

DELIVERY OF A PRODUCT FOR CONVEYING INFORMATION CONCERNING WINTER ROAD CONDITIONS TO USERS, AND THE STEPS TAKEN TO ENSURE DELIVERY OF A QUALITY PRODUCT

S. Noël
Ministère des Transports du Québec, Québec, Canada
Sylvain.Noel@mtq.gouv.qc.ca

F. Béland
Ministère des Transports du Québec, Montréal, Canada
Francois.Beland@mtq.gouv.qc.ca

SUMMARY

In winter, the Ministère des Transports du Québec provides road users with information concerning road conditions. Its activities in this area began in 1963. Since then, new terminology and a quality control procedure have been developed in order to ensure the quality of the service. Computer applications have made a significant contribution in terms of supporting the information on the network in order to provide the service that is currently available to a constantly growing audience. The first application served as a database for compiling information. Subsequent applications made it possible to obtain information directly from Segment Supervisors, to provide quality control tools, and finally, to make the information readily accessible by broadcasting it via Québec 511 Info Transport, among other means of transmission.

KEYWORDS

CONDITIONS / ROAD / INFORMATION / 511

1. INTRODUCTION

Road administrations are responsible for ensuring the safety and reliability of their network during the winter. In addition to performing winter maintenance work, they must also keep road users informed with respect to the effects of various types of weather on the network.

The Ministère des Transports (MTQ) is not exempt from this responsibility. In fact, it has made this a Ministry Commitment in its "Declaration of Services to the Public".

2. MODEST BEGINNINGS MARKED BY ORGANIZATIONAL CHANGES

For more than 40 years, the MTQ has been making information concerning winter road conditions available to the public. Its activities in this area began in 1963, when four call centres (Montréal – Drummondville – Québec – Chicoutimi) were established in order to handle the demand. Each centre had eight telephone lines available, which meant that eight calls could be handled simultaneously.

In those early days, the information that was gathered by MTQ employees was posted on a giant map by hand. Telephone operators had access to the information that was collected so that they could pass it on to users who called in.



Figure 1 – Information displayed on a giant map in 1974

Four other call centres (Sherbrooke – Cap-de-la-Madeleine – Amos – Rivière-du-Loup) were added in 1965, and two additional centres (Gaspé – Aylmer) went into service in 1971. Some of the service centres in the regions dealt with local calls. This method of operation did not allow for the exchange of data between regions.

In the late 1980s, the first database was set up with the cooperation with a private communication services company (Videotron), replacing the traditional display charts. Automated answering systems were installed in Montréal and Québec City, the messages intended for users had to be recorded individually.

3. DEVELOPMENTS IN THE 1990S

In 1994, the increasing demand for information forced the Direction des communications [Communications Branch] of the MTQ to commission a study respecting the optimization of information concerning road conditions. Starting in 1995, it was no longer necessary to input the messages intended for users one at a time. Using the database and computer files linked end to end, it was now possible to program messages quickly. This method of operation is known as message concatenation.

3.1. The First Dedicated Computer Application for Road Conditions

A new computer application is born: the ERT (État des RouTes [Road conditions]) system. The introduction of the ERT system in 1996 resulted in an improvement in response time between collection and dissemination of the information. The time lag decreased from four hours to three minutes. This same system is in use today.

At that time, as many as eleven road conditions centres were responsible for collecting information concerning 230 road segments. In 1997, emphasis was placed on cooperation with Environment Canada in terms of disseminating information. This meant that 35 regional access points were made available, reaching 80% of the population. However, there was no toll-free (1-800) number. On the other hand, Internet service became available that same year.

3.2. Focus on the Distribution of Information

An agreement with Bell Canada early in 2000 made it possible to enhance the telephone service. In addition to the toll-free (1-800) number, the seven local numbers, real-time data updating, and the ability to handle an almost unlimited number of calls, development of the application made it possible to process requests using voice recognition technology. The telephone application now provides information concerning road conditions, roadwork, and road closings based on the starting point and destination indicated by the person who makes the request.

