

# **Current Trend and NPA Initiatives Regarding Automated Driving**

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# Outline

- 1. Traffic accidents in Japan**
- 2. Overview of AD and the government's Charter for improvement of legal system and environment for AD systems**
- 3. Activities of National Police Agency**

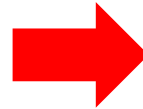
# Traffic accidents in Japan (1)

## Objectives Set for Road Traffic Safety

### <The Ninth Fundamental Traffic Safety Program>

By 2015

- Reduce the number of fatalities within 24 hours to **3,000 or fewer**

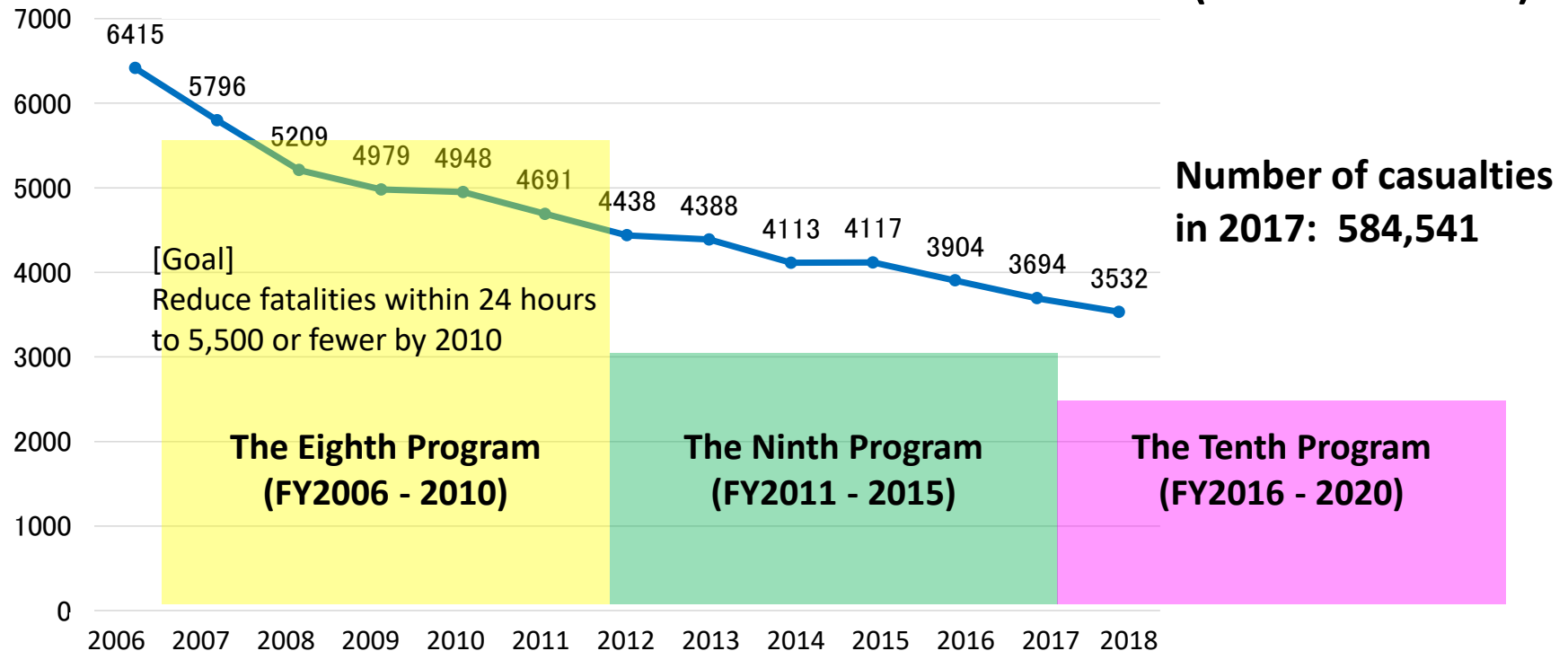


### <The Tenth Program>

By 2020

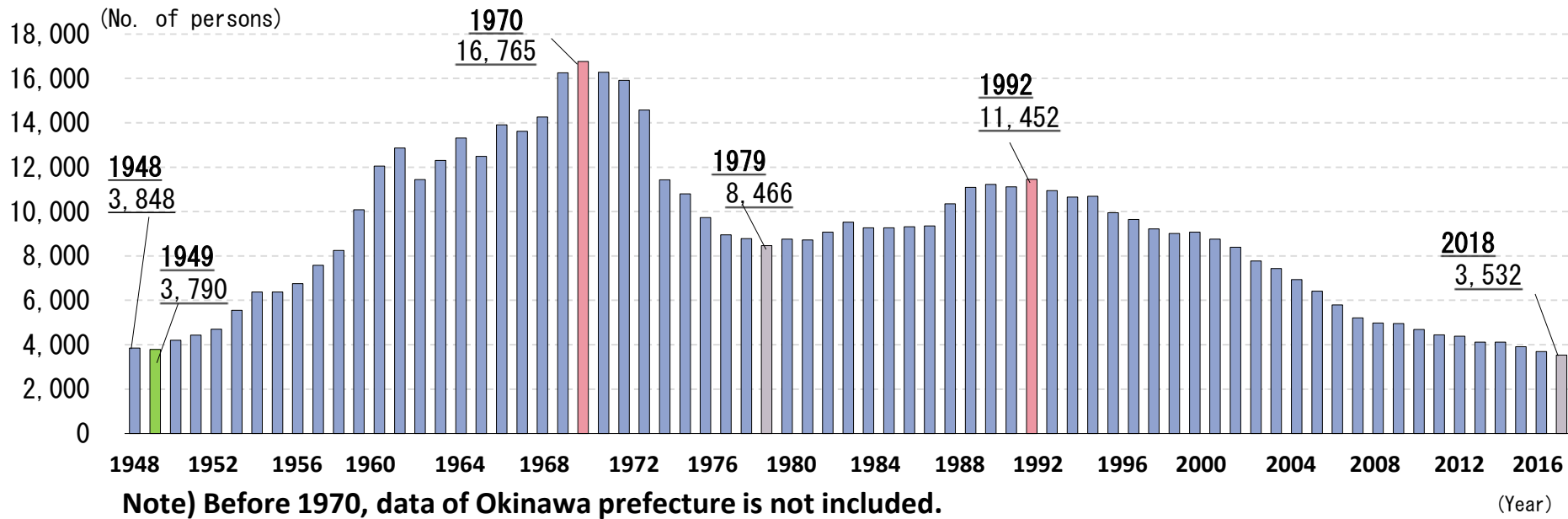
- Reduce the number of fatalities within 24 hours to **2,500 or fewer**

(No. of persons) **Transition of the number of traffic accident deaths (within 24 hours)**



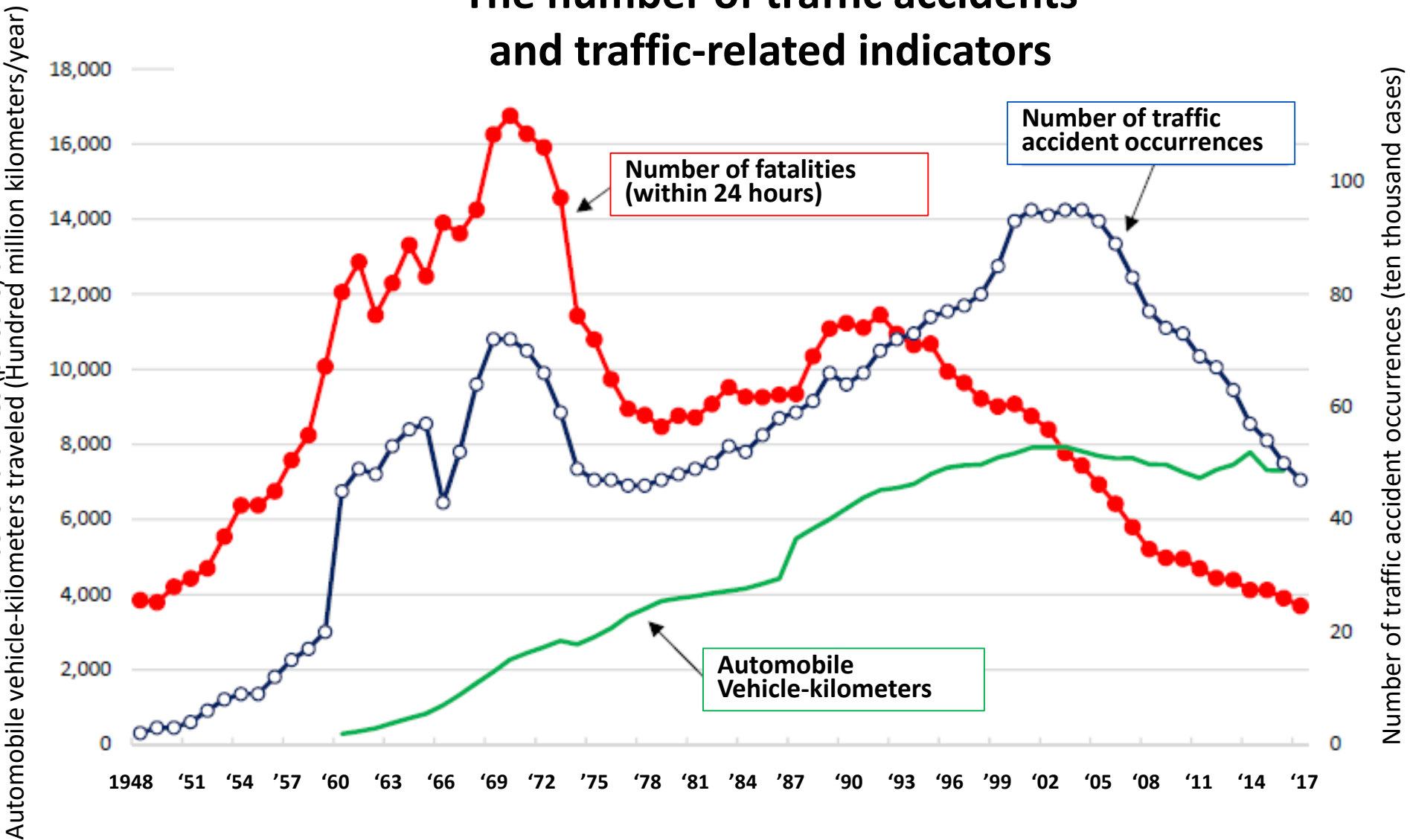
# Traffic accidents in Japan (2)

- The number of traffic fatalities in 2018 was the lowest since 1948.
- The number of fatalities on a population basis is declining in all age groups.



