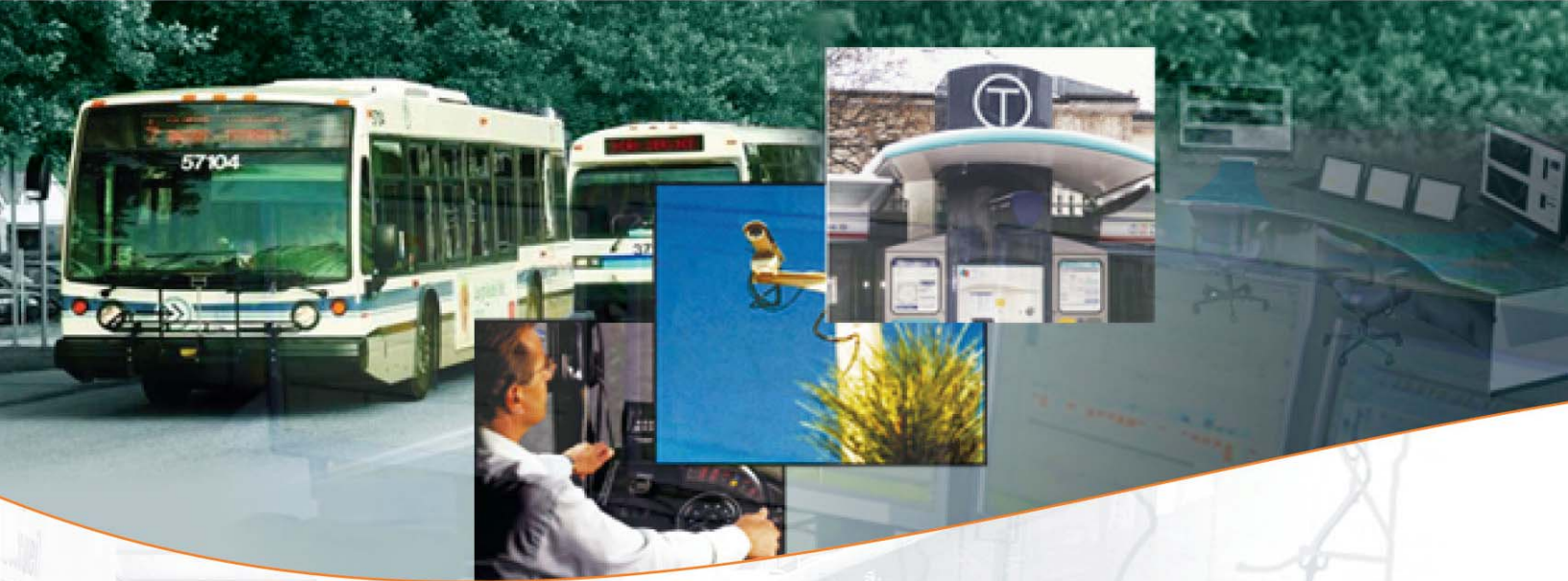




On gère de près



Prix de réalisation en transports urbains durables

Démarche stratégique intégrée de planification et d'exploitation du transport collectif dans le domaine des STI au Québec



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Table of contents

Project Summary.....	2
1. Diagnosis and objectives.....	2
Context.....	2
Objectives.....	3
2. Proposed solution.....	3
The Integrated strategic ITS deployment process	3
Phase 1: Development of strategic plans for each of the four public transit agencies.....	4
Integrated physical and logical architecture	4
Phase 2: Development of an integrated information management system (SIPE) at the STS.....	4
Control panels.....	5
Phase 3: Assessment of each public transit agency's specific needs	6
Upcoming ITS deployment activities for each transit agency	6
3. Results	6
Objectives attained	6
Positive impacts on sustainable mobility and transportation	7
4. Project justification according to the evaluation criteria	7
Development and enhancement of sustainable urban transportation	7
Degree of innovation.....	7
Transferability to other Canadian communities and organisations.....	8
Appendices.....	9

Project Summary

Sharing common needs and interests, four Quebec public transit agencies, namely the Société de transport de Sherbrooke (STS), the Société de transport de Trois-Rivières (STTR), the Société de transport de Lévis (STLévis) and the Société de transport de Saguenay (STSaguenay) decided to work together to develop and deploy their respective intelligent transportation systems (ITS) to deliver sustainable public transit services.

