



MINISTÈRE DES TRANSPORTS



GUIDE TO SETTING UP AN AUTONOMOUS VEHICLE TESTING PROJECT IN QUÉBEC

February 2022

This publication was prepared by the Direction générale de la Sécurité et du Camionnage in cooperation with the Société d'assurance automobile du Québec and edited by the Direction générale des communications du ministère des Transports.

Cette publication est également disponible en français sous le titre Guide de démarrage d'un projet d'expérimentation de véhicules autonomes au Québec.

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ISBN 978-2-550-91313-9 (PDF)

(Original edition: ISBN 978-2-550-87266-5 [PDF])

Legal deposit – 2022

Bibliothèque et Archives nationales du Québec

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TABLE OF CONTENT

Content

1	INTRODUCTION	1
1.1	Terminology.....	1
1.2	Objective of this guide	2
1.3	Testing project and objectives	2
1.4	Scope	2
1.5	Legislative and regulatory compliance.....	3
1.6	Responsibility with respect to road safety.....	3
2	PREPARATION.....	4
2.1	Preparing for a test in Canada.....	4
2.2	Regulations in Québec	4
2.3	Stakeholders.....	5
2.4	Testing project application	5
2.5	Insurance.....	7
3	EXECUTION.....	8
3.1	Amendment of the Ministerial Order	8
3.2	Test period with no passenger.....	8
3.3	Follow up	9
3.4	Accountability	10
	APPENDIX 01 SAE J3016 LEVELS OF DRIVING AUTOMATION	11
	APPENDIX 02	12

1 INTRODUCTION

The government of Québec is committed to promoting innovation and economic development from a sustainable development perspective. By 2030, the goal is for Québec to be the North American leader in sustainable and integrated mobility.

Aware of the potential of autonomous vehicles (AVs), both in terms of road safety and sustainability mobility, the government Québec amended the Highway Safety Code (HSC) in April 2018 to regulate their introduction on the market.

The Minister of Transport can thus, by ministerial order, put in place pilot projects to test the operation of AVs on public roads and allow for these provisions to prevail over those of the HSC and the Automobile Insurance Act.

By proceeding with pilot projects, the Minister is assuring the flexibility necessary to establish rules specific to the types of vehicles that promoters wish to put into operation, while ensuring the safety of road users.

1.1 Terminology

Promotor: The trial organization, as defined by Transport Canada¹: a company or an organization seeking to trial an ADS [automated driving system] in Canada, including original manufacturers of automated vehicles, technology companies, academic or research institutions, and manufacturers of parts, systems, equipment or components for automated driving systems.

Testing project: A project submitted by a promoter and authorized by the Minister of Transport through a ministerial order, enabling the promoter to use an AV for experimental purposes.

Pilot project: A regulatory framework drafted in accordance with the second paragraph of section 633.1 of the HSC (chapter C-24.2) allowing the implementation of experimental AV projects.

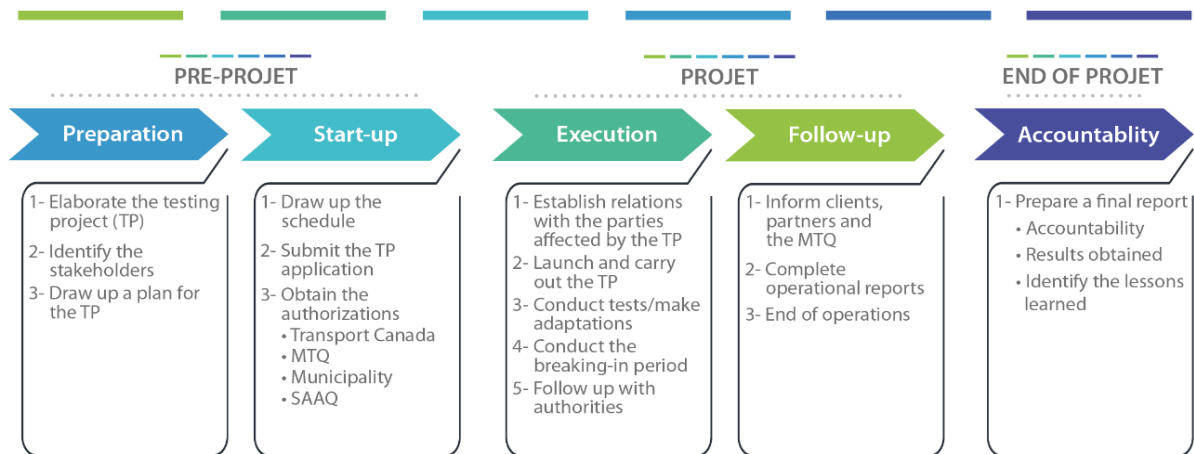
¹ Transport Canada, *Testing Highly Automated Vehicles in Canada: Guidelines for Trial Organizations*, June 2018.

