing and analysis centres, vehicles and communication and information exchange networks are at the core of these systems.

The benefits of ITS lie in their capacity to optimize the use of existing infrastructure, reduce costs and to meet the growing mobility needs of citizens. They also play a crucial role in mitigating the disruptions of multimodal trips, especially for intermodal travel. The use of technology and process automation also allows for:

- the improvement of the capacity and responsiveness concerning daily management of travel;
- the compilation of a wealth of data on traffic flow;
- better diagnostics of problem areas;
- better planning of new infrastructure based on observed findings.

### THE STRATEGIC PLAN

All technological opportunities must be integrated in a coherent manner, based on a clear vision. This was accomplished by City of Montréal when it developed an ITS Strategic Plan in accordance with its Transportation Plan. Adopted in 2011, This Strategic Plan includes ten targeted projects, six of which are currently underway, and is the result of a close collaboration with sector stakeholders. It highlights the priorities and needs of Montrealers in terms of «intelligence» regarding the transportation infrastructure.

For the sake of consistency with other Canadian and North American cities, this plan was developed in accordance with the Canadian ITS architecture. All technological standards were met and will in no way compromise the evolution of systems over time.

### A VISION THAT IS REALIZED THROUGH CONCRETE PROJECTS

After analyzing the needs of the partners of the Ville de Montréal, a series of projects were identified to help the management of transportation networks in Montréal to meet the challenges of innovation and efficient urban mobility. The principle stakeholders are the Montréal Police Force, the Montréal Fire Department, the *Société de transport de Montréal*, the *Centre de Sécurité civile de Montréal*, *Stationnement de Montréal*, *Transports Québec* and the Federal Bridge Corporation.

### And much more...

Beyond the projects included in the Strategic Plan, several other ITS applications, of a smaller scale and responding to specific issues, are being or will be deployed. This is particularly the case for the virtual over-height gantry for a railway viaduct on Guy street in Montréal. This system, developed by the Transportation Directorate, is a concrete example of ITS application, which earned an award for excellence by the *Association québécoise du transport (AQTr)*, Québec's transportation association.

This virtual over-height gantry detects any truck whose height exceeds the safe maximum restriction for passing under the structure. This sensor is connected to a variable message sign installed on the viaduct and notifies the driver of an impending impact. Since the summer of 2012, this system has prevented, numerous potential collisions that would have caused severe disruption to the commuter rail service and users of the surrounding road network. This is a practical technological solution to a problem that would normally have been resolved through costly changes to the structure of the viaduct.



### THE TRANSPORTATION PLAN

Tabled for the first time on May 17, 2007, the Montréal Transportation Plan was officially adopted in June 2008. This document not only becomes the benchmark for transportation projects, but it offers a clear vision and strategic objectives in the field. The vision of the Transportation Plan is as follows: "To meet the transportation needs of all Montrealers by making our city a pleasant place to live as well as a prosperous economic hub that is respectful of its environment. To achieve this goal, Montréal intends to significantly reduce its dependence on cars through massive investment in various forms of public transit and active transportation, such as the tramway system, the subway system, bus rapid transit service, trains, bikes and walking, and by encouraging more appropriate uses for cars, such as carpooling, car sharing and taxi services".

### FROM A SMART CITY TO A "LEARNING CITY"

To innovate, a "learning city" knows how to capitalize on the brainpower of its citizens and local driving forces. The Ville de Montréal, including the *Transportation Directorate*, recently made a shift toward opening its data to the public. Thus, a large amount of data on mobility is being collected every day. Sharing this data fosters citizen participation as well as innovation and helps to improve the mobility of citizens and their quality of life.

For more information:  
<http://donnees.ville.montreal.qc.ca/>

### MONTRÉAL IS PLEASED TO HAVE BEEN CHOSEN TO HOST THE ITS WORLD CONGRESS IN 2017.

A charming blend of European flair and North American can-do attitude, our city is primed for a hugely exciting year in 2017, when it will be marking a variety of milestone events: Montréal's 375th anniversary, Canada's 150th birthday, and 50 years since it welcomed the world for Expo 67.

Montréal will be celebrating in grand style in 2017, and we look forward to you joining us for the occasion!

