



November 15, 2016

Cabinet Office

Director General for Science, Technology and Innovation

Implementation of the Large-Scale Field Operational Test for Automated Driving Systems

Research and development and other efforts have been conducted under the Cross-Ministerial Strategic Innovation Promotion Program (SIP). Various technological challenges should be addressed through collaboration among the relevant parties under the framework of Innovation of Automated Driving System through industry-academia-government cooperation. Now, we hereby announce that in order to accelerate the practical use of the system, it has been decided to implement a large-scale field operational test on public roads such as expressways and general roads, etc. beginning in the fall of 2017.

The implementation of this operational test will be announced at the third SIP-adus Workshop 2016 to be held in Tokyo today.

1. Efforts to Date

Since FY 2014, we have conducted research and development on the common challenges that require a joint industry-academia-government undertaking (cooperative area) under the SIP Automated Driving System with the aim of reducing traffic accidents and traffic congestion, realizing the next-generation urban transport system, and so on through the early rollout and widespread adoption of an automated driving system.

Beginning this fiscal year, we have been deliberating and conducting development with a focus on five particularly important technological fields (dynamic map, Human Machine Interface (HMI), information security, pedestrian accidents reduction, and next-generation urban transportation) that have been identified.

2. Outline of the Large-Scale Field Operational Test

It is important to accelerate the practical use of an automated driving system with a view to the 2020 Tokyo Olympic and Paralympic Games so that we will be able to show the world an innovation that embodies the superb, cutting-edge technology, etc. that Japan has to offer. It is from this perspective that the large-scale operational test will be conducted to verify the technology, mainly in the abovementioned five technological fields, under actual traffic conditions on public roads with the participation of auto manufacturers, etc.

Furthermore, in addition to identifying specific technological, operational,

institutional, and other issues in light of practical use in the future, we will also strive to promote international collaboration, cooperation, etc. by calling on manufacturers, etc. overseas to participate as well. We will also be considering holding events and the like aimed at promoting the accurate understanding of automated driving systems by the general public and building social acceptance, etc.

The outline of the operational test (as planned) is as follows.

1) Implementation period: September 2017-March 2019

2) Test locations (planned)

- Expressways (approximately 300 km including the Metropolitan, Tomei, and Shin-Tomei Expressways)
- General roads (in the Tokyo waterfront area)
- Test course (the simulated urban test course at the Japan Automobile Research Institute (JARI), etc.)

3) Participants

Both domestic and international automotive manufacturers, suppliers, universities and research institutions.

4) Main activities to be conducted*

- Actual road test using prototype data from high-precision 3D map (dynamic map)
- Collection of data on state of the driver during long-distance driving (HMI)
- Confirmation of defense function against cyberattacks from outside the vehicle (information security)
- Validation of effectiveness of pedestrian-to-car communication (wireless communication between the automobile and the terminal device of the pedestrian) (pedestrian accident reduction)
- Validation concerning the utilization of automated driving and other technologies in public buses (next-generation urban transportation)

*To be conducted at appropriate time during the project period.

5) Future plans

- The implementation of this field operational test will be announced at the third SIP-adus Workshop 2016 to be held in Tokyo today.
- The details of the technical specifications for this field operational test and the application requirement for participation (terms and conditions for participation and procedures, etc.) will be announced around June next year. In implementing the test, we will proceed in coordination with the relevant parties regarding the specific terms and conditions of the test, safety management, and so on.

3. Others

In order to promote responses to issues regarding road traffic in local cities, the Cabinet Office is considering operational testing on the utilization of automated driving outside of the Kanto area in addition to today's announcement.

This undertaking will be implemented in collaboration with efforts taken by the relevant ministries and agencies regarding the development and demonstration of applied technology to be used in automated driving system.

[Attachment] Outline of the large-scale field operational test under the Cross-Ministerial Strategic Innovation Promotion Program (SIP)

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The Council for Science, Technology and Innovation (CSTI) website is here.

<http://www8.cao.go.jp/cstp/english/index.html>

Cross-Ministerial Strategic Innovation Promotion Program

Automated Driving System

Outline of Field Operational Test



Outline of Field Operational Test

1. Organizer

Automated Driving System of SIP-Promoting Committee

2. Objects and Purposes

- Revitalize the study / technology development towards accelerating deployment of automated driving systems by offering test sites and essential infrastructures for the experiments
- Conduct functional validation of technological results in cooperative areas, such as the dynamic map, with the participation of each manufacturer
- Evaluate automated driving systems openly from various perspectives and give feedback for further R&D
- Promote international corporation and further government-industry-academia collaboration by encouraging the participation of both domestic and international parties such as overseas manufacturers. Contribute to the promotion of social acceptance.

3. Schedule

15, November 2016 (Today) Publication of FOT Outline

(The end of November 2016 – May 2017
Plan of experiment detail (technical specification), preparation for the recruitment of participants, negotiations with stakeholders)

Jun. 2017 Announcement of FOT detail
 Public offering / Site preparation

Sep. 2017–Mar. 2019 Start of SIP-adus FOT

(March 2018 Interim Report. / March 2019 Final Report.)