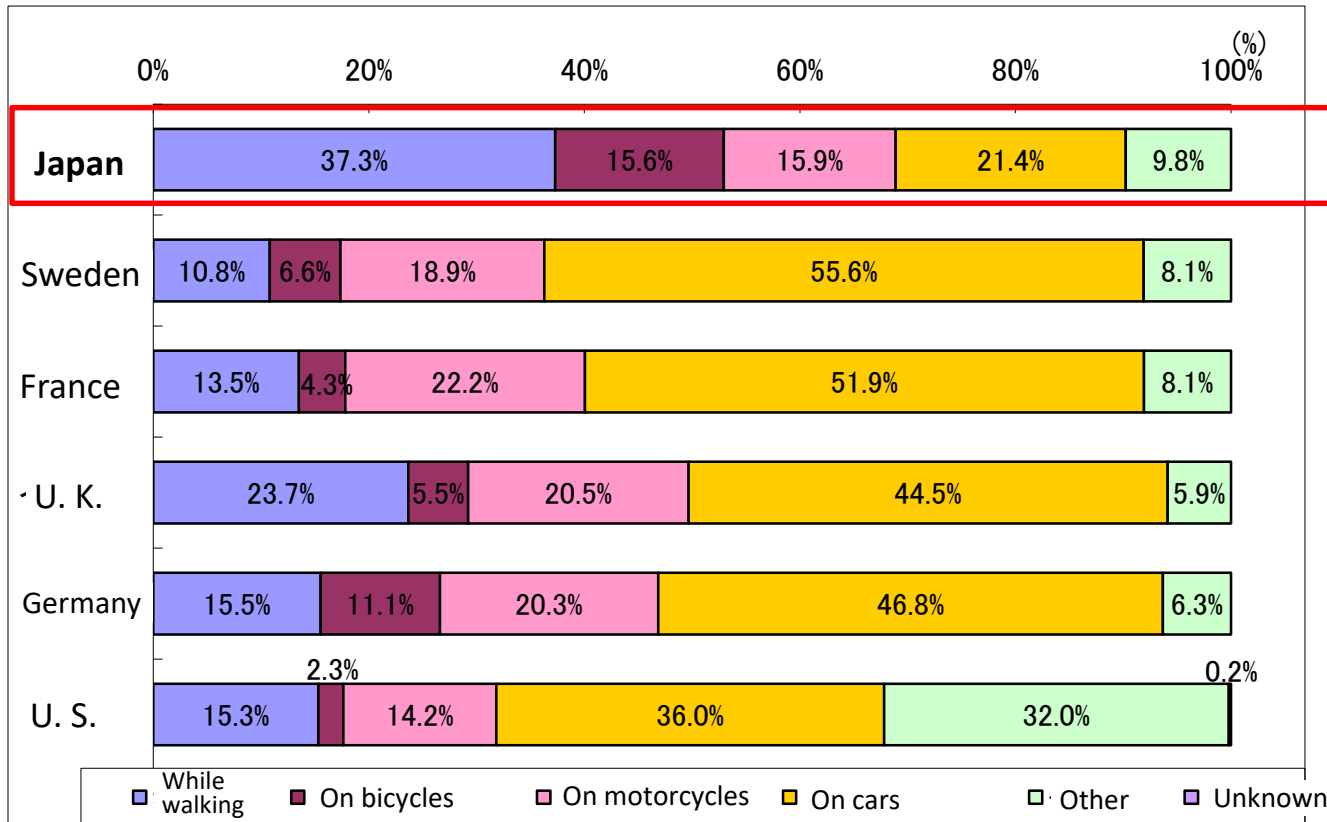
# Traffic accidents in Japan (3)

## The number of traffic accidents and traffic-related indicators



# Traffic accidents in Japan (4)

## Traffic fatality rates by situation (in 2015)



Number of fatal accidents	Number of fatalities	Proportion fatalities/100,000 people	Number of fatalities/100,000 people
536,899	4,859	0.9%	3.8
14,667	259	1.8%	2.7
56,603	3,461	6.1%	5.4
146,203	1,804	1.2%	2.8
305,659	3,459	1.1%	4.3
1,747,560	35,092	2.0%	10.92