# INTELLIGENT TRANSPORTATION SYSTEMS

For the service of citizens



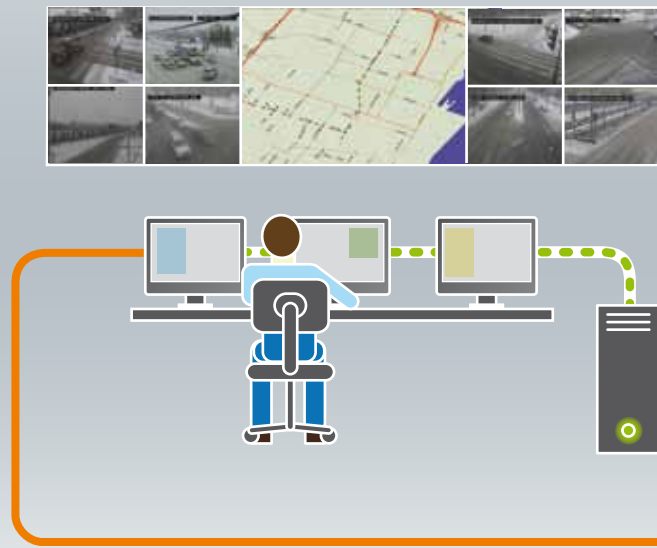
Montréal 



# 1 THE UMMC: THE HEART AND BRAIN OF INTELLIGENT TRANSPORTATION SYSTEMS IN MONTRÉAL

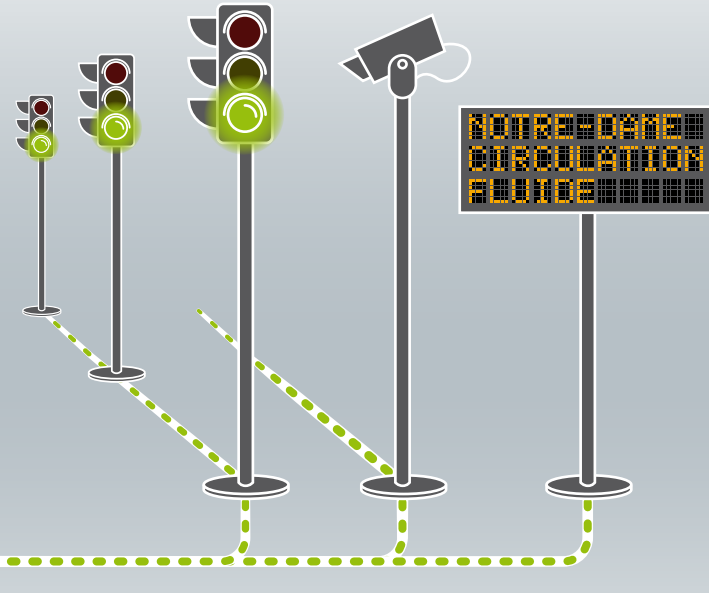
The *Urban Mobility Management Centre* (UMMC) is the basis for the implementation of ITS in the territory. It is the operation centre to which information is obtained from various devices (traffic signals, video surveillance, sensors, variable message signs). The UMMC is the central system that processes and analyzes information and presents it to the control centre operators. In terms of transportation management, it becomes the heart of decisions in real-time to facilitate the mobility of citizens.

It should be noted that, ultimately, approximately 500 cameras will be installed at key intersections of the arterial network. These cameras will allow the UMMC operators to see congestion problems and incidents affecting travel. The images captured by these cameras are transmitted in real time to the UMMC and will facilitate decision-making on corrective measures.