 
Bell Mobilité (sans frais) # 2363
Montréal (514) 284-2363
Québec (418) 684-2363
Chicoutimi (418) 545-2363
Hull (819) 776-2363
Joliette (450) 756-2363
Sherbrooke (819) 823-2363
Trois-Rivières (819) 370-2363
Ailleurs au Québec 1 877 393-2363
www.mtq.gouv.qc.ca

Figure 2 – Access to information concerning road conditions by telephone and via the Internet in the early 2000s

Other agreements with television broadcasters (MétéoMédia, VidéoTron, Telbec, VidéoWay), a radio broadcaster (NTR), and news networks (RDI and LCN) have made the information even more accessible to users.

SERT : Road Condition System

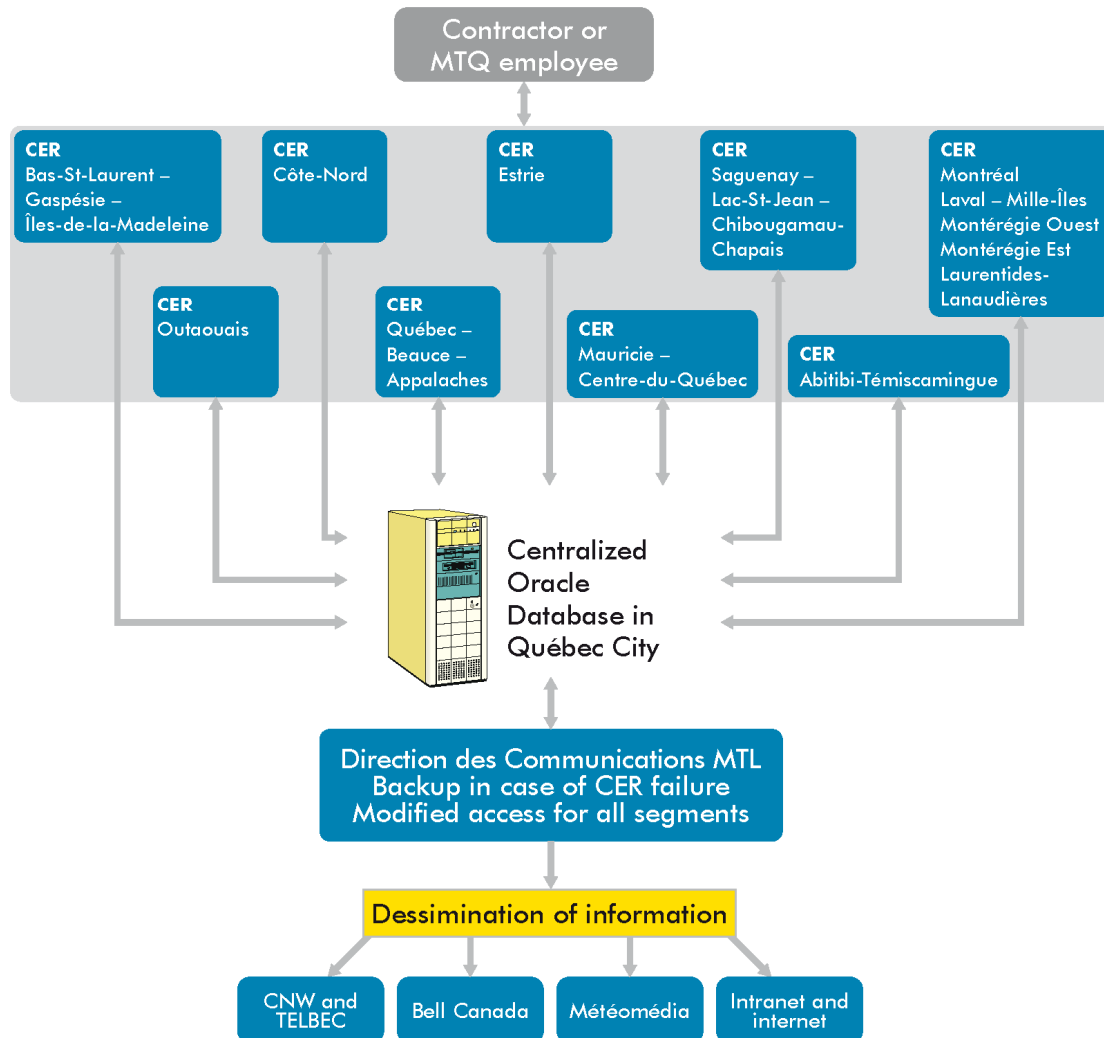


Figure 3 – Organization of Road Conditions Centres in the early 2000s

4. REVIEW OF OUR METHODS OF ENSURING THE QUALITY OF INFORMATION

The late 1990s saw improvements in speed and the methods of distributing information, but the focus shifted in the new millennium toward the collection process and the quality of the product.

The three criteria for information quality are relevance, reliability, and validity.

4.1. A Quality Assurance Process

In order to ensure the reliability of data, the first stage in reviewing our methods was undertaken in 2001, with the launch of a ministerial improvement program. Clear quality assurance procedures were established, and the roles and responsibilities of all of the actors involved in delivering the road conditions product and service (P/S) were defined. The roles and responsibilities of these actors were guided by, among other things, logic diagrams to process information.