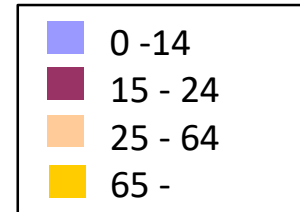
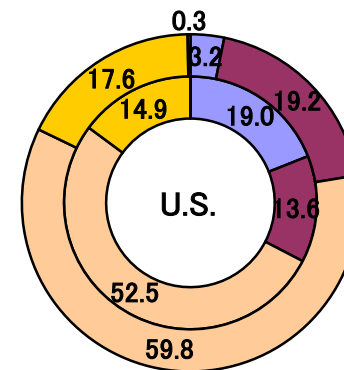
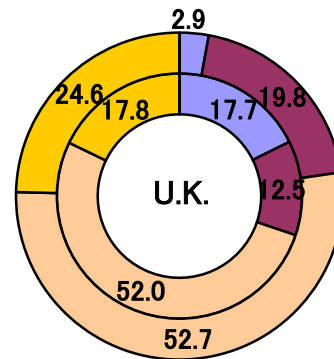
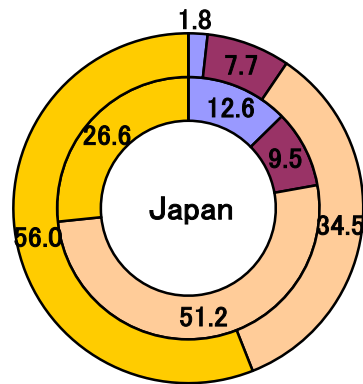
※ Fatalities are the number of deaths within 30 days of the accident

(Source: IRTAD data)

# Traffic accidents in Japan (5)

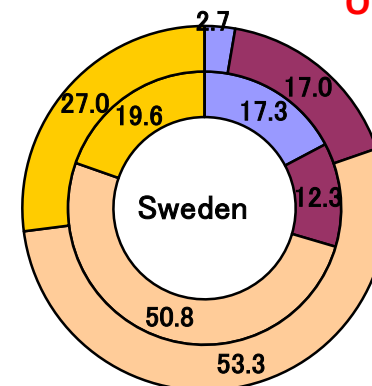
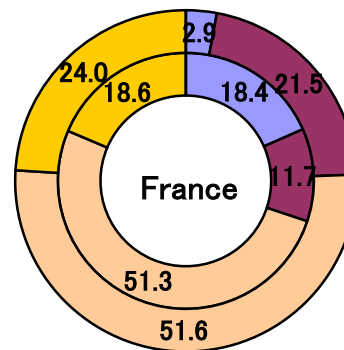
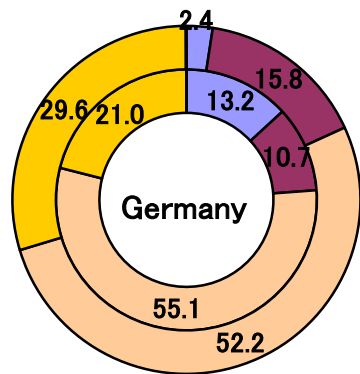
## Traffic fatality rates by age group and demographic composition (2015)

(Source: IRTAD data)



**Inner circle:** Demographic composition

**Outer circle:** Proportion of Traffic fatalities



⊗ Fatalities are the number of deaths within 30 days of the accident

# The government's Charter for Improvement of legal system and environment

Level 1

- LKAS, ACC, etc. have already been put to practical use.

Level 2

Level 3

- Realization of the level 3 automated driving on expressways by 2020
- Realization of unmanned automated-driving mobility services in selected areas by 2020

Level 4

- Realization of the Level 4 automated driving on expressways around 2025

Level 5

※SAE : Society of Automotive Engineers



# Activities of National Police Agency

## NPA Approach

AD technology is considered to become **essential in the future to reduce traffic accidents and to alleviate congestion**, and the police have been implementing various efforts **from the perspective of supporting the advancement of the technology while ensuring safety.**

## Specific efforts

- Review of road traffic rules
- Preparation of the environments for public road demonstration
- Participation in international discussion
- Promotion of R&D and building of infrastructure

# Review of road traffic rules

## In Japanese Government

**NPA** (National Police Agency)

**Road Traffic Act:**  
providing traffic regulations

**MLIT** (Ministry of Land, Infrastructure,  
Transport and Tourism)

**Road Transport Vehicle Act:**  
providing safety standards of vehicles

## NPA's Actions

- Legal obligations of drivers using Automated Driving Systems
- Preservation of data related to Automated Vehicles
- Relationship with other road users

# Preparation of the environment for public road demonstration (guidelines)

■ May 2016

“Guidelines for public road demonstration experiments of automated driving systems” were developed and published.

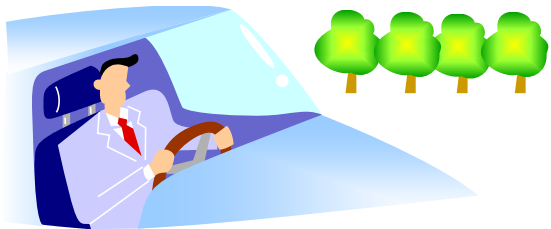
The guidelines clarified the details of the experiments that can be carried out without any special permission or reporting, including instructions stating that the driver operates the vehicle in the event of an emergency as necessary.