The project management approach developed and used for this initiative was a first for Canada. Under the guidance of Roche ltée, Groupe-conseil (Roche), acting as project manager and technical advisor, this integrated strategic initiative, completed between June 2008 and February 2010, was divided into three main components:

1. ITS strategic plans for each of the four transit agencies
2. Development of an integrated information management system (SIPE) for the STS
3. Assessment of regulatory, telecommunication, sales and fee collection system needs for each transit agency

This project will have a significant positive impact on personal mobility, as it will result in improved transit services that are safer, more efficient and more responsive to client needs. Through the implementation of ITS, it will strengthen the role of public transit as a viable and sustainable transportation alternative in these mid-sized cities where the automobile is typically the predominant means of transportation.

The project's potential application in other settings is quite high given that the methodology can easily be adapted to the specific needs of different urban environments. In fact, within this project, the approach was adjusted to suit the needs of four distinct public transit systems operating in different regions of Quebec. Given its unique and innovative approach and methodology, project authorities were able to secure funding from Transport Canada for phases 1 and 2.

1. Diagnosis and objectives

Context

According to new government transit funding guidelines, ITS-related costs are now considered allowable expenditures, as these systems are recognised as key assets in support of technical innovation. Given their obvious benefits, funding programs increasingly encourage transit authorities to acquire these systems.

As opposed to their big-city counterparts, transit agencies operating in small and medium-sized cities do not typically have the human and financial resources required to develop, implement and deploy ITS programs tailored to their specific needs. In light of this reality, pooling resources can be a suitable alternative, providing key benefits such as increased purchasing power, economies of scale and information sharing opportunities, etc.

Seizing upon a recommendation by Roche, acting as project manager and technical advisor, four Quebec public transit agencies joined forces for this project. Operating outside or on the periphery of major metropolitan areas, these transit agencies function in similar planning and operational environments. They serve populations of comparable size, and operate comparable vehicle fleets.

Objectives

The objectives of this collective ITS approach were as follows:

- Identify each transit agency's specific ITS needs and requirements;
- Develop an ITS deployment strategy, including project priorities;
- Identify projects common to several transit agencies;
- Develop a common front in dealing with suppliers to obtain products that are more responsive to stated needs and to benefit from economies of scale (development and implementation components);
- Create an experience and expertise sharing forum for strategic and technical ITS mentoring across Quebec.

More specifically, with respect to the planning and operation of each of the individual transit networks, the detailed objectives are as follows:

- Improve monitoring systems throughout the network (staying on schedule, on-board functions, etc.);
- Optimise network operations (operational guidance);
- Improve client information functions;
- Enhance reliability and service quality;
- Increase ridership and strengthen public transit's position as a preferred, sustainable means of transportation;
- Improve client satisfaction;
- Increase productivity;
- Improve the planning function;
- Respond to user needs better;
- Optimise human and material resource allocation.

2. Proposed solution

The solution developed to achieve the stated objectives and to provide ITS services that meet the needs of the four public transit agencies in the **Integrated strategic ITS planning and deployment process for public transit in Quebec**.

The Integrated strategic ITS deployment process

The Integrated strategic ITS deployment process was divided into three phases:

- Phase 1: Development of strategic plans for each of the four public transit agencies
- Phase 2: Development of an integrated information management system (SIPE) for the STS:
- Feasibility study;
 - Concept validation and pilot project.
- Phase 3: Assessment of each public transit agency's specific needs:
- Regulatory needs, including telecommunications;
 - Sales and electronic fee collection.

Phase 1: Development of strategic plans for each of the four public transit agencies

Development of the ITS strategic plans was conducted in conformity with Canadian ITS architecture guidelines and applicable standards. These guidelines provide a framework to promote optimal use of all modes of transportation and encourage partnership development among all transportation sectors.

As they implement their respective strategic plans, the four public transit agencies will benefit from clear direction to plan, define and integrate their ITS initiatives. By doing so, they will be providing seamlessly integrated ITS products and services, making the transit service offer more reliable and competitive.

The approach used to develop the strategic plans was based on the process proposed in the Transport Canada ITS Strategic Planning Model, and includes the following components:

- Component 1: Formation of the coalition;
- Component 2: Contextual analysis (inventory of existing ITS initiatives and identification of user needs, followed by development of services and sub-services responding to the stated needs);
- Component 3: Outlook analysis (required functionalities and development of physical and logical framework architecture);
- Component 4: ITS program development (all markets);
- Component 5: Deployment program development.

Integrated physical and logical architecture

The strategic planning phase involved developing the physical and logical architecture shown in Figure 1 (appended). In addition to representing the forces at play in each transit agency, the architecture also highlights common issues and realities. It is:

- Focused on innovation;
- Open to providing the requisite flexibility and future expansion potential (addition of new systems and new technologies);
- Interoperable to facilitate implementation and integration of various systems;
- Open to different designs and implementation approaches.