1.2 Objective of this guide

This guide has been designed to provide promoters with general guidance for testing all types of AVs on public roads. Specifically, it establishes the Québec government’s minimal requirements for setting up pilot projects.

Promoters who wish to propose a testing project must follow the steps described in this guide.

The diagram below illustrates the approach recommended for these projects.



1.3 Testing project and objectives

Testing projects enable enterprises to demonstrate automated driving systems and further the development of these technologies. They also make it possible for public transportation organizations and municipalities to become familiar with the new technologies and thereby prepare themselves for their use on public roads.

In addition, these projects provide a means to collect information in order to evaluate the impact of AVs on road users and the road network. Ultimately, this information will enable legislation to be adapted to regulate the safe operation of AVs on public roads.

1.4 Scope

This guide applies to the testing of AVs on the following bases:

- The testing concerns level 3 AVs (except vehicles whose sale is allowed in Canada), and levels 4 and 5 AVs, as defined by the SAE International standard J3016 (see Appendix 1).

- The testing is to be conducted on public roads including roads managed or maintained by the ministère des Forêts, de la Faune et des Parcs and the ministère de l'Énergie et des Ressources naturelles, on private roads open to public traffic, on the property of shopping centers and on other areas where the public is allowed to drive.
- No application for testing or ministerial authorization is needed for testing conducted on other than public roads (e.g., private land or roads closed to public traffic, public road completely closed to road vehicles, private parking lot closed to the public, etc.).
- Please note that AVs must not be operated on the public roads of Québec other than as part of a pilot project approved by the Minister of Transport. However, this prohibition does not apply to AVs with automation level 3 or lower that are sold in Canada.

1.5 Legislative and regulatory compliance

For a testing project to take place on a public road, a ministerial order must be signed by the Minister of Transport. Promoters are responsible for carrying out their testing in compliance with the requirements set out in the Ministerial Order.

The Ministerial Order does not override all of Quebec's other laws and regulations. The promoter must comply with all applicable laws and regulations. A working committee (Committee) composed of road safety experts from the ministère des Transports du Québec (MTQ) and the Société de l'assurance automobile du Québec (SAAQ) will guide promoters in this regard.

1.6 Responsibility with respect to road safety

The promoter must ensure that the testing is carried out in complete safety for all users of the Québec road network, whether conducted on a predefined route or circulating freely. Promoters must therefore identify any potential risks to road safety and, in their application to run a testing project, propose mitigation measures taking into account the type of vehicle, the route and cohabitation with other road users.

While the vehicle is in operation, the driver must ensure a safe sharing of the road between the vehicle, the other users and the testing framework (route, how the vehicle is expected to behave, etc.).

The proposed mitigation measures will need to be supported by previous demonstrations or testing or by technical documents showing their effectiveness. Modifications to the testing project, as initially submitted, can also be used to mitigate one or more risks.

Regarding cybersecurity, the promoter is responsible for demonstrating the vehicle's security.

It is the Committee's responsibility to ensure, among other things, the safety of passengers and other road users, before approving proposed testing projects.

2 PREPARATION

The promoter needs to complete a number of steps before testing an AV on the road network.

The steps involved in submitting an AV testing project are outlined below.