Public road demonstration experiments in various areas of the country

<Points to be noted>

- **The vehicle complies with the requirements of the Safety Regulations for Road Vehicles**
- **The driver is seated in the driver's seat, monitors the surrounding traffic at all times, and operates the vehicle in the event of an emergency in order to ensure safety.**



# Preparation of the environment for public road demonstration (Criteria for road testing of AD system with remote control technology)

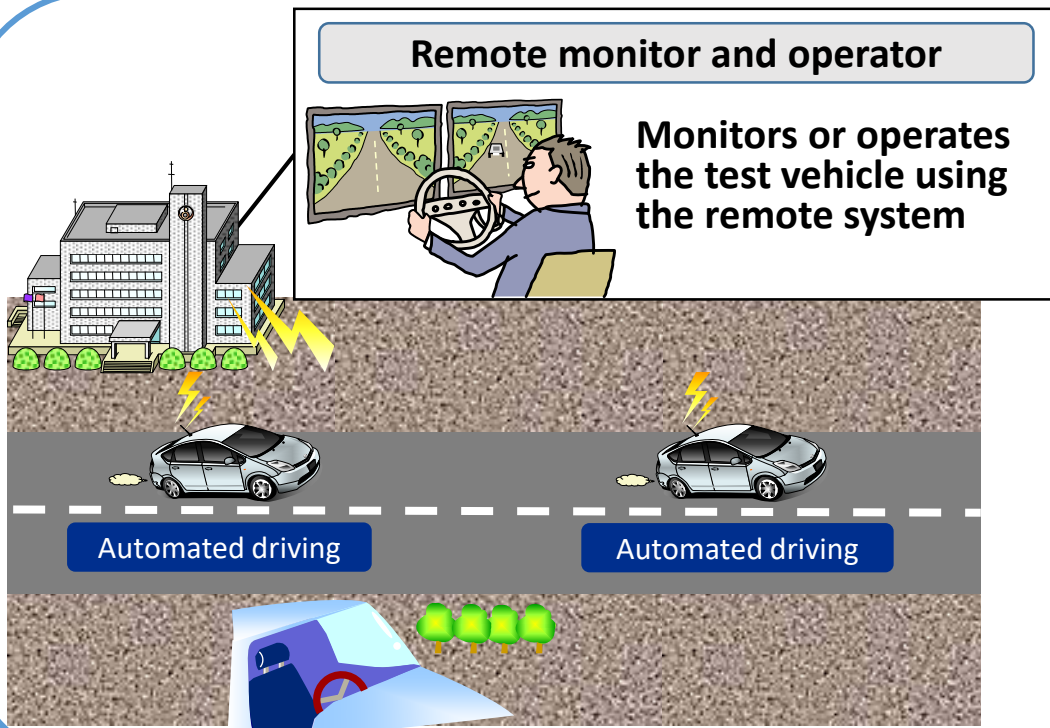
■ June 2017

“Criteria for the permission for use of roads for public road testing of the automated driving system with remote control technology” were published.

Changes were made to relevant rules so that the operation of AD system with remote control technology can be implemented with permission to use public roads under Article 77 of the Road Traffic Law.



Public road testing has been conducted in Tokyo and three prefectures.



< Points to be noted >

- **Compliance with the Safety Standards for Road Trucking Vehicles**
- **The remote monitor is able to monitor surrounding conditions and the inside of the vehicle.**
- Possession of a driver's license corresponding to the type of the test vehicle
- The 1-to-N type (where one remote monitor/operator drives multiple test vehicles) is not ruled out.