Phase 2: Development of an integrated information management system (SIPE) at the STS

Intelligent Transportation Systems generate data that will allow the public transit agencies to improve their system planning and operation functions. However, the vast quantity and varied format of generated data require the allocation of significant resources to data processing, integration and analysis for transformation into decision-making tools. In addition, the diversity of suppliers and products available on the market can be an obstacle to systems interoperability.

The purpose of the SIPE is to ensure the integrated management of the information produced by various systems and to ensure systems interoperability. It will make all processes fully automated, safeguards against system obsolescence and removes dependence on outside suppliers and integrators.

The draft concept submitted to the four transit agencies in February 2009 outlined the pilot project developed for the STS, which integrates the existing Intelligent Transportation System components provided to STS by various suppliers and developers, including:

- An on-board passenger counting system;
- In-house applications to channel information internally and to suppliers;
- A route-timing application;
- A routing and scheduling system.

In future iterations, the SIPE will become a key component of an integrated operations and user information support system (SAEIV) which will serve as an interface between sales and fee collection systems, user information systems, maintenance programs, security systems and other control systems. In addition, information management will be conducted in real or non-real time, as required.

Control panels

The SIPE should provide decision makers the tools they require to improve transit network planning and operations. These tools will need to be legible and easy to understand. To do so, the SIPE will generate control panels providing a clear picture of system use and performance in addition to identifying system malfunctions and operational problems.

The table below summarizes the six control panels developed for the STS as part of the pilot project.

Table 1: SIPE Pilot Project Control Panels

Objective	User	Periodicity
Decision Tool and Activity Monitoring	Senior Management	Monthly
	Strategic Support Branch	
Operations and Planning Monitoring	Operations Branch	Daily
	Planning and Development Branch	
Maintenance Monitoring	Maintenance Branch	Daily
Operations Supervision	Operations Branch	Weekly
Planning Support	Planning and Development Branch	Weekly
Public Consultation	General Public	Annually

These control panels include a number of indicators for three master variables: transit system use, service offer and operations, and revenues.

For example, the 8 indicators relating to system use measure hourly use, the number of passengers per kilometre and volume of use per route segment or for certain route combinations (by segment).

The 28 indicators relating to service offer and operations measure, among others, vehicle load, on-time performance, vehicle speed and commercial kilometres, hours of service and fuel consumption.

The 7 indicators relating to revenues measure, among others, cost/revenue ratios.

Phase 3: Assessment of each public transit agency's specific needs

Before choosing the technological solutions for control systems, telecommunications, sales and fee collection, each transit agency's implementation and operations requirements must be identified. This step is crucial to ensure a proper match between the functional requirements and the products offered by potential suppliers.

In order to provide the proper framework for control systems, telecommunications, sales and fee collection systems, the following activities were undertaken:

- Current conditions analysis (detailed inventory of existing systems, including deployment requirements);
- Needs identification, by function (define functional requirements to meet stated needs);
- Match functional requirements to systems provided by suppliers (identify the most appropriate solution).

This step in the process concluded with a list of specific technological recommendations for each individual transit agency.

Upcoming ITS deployment activities for each transit agency

Each of the transit agencies will undertake various ITS deployment initiatives over the next few years. The agencies will progressively implement new control systems, electronic sales and fee collection mechanisms and user information systems. To ensure integrated management and interoperability of all these systems, a SIPE will also be deployed at each transit agency.

3. Results

Objectives attained

The integrated strategic ITS planning and operations process achieved the following objectives:

- Identify the public transit agencies' individual and collective ITS needs – Phases 1 and 3;
- Develop a comprehensive ITS deployment strategy including project prioritisation and budget estimates over a 10-year horizon – Phase 1;

- Develop a common front to deal with suppliers (purchasing power), to obtain products that are more responsive to stated needs – Phase 3;
- Identify projects common to several transit agencies – Phases 1 and 3;
- Achieve economies of scale – Throughout the process;
- Create an expertise and experience sharing forum – Throughout the process;
- Improve the public transit services offer – Throughout the process;
- Base the ITS deployment strategy on the principles of cost optimization and overall transportation systems improvement – Throughout the process.

Positive impacts on sustainable mobility and transportation

Thanks to the openness and commitment to collaboration displayed by the leaders of the four public transit agencies, the ITS deployment initiative is having a positive impact on personal mobility by providing better quality public transit services that not only safer and more efficient, but also more responsive to client needs. Specifically, this initiative is delivering:

- Increased reliability (staying on schedule);
- Greater comfort (better management of the on-board experience);
- Improved client information services;
- Enhanced response to client needs (better planning).

As a consequence, client satisfaction levels will increase, which will result in increased use and a stronger role for public transit as a sustainable transportation alternative in these mid-sized cities, where the automobile is typically the preferred mode of transportation.