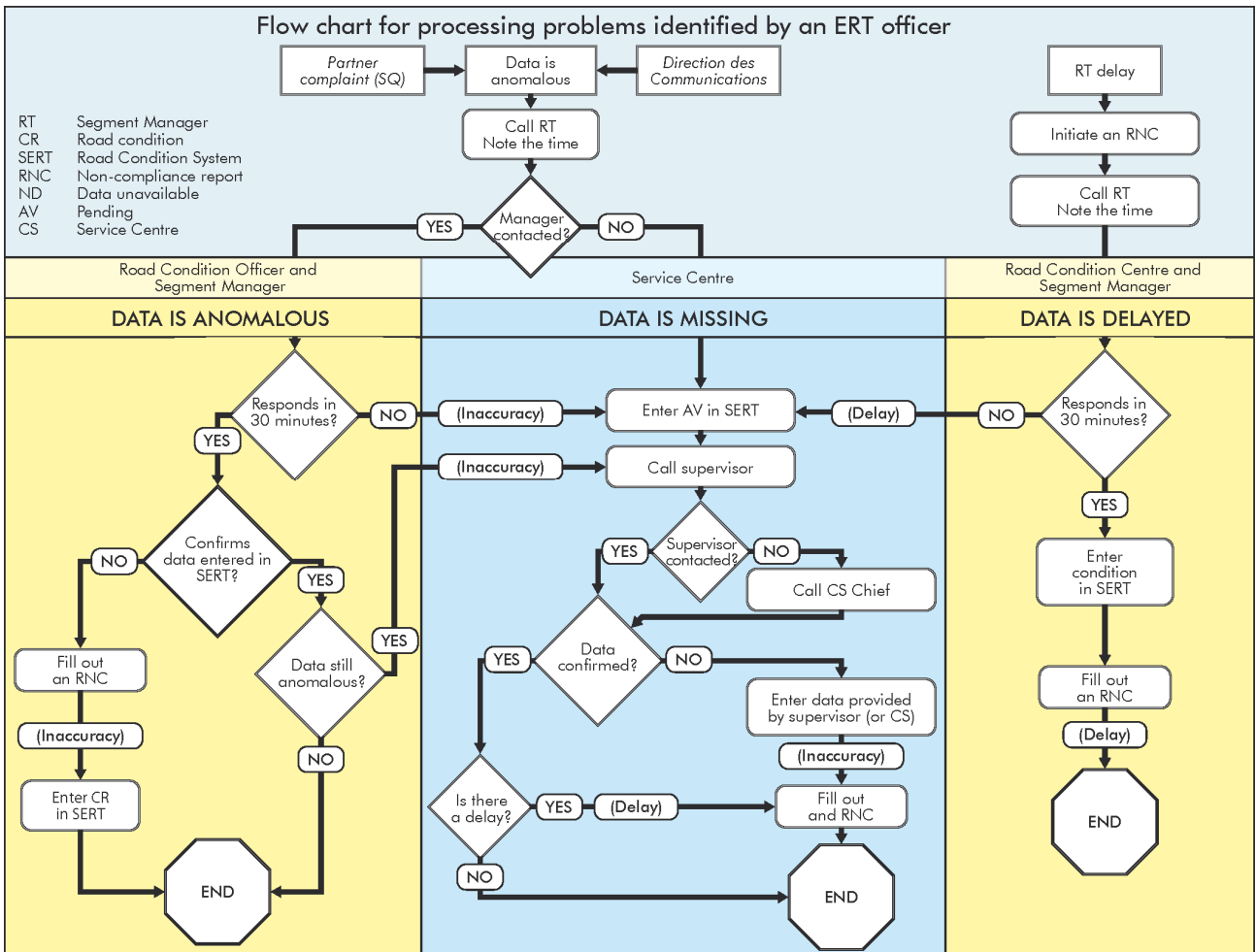


Figure 4 – Logic diagrams for Road Conditions Officers to detect and resolve problems

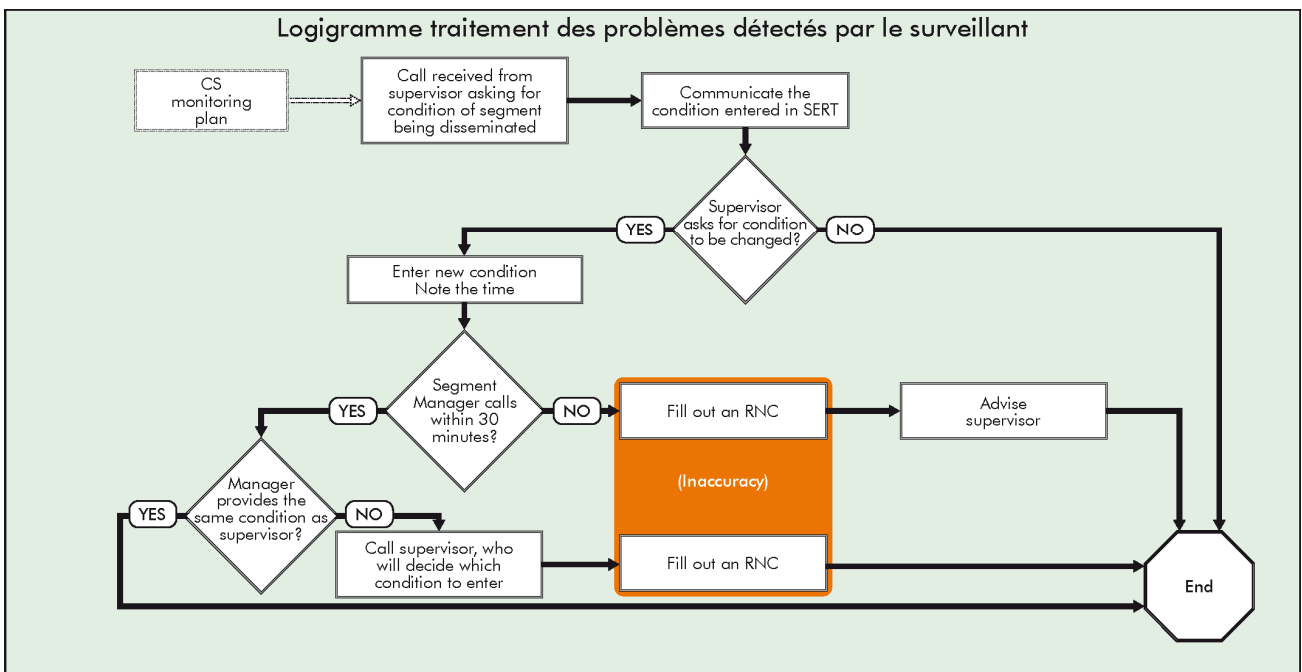


Figure 5 – Logic diagrams for Road Supervisors to detect and resolve problems

Self-inspection, monitoring, and external verification mechanisms (audits) were implemented.