# Field Operational Test

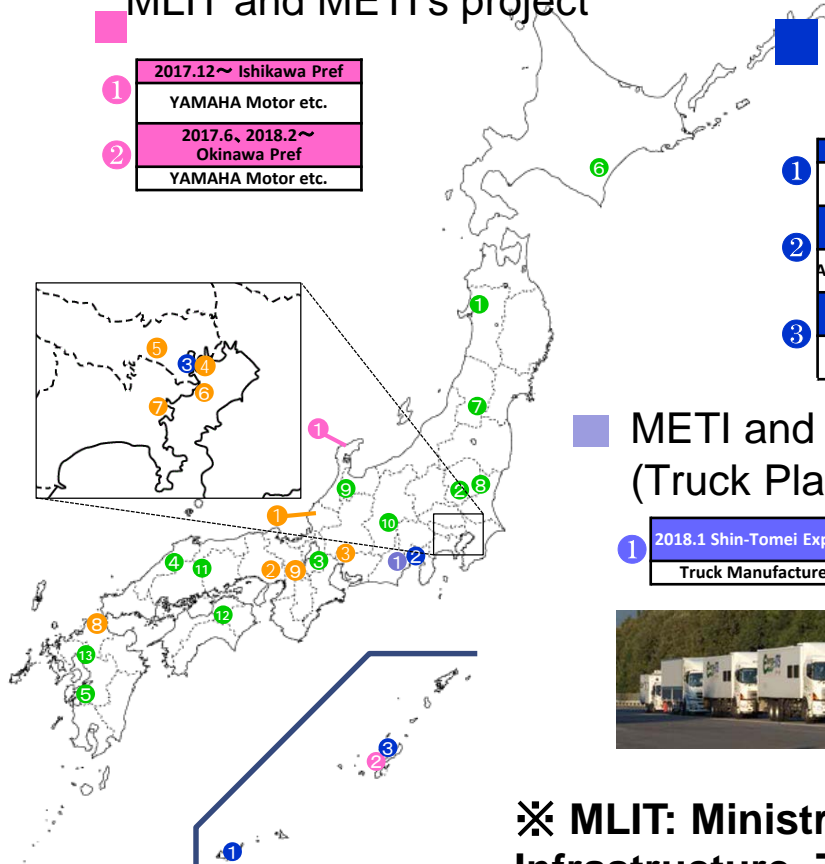
## Current AD Testing Locations

### MLIT's project

- 1 2017.12 Akita Pref  
YAMAHA Motor Co., Ltd. etc.
- 2 2017.9 Tochigi Pref  
DeNA Co., Ltd. etc.
- 3 2017.11 Shiga Pref  
Advanced Smart Mobility Co., Ltd. etc.
- 4 2017.11 Shimane Pref  
AISAN TECHNOLOGY Co., Ltd. etc.
- 5 2017.9~10 Kumamoto Pref  
YAMAHA Motor etc.
- 6 2017.12 Hokkaido Pref  
Advanced Smart Mobility etc.
- 7 2018.2~3 Yamagata Pref  
Yamaha Motor etc.
- 8 2017.11 Ibaraki Pref  
Yamaha Motor etc.
- 9 2017.11 Toyama Pref  
AISAN TECHNOLOGY etc.
- 10 2018.2 Nagano Pref  
Advanced Smart Mobility etc.
- 11 2018.3 Okayama Pref  
AISAN TECHNOLOGY etc.
- 12 2017.12 Tokushima Pref  
AISAN TECHNOLOGY etc.
- 13 2018.2 Fukuoka Pref  
YAMAHA Motor etc.

### MLIT and METI's project

- 1 2017.12~ Ishikawa Pref  
YAMAHA Motor etc.
- 2 2017.6, 2018.2~ Okinawa Pref  
YAMAHA Motor etc.



### Cabinet Office's project

- 1 2017.6~7 Okinawa Pref  
SB Drive Corp., Advanced Smart Mobility
- 2 2017.10~ Public Roads in Kanto Region  
Automobile Manufacturers etc.
- 3 2017.11~12 Okinawa Pref  
SB Drive, Advanced Smart Mobility

### Universities etc.

- 1 2017.10~2019.3 Fukui Pref  
Panasonic Corporation etc.
- 2 2017.11~12 Hyogo Pref  
Kobe Minato Kanko Bus Inc., Gunma Univ etc.
- 3 2017.12~2018.2 Aichi Pref  
AISAN TECHNOLOGY etc.
- 4 2017.12 Tokyo  
ZMP Inc. etc.
- 5 2018.1 Tokyo  
AISAN TECHNOLOGY, Univ of Tokyo etc.
- 6 2018.2 Around Haneda Airport  
ANA Holdings Inc., SB Drive
- 7 2018.3 Kanagawa Pref  
NISSAN Motor Co., Ltd. DeNA
- 8 2018.3 Fukuoka Pref  
Kyushu Institute of Technology etc.
- 9 2018.3 Kyoto pref, Osaka Pref, Nara Pref  
Public Foundation of Kansai Research Institute etc.

### METI and MLIT's project (Truck Platooning)

- 1 2018.1 Shin-Tomei Expressway  
Truck Manufactures etc.



※ MLIT: Ministry of Land, Infrastructure, Transport and Tourism  
METI: Ministry of Economy, Trade and Industry

# FOTs (Tokyo Waterfront City–Haneda Area)

FOTs will start in autumn 2019 in the Tokyo waterfront city area (general roads and Metropolitan Expressway in the Tokyo Waterfront City area/Haneda area) toward the **Olympic and Paralympic Games Tokyo 2020** (in cooperation with Japan Automobile Manufacturers Association).

**R&D in cooperative areas** will be promoted to achieve early implementation of automated driving (L2 to L4 on highways and general public roads). Efforts will also be made to increase social acceptance by involving local government, the general public, etc.

## Details of FOTs (draft)

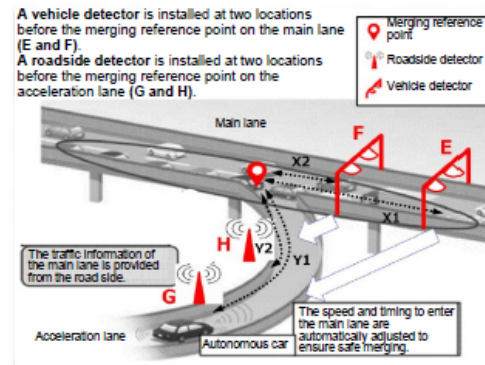
### Providing traffic signal information

Vehicles are allowed to pass through intersections safely and smoothly based on the **signal display and change timing information** even in environments where recognition is difficult using in-vehicle cameras.



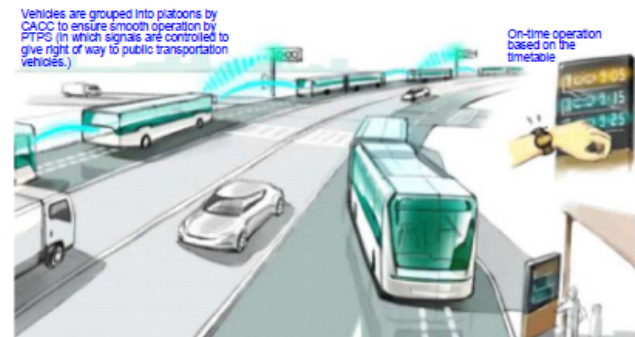
### Merging assistance on the main lane of highways

#### Providing vehicle information on the main lane



### Public transport system (self-driving buses)

FOTs for the next-generation ART will be implemented on public roads by using automated driving technology in **mixed traffic flow**.



