Submitted by the expert from Japan

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Provisional agenda item 11

Japan's Policy for Automated Driving

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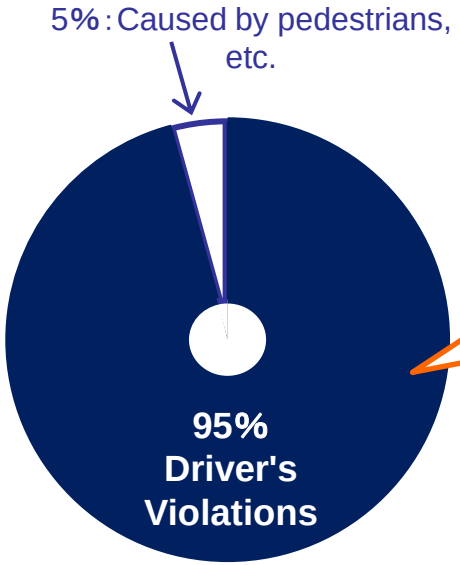
1.(1) Purpose of Promoting Automated Driving

Number of fatal accidents by violations of traffic rules (2021)



Number of traffic fatalities and injuries(2021)

Fatalities	2,636
Injuries	362,131

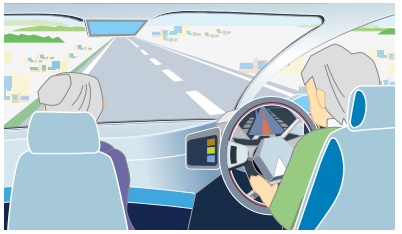
Expectations of AD (Example)

Reduce traffic accidents

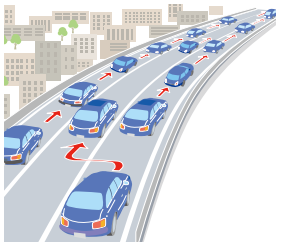
Maintain local public transportation

Improve productivity

Assistance for elderly



Reduce traffic congestion



1. (2) Current Status of Automated Driving

Mobility Service

Deployment of Level 4 Automated Mobility Services
Since May. 2023

Field Test
Various field test project is ongoing over the nation.

Level 4 automated driving has been possible since Apr. 2023 in Japan

Level 5
Full Driving Automation

"Driver Free"

Level 4
High Driving Automation

"Eyes Free"

Level 3
Conditional Driving Automation

Level 3 on Motorway
World's first type approval.

Honda Legend

"Hands Free"

Level 2
Partial Driving Automation

"Foot Free"

Level 1
Driver Assistance

Private Vehicle

1.(3) Challenges for Automated Driving

	Private Vehicle	Mobility Service	Logistics Service
		 	
Govt's., Goals	Realize level 4 AD on motorway (~2025FY)	Deploy automated mobility services **over 50 areas** (~2025FY)	Realize level 4 AD on motorway (2025FY~)
Achieve-ment	✓ Type approval for the vehicle equipped with Level 3 ADS dedicated to drive on congested motorway (Mar. 2021)	✓ Providing support to field test projects conducted by local governments. (2022FY~) ✓ Deployment of Level 4 Automated Mobility Services in Fukui pref. (May. 2023)	✓ Conduct field test of truck platooning technology. (Feb. 2021)
Current Efforts	Developing safety regulations for advanced automated driving functions.	Conducting a number of field tests in order to expand AD mobility services.	Developing level 4 automated driving truck technology.