Management and performance indicators were developed in conjunction with these mechanisms, along with systems for measuring these indicators. A small application facilitates the compilation of the results from the external auditors.

Table 1 – Performance indicators

N°	INDICATOR	BY WHOM	SUBMITTED TO WHOM
PI1	Total number of non-compliance reports (NCR) per segment and per service centre	Operations module	Manager SC head
PI2	Number of road conditions indicated as "Pending" in the ERT system per segment and per service centre	Operations module	Manager SC head
PI3	Average number of daily updates for each reference period per segment and per service centre	Operations module	Manager SC head
PI4	Concordance rate: ratio of the number of concordant visits (Vc) to the number of segments audited (V) IP4 = Vc / V	Officer in charge of external auditors	Manager SC head

These measurement systems ensure uniformity in processing the data. They feed into the indicators in order to guarantee reliability. This quality assurance process, which is still in use, has undergone periodic changes in order to reflect the evolution of the MTQ.

4.2. New Terminology

Following up on a variety of observations, a working group studied the relevance and validity of the information that is transmitted, the objective of which must be to inform users in order to assist them in making their decision prior to departure. Ultimately, the language that is used must be clear enough to avoid putting users into an undesirable situation (assist them in adapting to conditions). The new terminology had to meet the following four requirements: be easy to apply on the road, be easy for users to understand, be easy to illustrate, and be easy to "concatenate" (terms that are easy to associate with one another). This language was developed in 2001.

Focus groups (24 users from three cities, representing various types of users) were set up during the summer of 2001 in order to validate the new terminology. The terminology subsequently underwent testing within the territory of the Abitibi-Témiscaminque–Nord-du-Québec Branch during the 2001-2002 winter season. After these reflection and validation efforts were completed, the terminology was finally introduced throughout the MTQ during the 2002-2003 winter season, after a widespread training plan was implemented.

Electronic media (television and the Internet) require a simplified visual representation that can be grasped from a single glance at the screen. The number of colours that are easily distinguishable by the human eye is limited to five or six. This constraint limits the number of road conditions that can be represented quickly using these media. Therefore, including the condition "closed", which indicates that access to a road is prohibited, four conditions have been chosen: good, fair, critical, and closed. A four-colour code (green, yellow, white, and red) has been proposed in order to provide a visual translation of the conditions that users must take into consideration when planning their travel. Key messages are also suggested.

Table 2 – Road conditions and their respective colours and safety warnings (from the reference document "Road condition" ^[1])

Road condition	Basic slogan	Colour
Good	Be careful!	Green
Fair	Don't be caught off guard! Allow extra time!	Yellow
Critical	Delay your trip if possible!	White
Closed	Sorry. Road closed!	Red
Data to come		Black
Off season		Grey

By definition, the condition of a road represents a combination of the pavement condition and visibility. Visibility comes into play as an aggravating factor for the pavement condition.

Table 3 – Combination of pavement conditions and visibility conditions, resulting in road conditions (from the reference document "Road condition" ^[1])

Visibility/ Roadway	GOOD	REDUCED	ZERO IN PLACES	ZERO
CLEAR	Good	Good	Fair	Critical
SNOW-COVERED PATCHES	Fair	Fair	Fair	Critical
ICY PATCHES	Fair	Fair	Fair	Critical
PARTLY SNOW-COVERED	Fair	Fair	Fair	Critical
PARTLY ICY *	Fair	Fair	Fair	Critical
SNOW-COVERED	Fair	Fair	Critical	Critical
ICY	Critical	Critical	Critical	Critical
ROAD CLOSED	Closed	Closed	Closed	Closed

Since the introduction of the new terminology, a guide has been made available as a teaching tool. More recently, a training DVD illustrating road conditions has been released, and is much appreciated.