# FOT vehicles

## ① Advanced Smart Mobility Co., Ltd.



Capacity: 20 passengers

Speed: 35 km/h

## ② YAMAHA Motor Co., Ltd.



Capacity: 4 ~ 6 passengers

Speed: 12 km/h (automated)  
20 km/h (manual)

## ③ AISAN TECHNOLOGY Co., Ltd.



Capacity: 4 passengers

Speed: 40 km/h



## Examples of driving support systems

- Adaptive Cruise Control (ACC)
- Lane Keeping Assist System (LKAS)
- Parking Assist System

※ In response to **the occurrence of traffic accidents caused by too much reliance on technologies**, the National Police Agency and the Ministry of Land, Infrastructure, Transport and Tourism issued **an alert** to automobile users and dealers.

Awareness was raised that the driving support systems currently in use assume that the driver is responsible for safe driving and are not AD systems in which the car autonomously performs safe driving operation on behalf of the driver.



# International discussion

- ❑ May, 2018 WP.1 Special Session
- ❑ Sep., 2018 WP.1 77th Session

Adopted “Global Forum for Road Traffic Safety resolution on the deployment of highly and fully automated vehicles in road traffic” (non-binding guidance)



## Resolution (Excerpt)

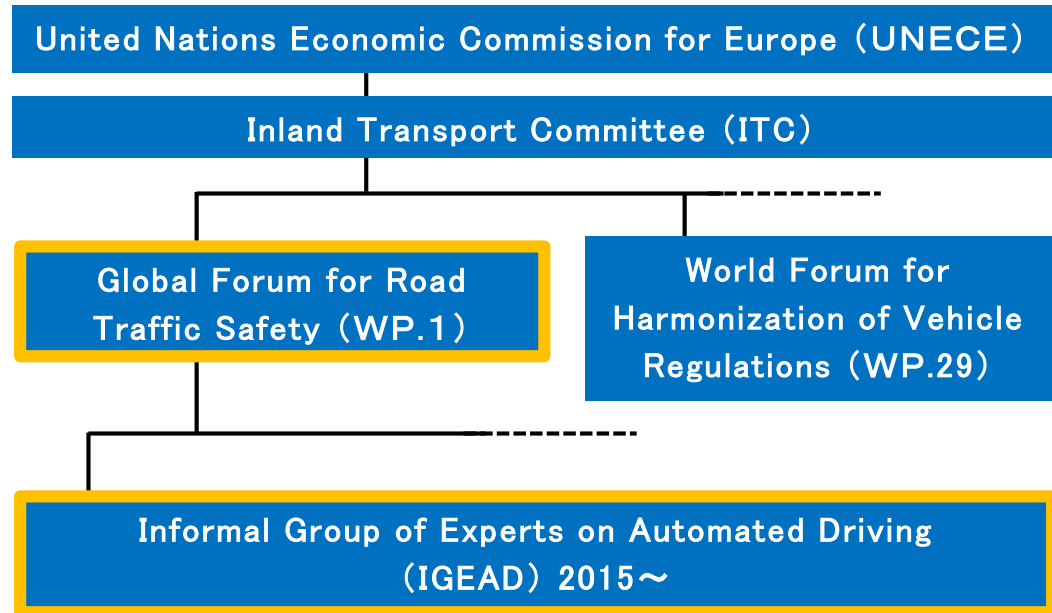
### II . Scope

This Resolution:

- (a) Is intended to guide Contracting Parties to the Convention on Road Traffic done at Geneva on 19 September 1949, and the Convention on Road Traffic done at Vienna on 8 November 1968, with respect to the safe deployment of highly and fully automated vehicles in road traffic, in order to support the enhancement of road traffic safety, mobility and socio-economic progress,
- (b) Provides complementary recommendations supporting the road safety principles of the 1949 Convention on Road Traffic, and the 1968 Convention on Road Traffic, to facilitate the safe, global deployment of highly and fully automated vehicles in road traffic, (The rest omitted.)

### ❑ Schedule for Next Sessions

- Feb., 2019 WP.1 Special Session (WP.1 /WP.29 Joint Session)
- Mar., 2019 WP.1 78th Session



## SIP (Strategic Innovation Promotion Program)

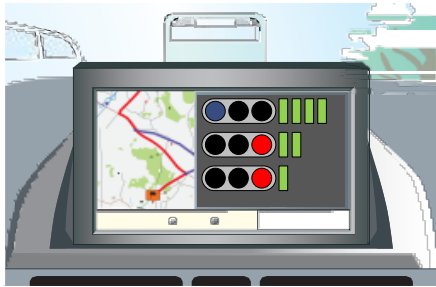
- SIP was established in May 2014 as a program beyond the framework of government ministries to promote the development of technologies that serve as a key to the solution of social issues.
- “AD system” is one of the selected issues to be addressed by SIP R&D projects.