1.(4) Major Examples of AD Mobility Services

Light-weight EV Bus

Public road field test of an automated driving system using a EV bus

Operator： Tier 4

Middle-weight Bus

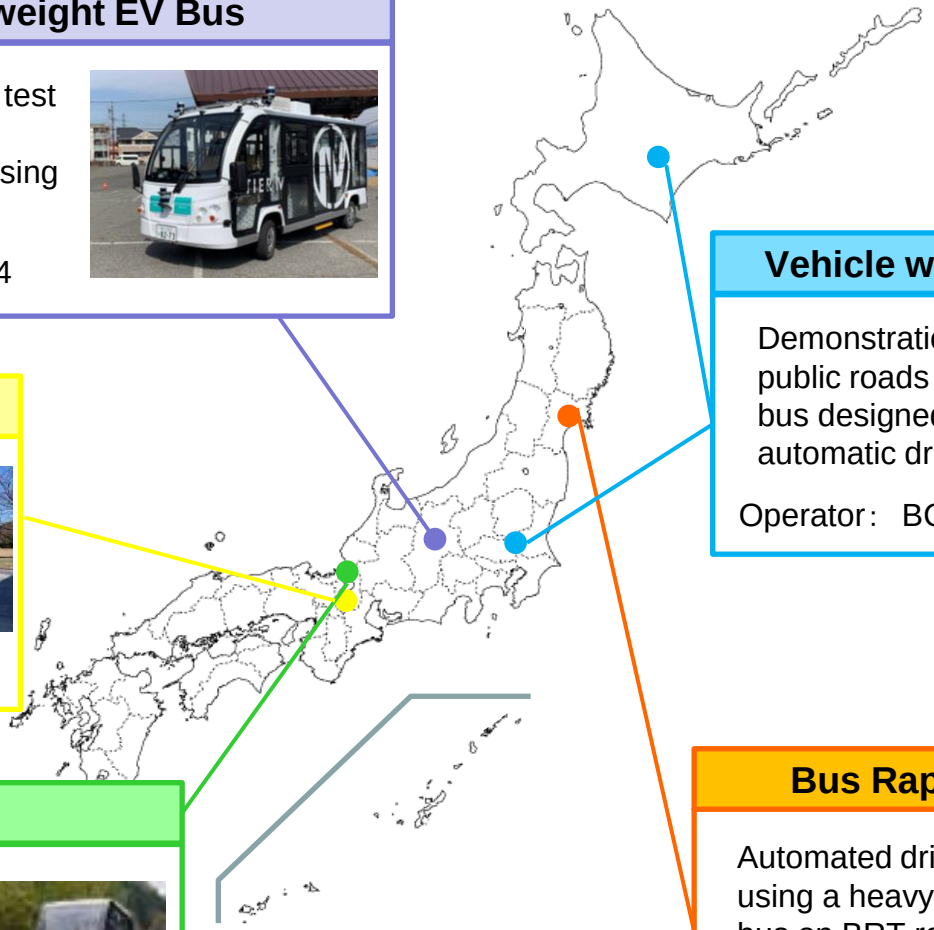
Public road field test of an automated driving system using a conventional bus

Operator： AS mobi

Small Cart

Public road field test of an automated driving system using a small cart.

Operator： AIST



Vehicle without Steering Wheel

Demonstration on public roads of a bus designed for automatic driving

Operator： BOLDLY

Bus Rapid Transit System

Automated driving using a heavy duty bus on BRT road.

Operator： JR East

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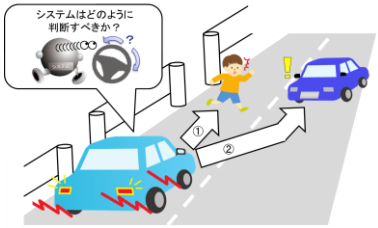
2.(1) Consideration about the Safety Level

Safety Level

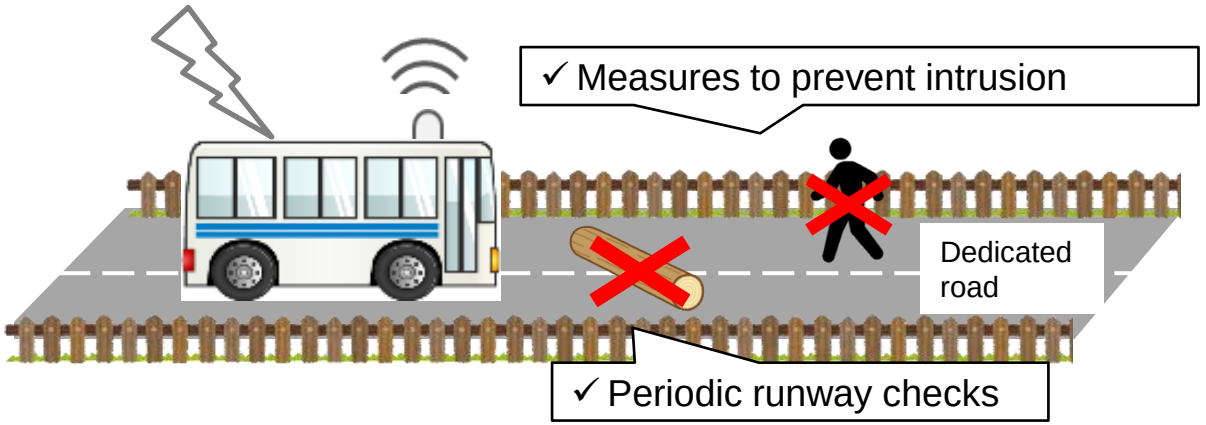
	Physically difficult to avoid	Either decision causes damage.
Events	 Sudden rush out	 Trolley Problem
	Physical limit: human being = system However, each “pros" and “cons" is different. Ex) Response speed Human being < System Perception Human being > System	Equally difficult for both human beings and systems. However, society's acceptance of each may differ. （If it were a person, it would be no problem. But what if it's a system?
Issues	Responsibility of System (To what extent should the system handle?)	Decision-making of System (How should the system determine?)