Information concerning road conditions begins with observations provided by Segment Supervisors. These individuals may be private contractors, municipalities, or internal MTQ personnel. A Segment Supervisor must travel every kilometre of the segment IN order to provide a condition report. Pursuant to their contractual obligations, contractors must provide road conditions at set times twice per day, and whenever conditions change. The set times are generally a bit before the start of rush hours, namely early in the morning and in the afternoon.

In order to facilitate the process of obtaining data from Segment Supervisors without having to go through agents or answering systems from the nine road conditions centres, a computer system was designed and implemented for the 2005-2006 season. The "Rafales" [wind gusts/data bursts] application allows for the automated capture of data gathered by Segment Supervisors. The Supervisor communicates with the server over a telephone link, identifies himself with a password, indicates the segment that was evaluated, follows the instructions for selecting the conditions, and validates the information captured.

In parallel with this application, a small application known as "SAM" is used to assign passwords to the various contractors.

The increased efficiency of these recent developments has resulted in the following consolidations within the organization: two Centres intégrés de la gestion de la circulation (CIGC) [Integrated Traffic Management Centres] now take the place of the nine road conditions centres, serving the entire province. The CIGC in Québec City serves the eastern part of the province, and the CIGC in Montréal serves the western part of the province.

During the 2007-2008 winter season, approximately 75,000 data-collection transactions were carried out by the Rafales system, and the Inforoutière service handled 360,000 calls from the public.

5. TAKING A STEP TOWARD THE FUTURE

In a context where the road network is increasingly congested and the automobile population continues to grow, it has become necessary to plan your travel more carefully for reasons of safety, economy, and efficiency. In order to facilitate access to this information at all times, both via the Internet and by telephone, the MTQ introduced the Québec 511 Info Transports service in October 2008. Info Transports is the result of the enhancement and modernization of the former Inforoutière service, integrating cutting-edge technology that allows for standardization of the information provided. The automated Text-To-Speech transfer system, working in conjunction with the Geographical Inventory System, makes it possible to ensure that the information that is seen on the MTQ website is the same as the information that is disseminated via the telephone system. The simple and user-friendly approach works with voice recognition, but also allows users to request information using a telephone keypad. Among others, this functionality allows users with speech impediments to consult Québec 511 without difficulty.

All of the information that is required in order to plan a trip anywhere on the Québec road network can be accessed through the various types of requests (e.g.: by origin-destination, by highway number, or via a specific transportation facility, such as a bridge or ferry).

Québec 511 offers bilingual (French and English) telephone services and mostly bilingual content on the Internet. The service is available free of charge by dialling 511 in Québec, or 1-888-355-0511 (toll-free) from elsewhere in North America. It is also available on the Internet, at www.quebec511.gouv.qc.ca.

This development is part of a North-America-wide initiative to provide transportation information by means of calls to the telephone number 511. This service is already available in many US jurisdictions or States, and in only one other Canadian province: Nova Scotia.

This service is intended to become an intermodal portal combining a number of transportation service providers. The information provided includes road conditions, hindrances resulting from road work, major incidents, weather warnings, ferry schedules, and waiting times at border crossings.