2.1 Preparing for a test in Canada

To learn about the different roles and responsibilities of the federal, provincial, territorial and municipal governments in regard to facilitating testing in Canada, promoters are invited to consult the document [*Canada's Safety Framework for Automated and Connected Vehicles*](#), prepared by the Government of Canada in collaboration with the provinces and territories.

The document enables promoters to familiarize themselves with the requirements and necessary authorizations from Transport Canada, compliance with which is mandatory when carrying out their activities in Canada and planning to put a vehicle into operation in Québec.

The Safety Framework as well as related tools and resources can be found on Transport Canada's website at <http://www.canada.ca/automated-connected-vehicles>.

However, municipal, territorial and provincial administrations remain responsible for approving applications presented by promoters, based on their respective laws and regulations and by expanding, as they deem necessary, the minimal requirements dictated by Transport Canada.

2.2 Regulations in Québec

Section 492.8 of the HSC prohibits putting an autonomous vehicle into operation on public roads, except for autonomous vehicles that correspond to automation level 3 whose sale is permitted in Canada. However, section 633.1 allows the implementation of pilot projects authorized by the Minister of Transport via a ministerial order.

In February 2020, the government of Québec approved the Autonomous Bus and Minibus Pilot Project (Ministerial Order 2018-16), which regulates any project concerning this type of AV. This Ministerial Order includes a section that applies to all testing projects and a section outlining specific rules pertaining to each project, such as identifying the operator, the manufacturer, the vehicle model and where the project is to be carried out.

Where a promoter submits an application to test a type of AV that is neither an autonomous bus nor autonomous minibus, a new ministerial order, specific to the new type of AV, will need to be authorized by the Minister of Transport.

2.3 Stakeholders

Promoters will need to collect a significant amount of information and do the necessary conciliation-related work before launching their testing projects. This work must take into account all stakeholders involved in the testing in order to limit conflicts and includes informing enterprises, police forces, emergency services, the public and the other road users likely affected by the pilot project.

In addition, throughout the project, the promoter must regularly update the SAAQ and the MTQ so that they can follow the project's progress. At any time during the project, the promoter may be asked to provide information deemed necessary for the project to continue.

Road network manager

To carry out a testing project on a municipal road network, promoters must approach the municipality when preparing their project for permission to carry it out on its network. As the entity that manages the municipal road network, the municipality is a key partner in conducting the project.

For a project taking place on the MTQ-managed road network, promoters need to contact the *Direction territoriale* of the administrative region concerned when preparing their project, that is, before submitting their project for approval.

Promoters are responsible for obtaining, from the competent authorities having jurisdiction in the matter, the authorizations required before undertaking any changes to the road layout or infrastructure.

2.4 Testing project application

In the framework of a testing project, the primary objective of the Ministère and the SAAQ is to ensure that the vehicle and its use are safe for all users under all road conditions in which the testing is carried out.

To submit an application to test an AV, promoters are to transmit the following documents to vehiculesautonomes@transports.gouv.qc.ca:

- A testing project application specifying:
 - the testing project (e.g., summary description of the project, where passengers may be present and timetable)
 - the objectives
 - the makes and models of autonomous vehicles intended to be put into operation, their quantity and level of automation

- the area in which the testing project is to be implemented with a description of the route to be taken by the vehicle (e.g., speed limit, urban/rural area, road infrastructures, etc.)
 - the means taken to ensure compatibility of the testing with the road layout where the testing is to take place
 - the safety measures proposed in view of ensuring harmonious coexistence of the test vehicle with other vehicles and road users
 - the measures taken in view of ensuring compatibility between the vehicle's capacities, the environment and the urban setting in which the vehicle will be tested
 - the duration of the project
 - a list of business partners involved in the project
 - the technical and technological design specifications of the vehicle to be tested (operational design domain, ODD).
- A program to maintain the vehicle in good working order and that specifies maintenance standards as well as vehicle inspection frequency and procedures.
 - Any information needed to determine whether the vehicle is safe (e.g., description of previous testing).
 - In the case of an AV operator, written authorization from the manufacturer permitting the testing to be conducted by the operator.
 - Proof that the promoter owns the vehicle or that the promoter has an agreement with the vehicle owner to use the vehicle in the testing project (pre-condition for registering the vehicle).
 - The training given to the vehicle driver, including documents used for the training, and the other instructional tools.