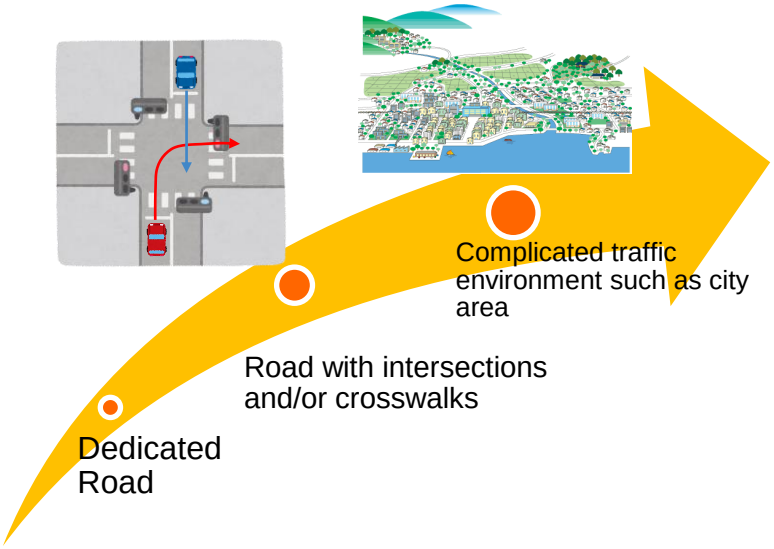
Safety levels acceptable to the society

(at least Careful and Competent (C&C) human driver’s level)

2.(2) Consideration about the Operating Environment

Operating Environment





Roles for securing environment

- Maintenance
- Security
- Operation

Sharing roles among relevant parties.

Build and maintain a safe operating environment

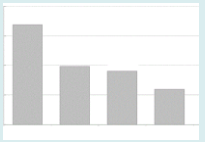
2.(3) Scenario Based Study

Safety Level

Traffic risk study

Human driver's behavior

Social acceptability survey



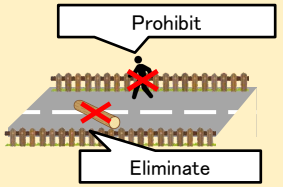
At least C&C driver's level

Safety Levels of ADV

Operating Environment

Performance of ADV

Driving Environment



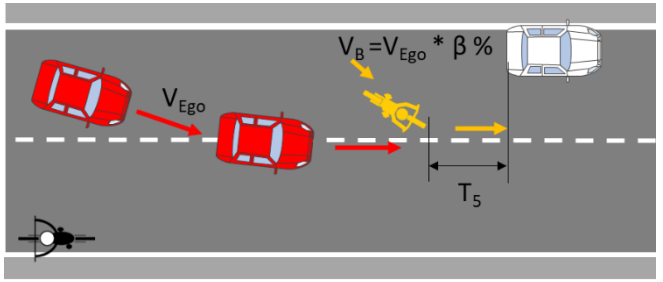
Role of each parties

Safety requirements of ADV and infrastructure

Scenario Example（Cut In - Bicycle）

Scenario Description

- A bicycle will change its course suddenly to pass a standstill vehicle parked on the street in front of the ego-vehicle.



Road Topology and road objects:

- Two-lane road, with a vehicle parked on the street.

Other actors' behavior:

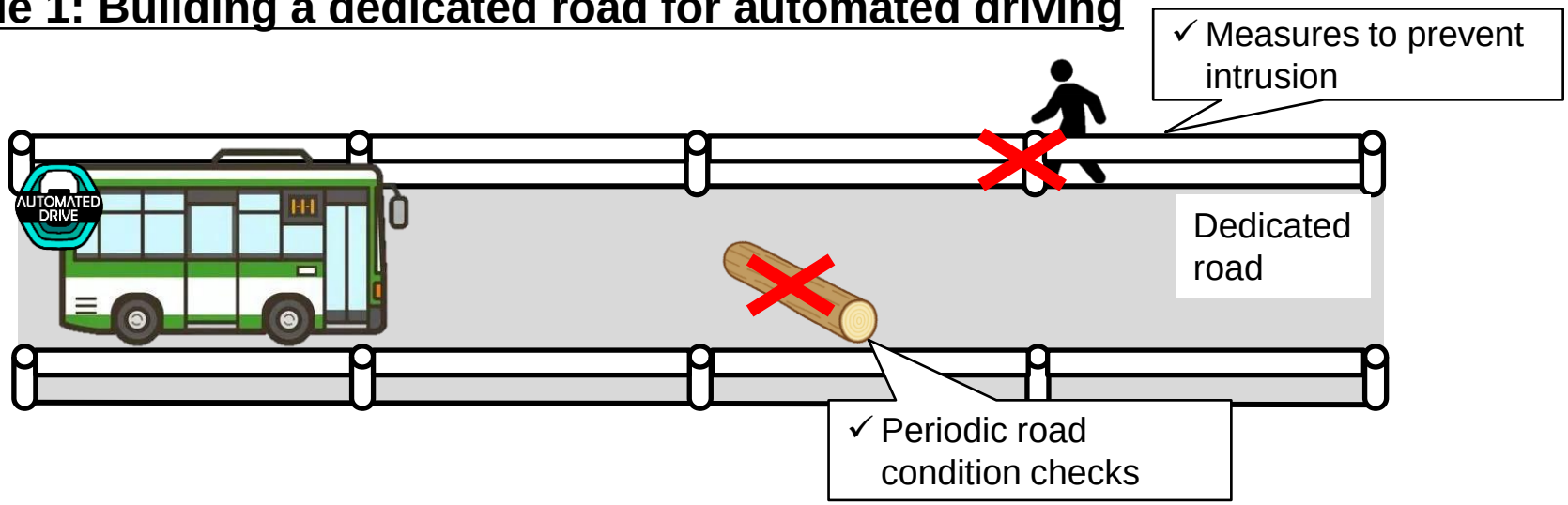
- At the beginning of the scenario, a bicycle is traveling in front of the ego-vehicle.
- When the bicycle approaches the parked vehicle, it starts to pass around the parked vehicle.