# 2 TELECOMMUNICATIONS IN THE SERVICE OF TRANSPORTATION

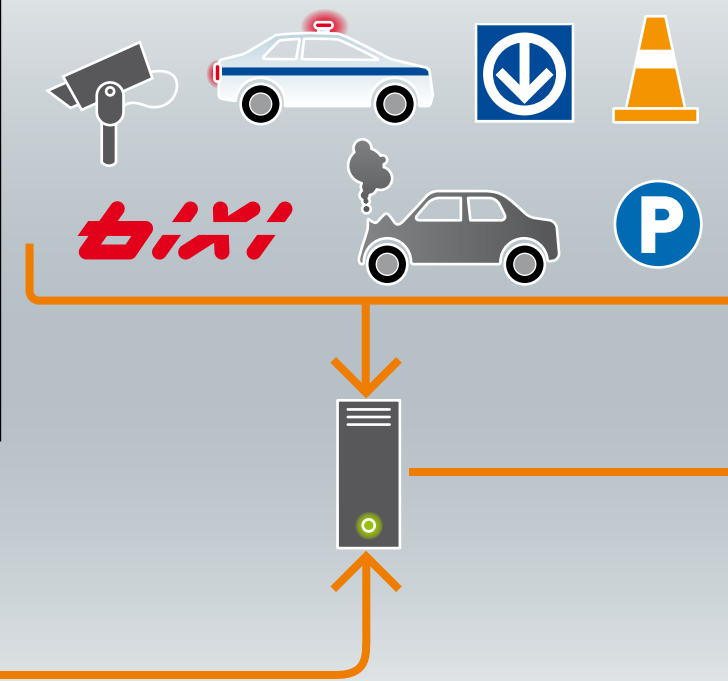
The proposed integrated telecommunication system's aim is to ensure the transmission of information. The Ville de Montréal has begun the deployment of a fibre optic network throughout its territory in order to connect equipment (traffic signals, cameras, variable message signs) to the UMMC. This network procures real-time information on equipment status, allows communication with field equipment and remote data collection.



# 3 GEO-TRAFFIC: A DYNAMIC DATABASE ON THE STATE OF TRANSPORTATION NETWORKS

This project involves the design of a dynamic database with real-time information on the state of Montréal's road network (road closures, congestion, incidents, and public transport disruptions). The goal is to gather, on a single platform, information that is relevant to traffic management and the operations of certain partners, such as emergency services and public transit agencies, for whom awareness of the network status in real time is crucial.

Exchange mechanisms for sharing and processing information will be developed as well as a graphic user interface for the partners.



# 4 INFORMATION FOR TRAVELLERS: FACILITATE TRAVEL AND MODAL CHOICES

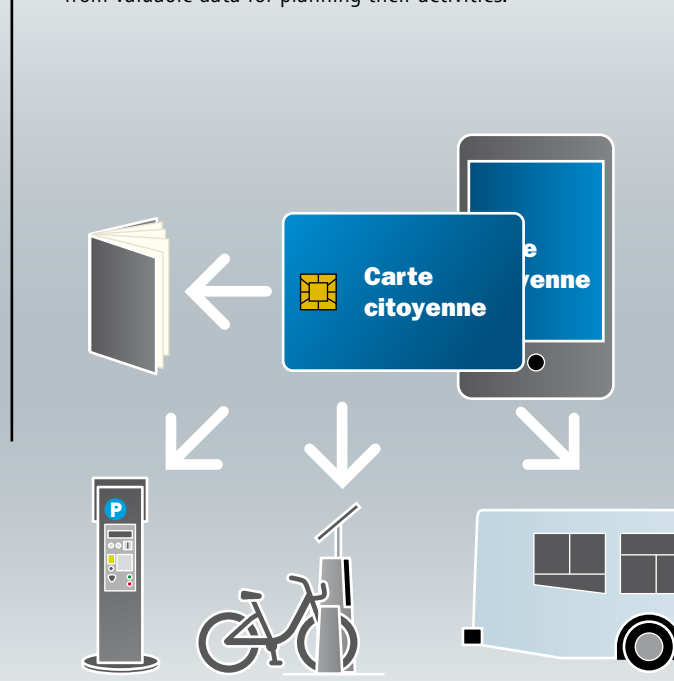
Related to Geo-traffic, this project makes it possible to provide real-time information on transportation networks and facilitate modal choices. Information on congestion, incidents and road closures, bus positioning on their routes, commuter trains or subway service disruptions and available parking spaces will allow citizens to travel more efficiently. The project's goal is to communicate this information to travellers through various platforms (online, smartphones, variable message signs, etc.) across Montréal.



# 5 ELECTRONIC PAYMENT: FOR A BETTER MOBILITY EXPERIENCE

An enhanced mobility experience requires simplified transfers between different modes of transportation. The arrival of new technologies enables the harmonization of different types of payment on the same platform. Several transportation services (buses, BIXI, parking, tolls) already use electronic payment, but not in an integrated manner.