The Committee examines each AV testing project application and will assess the feasibility of the proposal regarding risks to road safety.

As required, the Committee may request additional information to clarify or complete the analysis of the project application and may also, depending on the risks identified, propose modifications.

Note:

Other than the documents for the application listed above, promoters must be certain to have obtained all necessary authorizations and have satisfied any other requirements inherent to the project.

A complete list of the documents to provide and requirements to fulfill throughout the testing process can be found in Appendix 2. If a promoter intends to put an AV other than an autonomous bus or minibus into operation, the Committee may require additional documents or proof.

2.5 Insurance

As regards autonomous bus or minibus testing projects, section 87.1 of the Automobile Insurance Act provides that the minimum amount of liability insurance for property damage that must be held by the owner or operator of a heavy vehicle is \$1,000,000. Consequently, to register the vehicle, the owner must have proof of property damage liability insurance of at least this amount.

If a promoter intends to put an AV other than an autonomous bus or minibus into operation, the insurance conditions may vary, based on the Committee's analysis.

3 EXECUTION

When the promoter receives authorization to implement their testing project, has registered their vehicle and holds property damage insurance, their project may begin.

Note: The following section presents the steps required to put an autonomous bus or minibus into operation. If a promoter intends to put an AV other than an autonomous bus or minibus into operation, the Minister of Transport may impose additional conditions.

3.1 Amendment of the Ministerial Order

Once a given project has been analyzed and the requirements satisfied, the Minister may allow, by order, the testing project to get under way.

The duration of the current Ministerial Order, which regulates the testing of autonomous buses and minibuses, is valid for five years. Pilot projects thus end on September 1, 2023. However, a two-year extension is possible.

Once published in the Gazette officielle du Québec, an amendment to the Ministerial Order comes into force on the fifteenth day following its publication. This means that the vehicle in question cannot be put into operation on the road network until this date.

3.2 Test period with no passenger

The Minister may impose a test period during which no passengers may be transported. This period is to be used to validate that any risks related to the vehicle, to its cohabitation with other road users, to the route and to the integration of these three aspects, are well mitigated. To reiterate, other than the personnel involved in the project, no passengers are allowed during this test period.

The promoter must develop a test protocol outlining for the Committee how and when the tests will be conducted.

The Committee may also request that specific scenarios be carried out during the test period to clarify certain elements of risk associated with the testing project. The Committee will send the promoter a validation protocol (list of scenarios) so as to enable the latter to adequately prepare.

Though this test period is at the Minister's discretion, promoters are very much encouraged to plan for it in their project schedule.

Technical validation of the project

During the test period, Committee members will verify first-hand that the project is safe for all concerned. Promoters will be sent a checklist of aspects to be checked. Following this validation, corrective action may be required before passengers can use the service.

3.3 Follow up

An operations report is to be submitted to the Committee, at a frequency determined jointly by the promoter and the Committee. According to the nature of the project, this report could include the following information:

- the dates which the vehicle has been in operation
- the periods (start time and end time) of the vehicle being in operation for each date
- daily weather conditions
- the vehicle’s average speed, by day
- the number of times the emergency stop was used and the context in which it was used
- the number of kilometres travelled in “automated driving” mode and in “manual driving” mode
- the number of “automated driving” mode disengagements and the reasons for them
- a description of all mechanical or technological incidents
- the number of software updates
- any other element considered essential to the monitoring of the testing project.

Upon receipt of the report, the Committee will determine whether there is a need to return to make further field observations of the project.

Note that the promoter must inform the Minister of Transport and the SAAQ without delay, at urgence.vehiculesautonomes@transport.gouv.qc.ca, if any of the following events occurs during vehicle testing:

- an accident causing damage or injury,
- any event that may have threatened the safety of road users; or
- a problem detected that may pose a risk to the safety of road users.

Before putting the AV back into operation, the promoter must provide the Minister and the SAAQ with all information necessary to determine the root of the problem or event, as well as with the measures being taken by the promoter to ensure that the problem or event will not reoccur, and that the safety of road users will no longer be compromised.