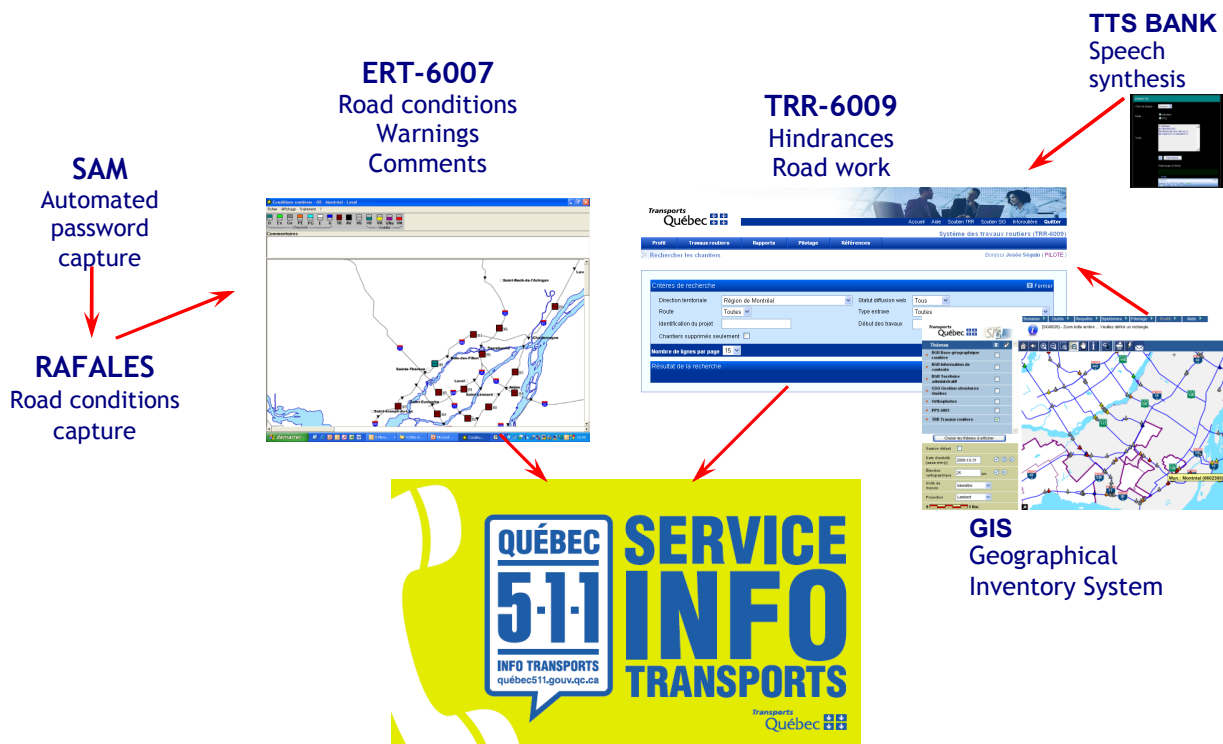


Figure 6 – Information systems comprising the Québec 511 service

The information concerning road conditions includes restrictions on heavy trucks and road closings. The MTQ makes this information available on a seasonal basis, and it is generally accessible between October 15 and April 15 of the following year.

Québec 511 provides information concerning traffic hindrances resulting from road work throughout the MTQ-administered network, as well as scheduled lane closings for all regions of Québec. This information is updated regularly as the work progresses.

Québec 511 quickly informs users of major events on its road network as they occur, such as a lengthy closing of a major artery or a natural disaster like a flood or blizzard. It also allows users to report an incident, to consult an agent in order to obtain information, and to file complaints.

Québec 511 also issues smog alerts pursuant to a memorandum of understanding among various departments and agencies respecting public health.

During its first season of operation (as of July 2009), Québec 511 handled 1,066,500 calls, which represents three times as many calls as during the previous season. There is no doubt that this increased utilization had a positive effect on the mobility and safety of road users. This transportation portal is expected to expand as future partnerships are established.

The setting up of these new computer applications, has improved the quality of information provided, in addition to making it more accessible to road users. The use of the Rafales application, among others, significantly reduces the time it takes to transmit information for dissemination. The efficiency of this application has enhanced the work of the Road Conditions Officers to such an extent that they currently manage the entire Québec network from only two Centres intégrés de gestion de circulation.

The Québec 511 portal is expected to expand as future partnerships are established. This product and service continues to evolve and adapts to expectations of its clients and to technological advances.

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