Result of study:

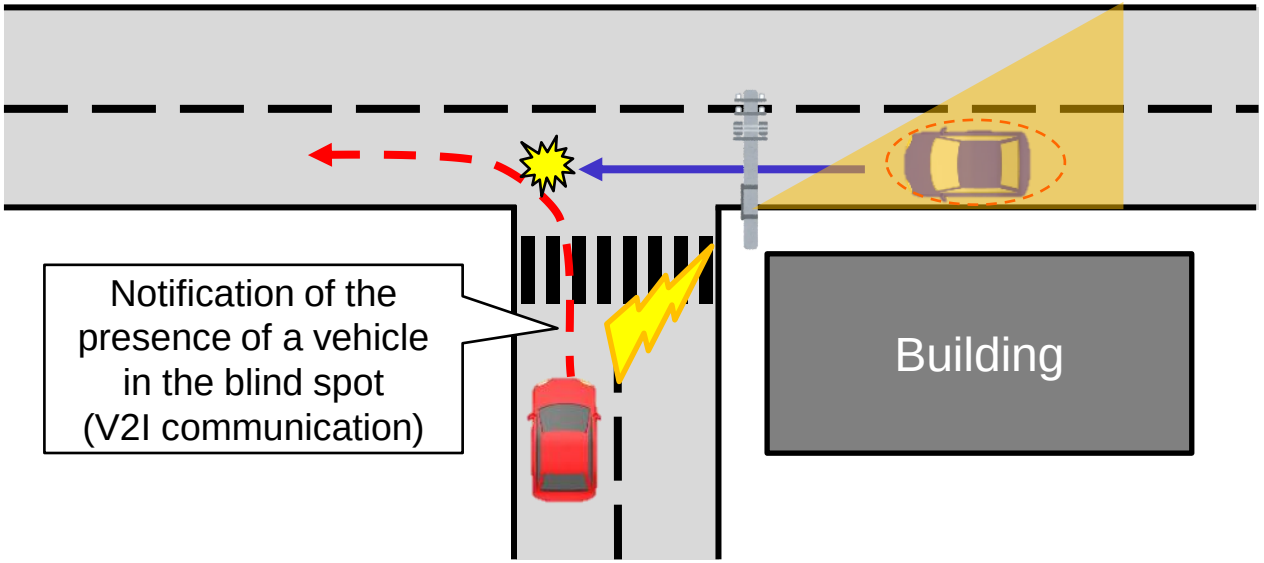
- Key 1 :
  C&C human drivers can avoid collision by decelerating after the bicycle started lateral movement
- Key 2 :
  C&C human drivers can anticipate bicycle's movement and decelerate in advance , and follows behind the bicycle.

2.(4) Securing Operating Environment

Example 1: Building a dedicated road for automated driving



Example 2: Installing an automated driving support system



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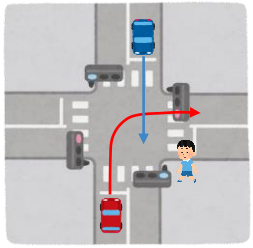
3. Future Perspective

Expand the ODD step by step toward complex traffic environments



Dedicated Road

Road with intersections and/or crosswalks

Complicated traffic environment such as city area

Conclusion

- In Japan, field tests on public roads are being conducted in various areas to launch automated vehicles as **mobility services in 50 areas and above by 2025FY**.
- MLIT is working to clarify **safety levels ,which are at least C&C human driver's level,** that respond to various risks in operations and develop a safe operating environment.
- Japan will continue to **contribute developing guidelines in WP.29 based on Japan's experience** to encourage the development and deployment of automated vehicles while ensuring safety.

Thank you for your attention.