

# Safe Testing of Automated Shuttles in Canada

Transport Canada Discussion Paper



Transport  
Canada

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# Purpose

- The purpose of this presentation is to provide an overview of Transport Canada's discussion paper: *Safe Testing of Automated Shuttles in Canada*.



# Background

- Automated shuttle trials and demonstrations are being conducted globally in various municipalities across Canada.
- Shuttles present unique safety considerations:
  - Vehicle design
  - Types of organizations conducting testing
  - Testing activities that include members of the public

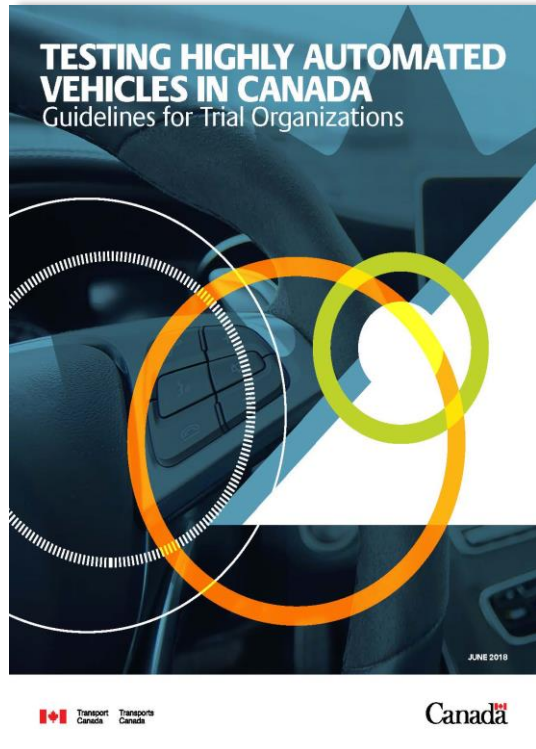


# Objectives of the Paper

- Elicit feedback on safety considerations and potential best practices
- Outline safety considerations specific to automated shuttle testing to complement existing guidance
- Provide stakeholders with an inventory of safety management strategies to consider when planning automated shuttle trials



# Existing Automated Vehicle Guidance



National Testing  
Guidelines  
June 2018



Jurisdictional Guidelines for  
Safe Testing and Deployment  
of Highly Automated Vehicles  
June 2018



Safety Assessment for  
Automated Driving Systems  
February 2019

# Outline of the Automated Shuttle Discussion Paper

## Vehicle and Operating Environment

- Pre-Trial Testing and Validation
- Understanding the Shuttle's ODD and OEDR
- Route Selection
- Roadside and Supporting Infrastructure
- Shuttle Maintenance, Charging and Storage
- Weather

## Supervision of Shuttle Operations

- Trials with an On-Board Safety Driver
- Safety Driver Training and Human-Machine Interface
- Considerations Prior to Removing Onboard Safety Drivers
- Trials with a Remote Supervisor

## Passenger Safety

- Passenger Displays and Controls
- User Protections
- Privacy and Occupant Monitoring
- Public Education and Awareness

## Engagement with Government Agencies and Law Enforcement

- Engagement with the Federal Government
- Engagement with Provincial/Territorial Governments
- Engagement with Municipal Governments
- Engagement with Law Enforcement and First Responders

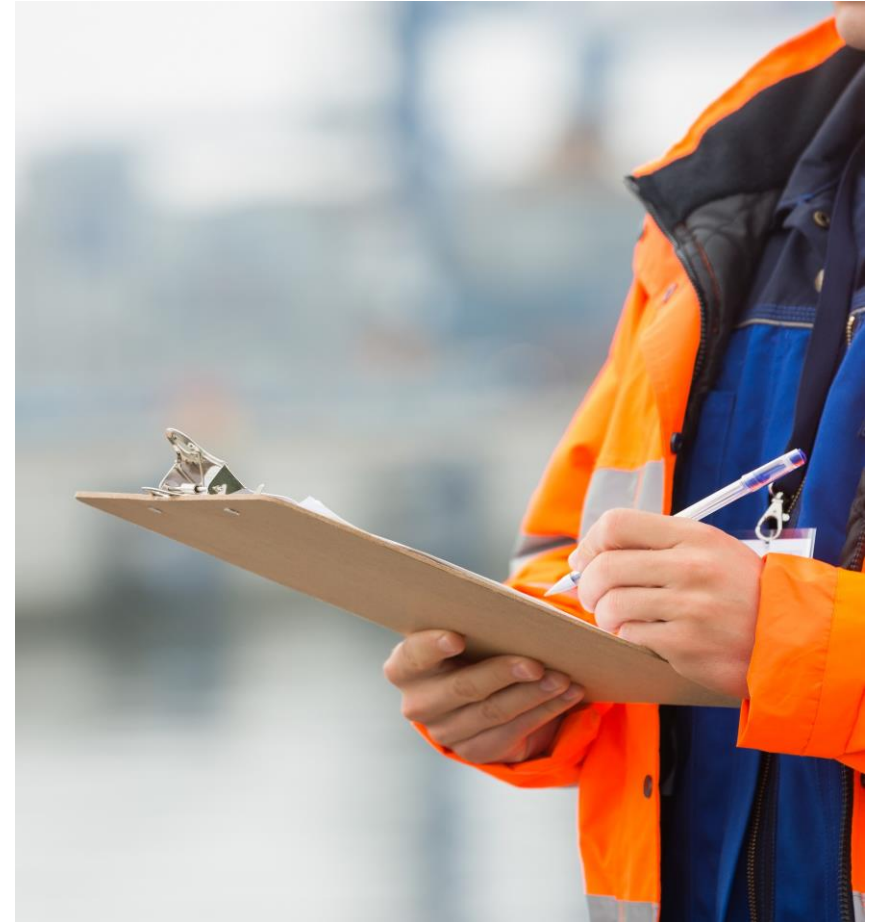
# Vehicle and Operating Environment

- Capabilities and Limitations of the shuttle:
  - Operational design domain (ODD)
  - Object event detection and response (OEDR) capabilities
- Pre-testing considerations
  - Infrastructure requirements
- Trial planning and route selection
  - Restricted access environments
  - Mixed traffic test routes



# Supervision of Shuttle Operations

- Safety drivers and on-board attendants.
  - Training requirements
- Minimizing safety driver distractions.
  - Automation bias and driver fatigue
- Interaction with the shuttle's controls by safety driver and passengers.
- Considerations for testing with safety driver in vehicles and remote drivers.



# Passenger Safety

- Safety considerations for trials involving members of the public and managing potential safety risks.
- Prototype vehicles tend to have limited ODDs.
- Passenger controls, human-machine interfaces, crashworthiness, occupant protections, public education and awareness and privacy are explored.



# Engagement with Government Agencies and Law Enforcement

- Responsibilities of different Canadian jurisdictions regarding oversight and approval of automated shuttle trials in Canada
- Discussion of considerations for engagement with law enforcement and first responders



# Thank you!

- We are accepting comments on the discussion paper until September 18, 2020
- Feedback and questions can be sent to:

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