4. Project justification according to the evaluation criteria

Development and enhancement of sustainable urban transportation

The ITS deployment process provides social, environmental and economic benefits in keeping with the principles of sustainable development and the commitment to improve sustainable urban transportation. These benefits include:

- From a social perspective, enhanced quality of life for everyone through improved personal mobility;
- From an environmental perspective, a stronger role for public transit as a sustainable mode of transportation; and: more efficient use of public transit vehicles will result in reduced GHG and other pollutant emissions;
- From an economic perspective, improved productivity through a more efficient allocation of human and material resources.

Degree of innovation

The idea of bringing four distinct public transit agencies together to develop a common an integrated strategic ITS planning and operations process is a **first** for Quebec and Canada. This collective endeavour responds to each agency's specific ITS requirements, it meets the stated

objective of improving personal mobility and provides innovative and cost-effective technical solutions, in keeping with a budgetary framework respectful of each transit agency's financial capability.

The SIPE is in itself a technological innovation as it integrates information management and system interoperability. The control panels and their indicators give decision-makers the tools they need to improve transit network planning and operations.

The benefits of a SIPE are numerous, including, among others, the creation of an information sharing platform, more coherent service planning, reduced labour costs and a modern, higher quality transit network, which in turn increases reliability and ridership, which translates into an improved bottom line and cost/revenue ratio.

Transferability to other Canadian communities and organisations

This project presents numerous transferability possibilities to other Canadian communities and organisations given the opportunity to replicate the experience in a wide variety of situations. This particular project brought together 4 distinct public transit agencies from different regions of Quebec. The financial support provided by Transport Canada is a clear indication of the interest shown at the national level and recognizes this platform's potential applicability across Canada.

The process outlined in this submission can be used by other public transit agencies throughout Quebec and across Canada, and could also be of use to all other vehicle fleet managers and operators in every transportation sector, including the trucking industry.

Appendices

Figure 1: Process Logical and Physical Architecture

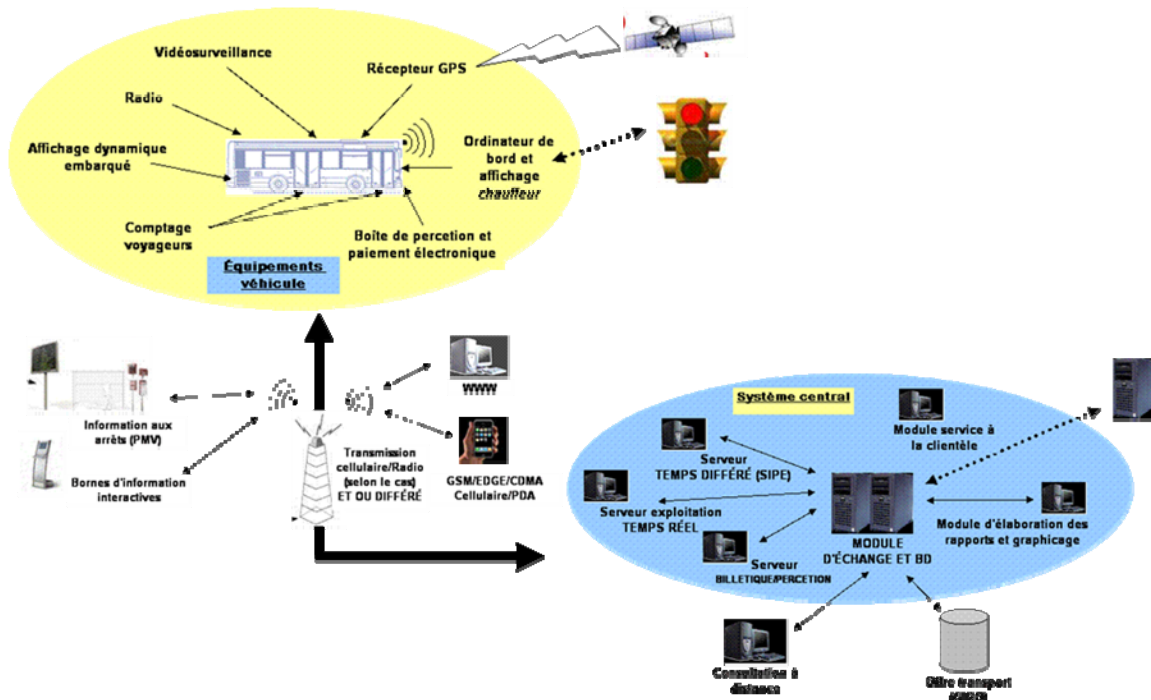


Figure 2: Advantages of the SIPE