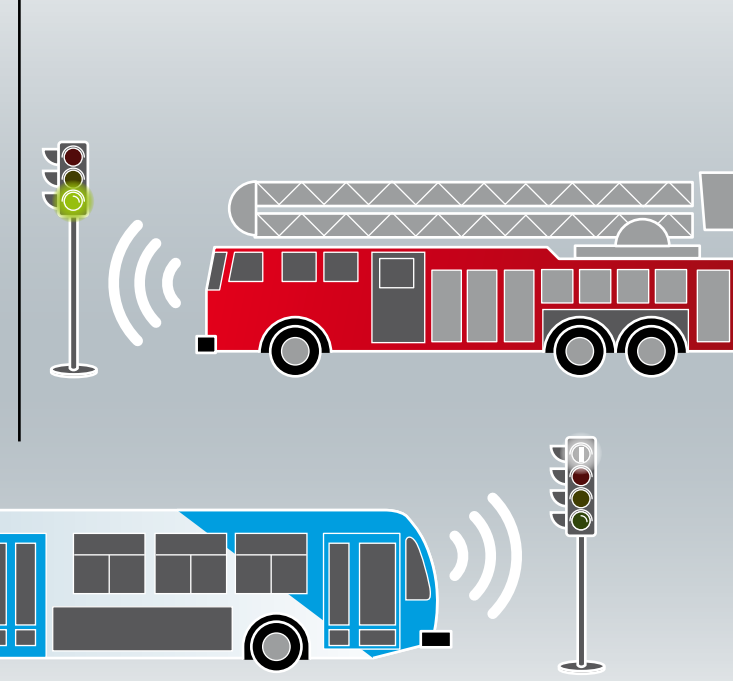
The goal of this project is to bring the various transportation actors to harmonize payment methods in order to facilitate intermodal travel and encourage the use of alternative modes of transportation. This harmonization could possibly be extended to other public services to citizens, such as libraries, museums, leisure centres, etc. The benefits are many, in addition to savings related to fare management. The different organizations involved can benefit from valuable data for planning their activities.



# 6 TRAFFIC SIGNAL PRIORITY FOR EMERGENCY SERVICES AND PUBLIC TRANSIT

The modernization of traffic signals allows the Ville de Montréal to be equipped with smart traffic signal controllers that can communicate with various modes of transport. It is now possible for emergency vehicles or buses equipped with the necessary devices to communicate with these electronic controllers so that they are given priority at intersections.

This project aims to extend these priority measures, first, at traffic signals neighbouring fire stations and, in a second phase, along the various major public transportation corridors.



## Accomplished to date:

- deployment of the operations centre, including servers, software and video screens;
- installation and connection of some 100 traffic surveillance cameras in the field;
- development of the UMMC operational processes and creation of centre-to-centre links with transportation partners (Transports Québec, *Société de transport de Montréal*, etc.).

## Underway:

- staffing and training of control centre operators;
- Deployment of 400 additional traffic surveillance and traffic sensors for a global coverage of the territory.

## Accomplished to date:

- implementation of a telecommunication network pilot project to test the viability of the project on a limited scale. To date, the results are conclusive;
- connection of several traffic signal networks to the fibre optic network.

## Underway:

- setting up of the telecommunications core network to cover the entire territory;
- connecting traffic signal and other equipment (traffic signals, cameras, variable messages signs) to the fibre optic network.

## Accomplished to date:

- prefeasibility study (objectives, costs, impacts, etc.) and market research on available technological solutions;
- project presentation to key stakeholders and partners;
- inventory of partners' data and development of a business case.

## Underway:

- pre-project that includes partners' commitments and technology solution options;
- detailed architecture and critical path;
- first phase of project implementation including data necessary for the proper functioning of the system;
- product improvement according to partner's needs.

## Accomplished to date:

- worldwide market analysis on best practices for the 511 system, carried out jointly with Transports Québec.

## Underway:

- feasibility study on implementing an information service for travellers in Montreal;
- determining the mode of governance of a Québec-wide information system.

## Accomplished to date:

- opportunity study on the harmonization of electronic payments in transportation;
- discussions initiated with partners in transportation;
- validation of the use of the Opus card with other transportation and public services.

## Underway:

- feasibility study on the integration of payment methods in transportation in Montréal.

## Accomplished to date:

- upgrading of traffic signals currently underway;
- test period for various technologies of traffic signal priority systems;
- deployment of a transit signal priority pilot project on Saint-Michel boulevard and traffic signal pre-emption around nine fire stations.

## Underway:

- continue the upgrading of traffic signals as required by the *Société de transport de Montréal*;
- continue with the deployment of traffic signal pre-emption systems around fire stations.