**Since FY 2016, the National Police Agency has been promoting R&D for AD based on SIP.**

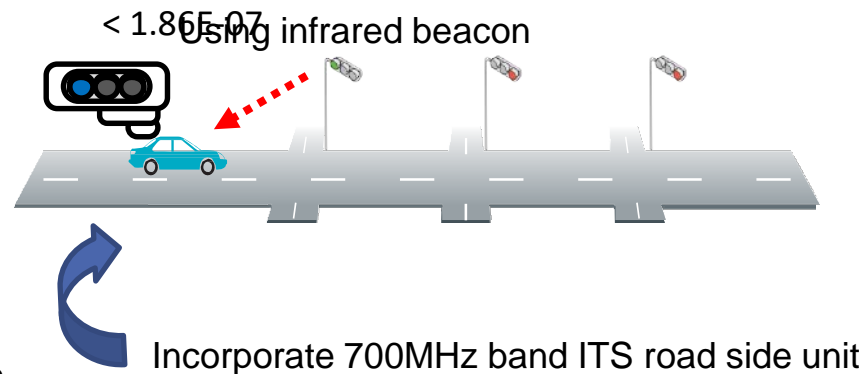
## ■ TSPS (Traffic Signal Prediction Systems)

TSPS encourage safe and eco-friendly driving by providing drivers with driving support information (ex. The color of traffic signals)



### Information

- The place of crossroads
- The maximum speed regulation
- The color of traffic signals
- Signal time span etc.



# Draft Amendment to the Road Traffic Act (Excerption regarding automated driving)

Establishment of regulations to realize practical use of automated driving technologies of motor vehicles

(1) Establishment of regulations concerning definition of Automated Driving Apparatus (hereinafter referred to as ADA) (provisional name)

The act will newly define an automated driving system which substitutes for a driver all the capability of recognition, prediction, judgement, and operation as ADA. Also, the act will provide that to use a motor vehicle, employing ADA, is included in "driving" defined in the act.

(2) Establishment of regulations concerning driver responsibilities when driving a motor vehicle employing ADA

(a) If a certain condition of ADA (\*) is not satisfied, the driver of the motor vehicle equipped with the apparatus will be prohibited from driving the vehicle employing the apparatus.

(\*) The condition on which ADA substitute for a driver all the capability of recognition, prediction, judgement, and operation.

(b) Article 71, paragraph (5), item (v) (\*) will not apply to a person who drives a motor vehicle employing ADA when they are ready to takeover driving operation immediately and appropriately in the event that the apparatus no longer meets the certain condition or other cases.

(\*) Prohibition against holding and using a wireless telephone such as a cellular telephone and focusing attention on the screen of a device

(3) Establishment of regulations concerning recording by an Operation Status Recording Device (provisional name)

(a) The user and other related bodies of motor vehicles equipped with ADA will be prohibited from driving or having the drivers drive the vehicles if they are not equipped with a device for recording data necessary to check the operation status of the apparatus (referred to in item (b) as an "Operation Status Recording Device") and will be obliged to preserve the recorded data.

(b) When a motor vehicle is being driven that could be found to constitute an improperly maintained vehicle, a police officer will be enabled to request the driver to disclose the recorded data by the Operation Status Recording Device and ask the manufacturer of the motor vehicle to take necessary measures to read the recorded data.

# Driver responsibilities when driving a motor vehicle employing automated driving systems

## 【Prerequisites for Automated Driving Systems】 \* Necessary to be legally ensured

- (1) Within ODD (Operational Design Domain), the system operates complying with traffic rules.
- (2) The system warns the driver to takeover driving operation in a way that he/she certainly recognize when it judges the continuation of automated driving as impossible due to trouble with the motor vehicle or exiting from ODD.

## 【Driver Responsibilities on the Road Traffic Act (In force)】 【 Driver responsibilities when employing automated driving system】

### A Responsibilities connected to driving operation

- Safe Driving Obligation
- Obligation to
  - obey traffic lights and other signals
  - obey the speed limit
  - maintain distance between vehicles etc.

### B Responsibilities not connected to driving operation

#### B-1) Responsibilities to ensure stable implementation of A

- Prohibition against holding and using a wireless telephone such as a cellular telephone
- Prohibition against focusing attention on the screen of an image display device such as a car navigation system

Prohibition against drunk driving etc.

#### B-2) Other responsibilities

- Obligation to
  - aid injured persons in case of a traffic accident
  - carry and present a driver's license etc.

The system which satisfies prerequisite (1) automatically implements Responsibilities A within ODD.

The driver can implement Responsibilities A by employing the system appropriately. (The driver remains under Responsibilities A.)

Withdrawal of both of the prohibition becomes possible because the driver no longer needs to pay attention constantly and to drive manually when employing the system appropriately.

The prohibition must remain because the driver can always be required to drive manually.

The responsibilities must remain because the system cannot implement them.

- ※ It is necessary to limit the use of the system within ODD.
- ※ Driver employing the system within ODD must at least pay attention enough to recognize “warning” and remain sufficiently alert to stop using the system and takeover driving operation.

**Thank you**