3.4 Accountability

At the end of the testing project, the promoter must submit a project report outlining the successes realized, difficulties encountered, results obtained, and lessons learnt.

The report is to be submitted to the Committee after the end of each testing year or no later than 30 days after the testing has ended. As stipulated in section 25 of the Ministerial Order, some basic information, for the entire period, is to be provided in the report, in particular:

- the results obtained from the experimentation
- the duration of the testing for each route
- the total number of kilometres travelled per automated and manual driving mode
- the dates of onboard software updates and a summary of the attendant effects on the testing
- the total number of automated driving mode disengagements and the main reasons for them
- a summary of traffic accidents
- the number of mechanical or technological incidents with a description of each and the corrective action taken
- the number of times the emergency stop was applied
- the number of complaints received, the subject of the complaints and the measures taken to remedy the situation
- the changes and adaptations made
- the lessons learnt and overall follow-up
- any other element considered essential to evaluating the testing project.

APPENDIX 01 SAE J3016 LEVELS OF DRIVING AUTOMATION

Note: SAE International regularly updates its standard. We invite you to consult the documents available at www.sae.org

Level ²	Name	Narrative Definition	Dynamic Driving Task (DDT)		DDT fallback	Operational design domain (ODD)
			Sustained lateral and longitudinal vehicle motion control	Object and event detection and response (OEDR)		
Driver performs part or all of the DDT						
0	No driving automation	The performance by the driver of the entire DDT, even when enhanced by active safety systems.	Driver	Driver	Driver	n/a
1	Driver assistance	The sustained and ODD-specific execution by a driving automation system of either the lateral OR the longitudinal vehicle motion control subtask of the DDT (but not both simultaneously) with the expectation that the driver performs the remainder of the DDT.	Driver and system	Driver	Driver	Limited
2	Partial driving automation	The sustained and ODD-specific execution by a driving automation system of both the lateral AND longitudinal vehicle motion control subtasks of the DDT with the expectation that the driver completes the OEDR subtask and supervises the driving automation system.	System	Driver	Driver	Limited
The automated driving system (ADS, or "system") performs the entire DDT (while engaged)						
3	Conditional driving automation	The sustained and ODD-specific performance by an ADS of the entire DDT with the expectation that the DDT fallback-ready user is receptive to ADS-issued requests to intervene, as well as to DDT performance-relevant system failures in other vehicle systems, and will respond appropriately.	System	System	<i>Fallback-ready user (becomes the driver during fallback)</i>	Limited
4	High driving automation	The sustained and ODD-specific performance by an ADS of the entire DDT and DDT fallback without any expectation that a user will respond to a request to intervene.	System	System	System	Limited
5	Full driving automation	The sustained and unconditional (i.e., not ODD-specific) performance by an ADS of the entire DDT and DDT fallback without any expectation that a user will respond to a request to intervene.	System	System	System	Unlimited

<https://www.sae.org/search/?qt=J3016>

The table below is a summary of the various documents that the promoter must submit to the Committee:

Document	Step
Testing project application (see 2.4 a.)	Submission of the application
Vehicle maintenance and inspection program, including daily inspections conducted by the driver before boarding passengers	Submission of the application
Drivers' training manual	Submission of the application
Crisis management plan	Submission of the application
Operational design domain	Submission of the application
Proof of vehicle ownership	Registration
Test period protocol (see 3.2)	Prior to the field visit
Periodic report (see 3.3)	During the pilot project
Annual report (see 3.4)	At the end of the pilot project

In addition, the promoter is to ensure that the necessary authorizations have been obtained and that any other requirement inherent to the project has been met, as summarized in the table below:

Requirement	Resource in charge	Ministerial authorization
Permission to import a vehicle, where applicable	Transport Canada	Before
Registration in the Registre des entreprises du Québec	Registraire des entreprises du Québec	Before
Registration in the Registre des propriétaires et des exploitants de véhicules lourds, where applicable	Commission des transports du Québec	Before
Property damage insurance	Private insurer	Before
Registration of the vehicle	SAAQ	After
Driver training	Promoter	After