4. Test site

- Expressways (some areas of Metropolitan, TOMEI, SHIN-TOMEI and JOBAN expressways)
- Arterial roads (Tokyo waterfront city area)
- Test facility (JARI* test course : New test facility for ADS evaluation)

*JARI : Japan Automotive Research Institute

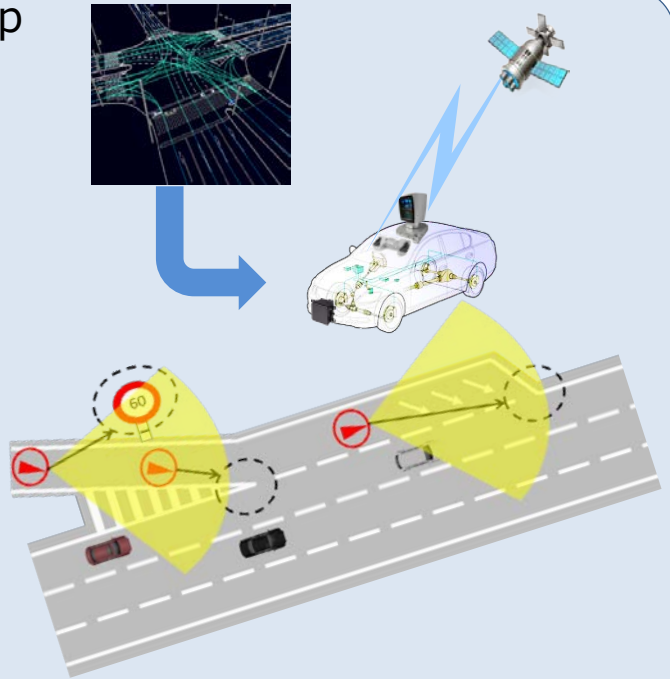
5. Expected Participants

Automotive Manufacturers / Suppliers / Universities / Research institutes and others.

6. Main contents in 5 development areas (1 of 2)

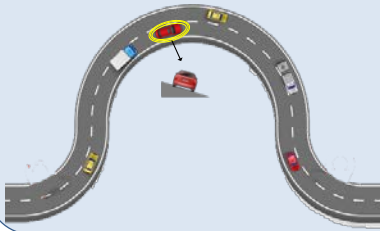
1. Dynamic Map※¹

- 3D high-resolution digital map data validation such as road geometry, environment and structures.
- Validation of semi-dynamic information such as traffic congestion and construction information.
- Validation of collecting, generating, and distributing dynamic map information.



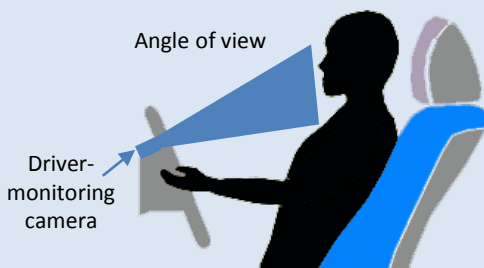
etc.

※¹ Highly precise 3D digital map with time-varying such as information on traffic jams and road building, information that changes with time (dynamically) including traffic regulations in the road map data.



2. H M I ※²

- Measurement of a driver's condition and driving under real-world driving conditions and continuous driving for a long time.
- Data collection and analysis of driver's condition.
- Study and validation of decision index of driver's condition. etc.



Driver's condition transition image when driving for a long time

※² Interface technologies to perform the transition between the driver and the system safely and smoothly. (Human Machine Interface)

Monitoring driver's condition

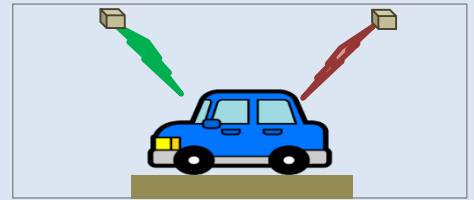
6. Main contents in 5 development areas (2 of 2)

3. Information security

- Evaluation experiment of simulated cyber attack from outside the vehicle with test equipment, in a radio wave darkroom, under real-world driving conditions

(using an existing test course and test bed)

- Validation of defense functions for automated driving vehicles, and others.

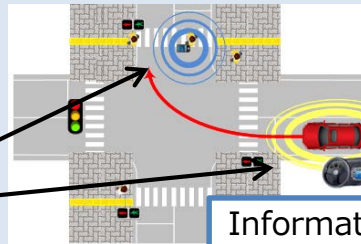


The inspection of the vehicle system by the simulated cyber attack at the test facilities.

4. Pedestrian accident reduction

- Validation of a pedestrian mobile terminal (smartphone) which mounts V2P communication technologies and a high-precision position measuring system for the prevention of cognitive mistakes which make up the majority of pedestrian fatalities
- Validation of safety effect of reminder system function for both pedestrians and drivers

Vehicle-to-pedestrian communication through smartphone

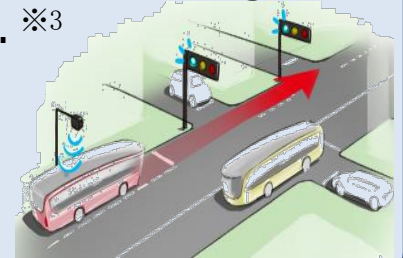


Reminder system for a person who has a pedestrian mobile terminal

Information provision for a driver at an intersection with low visibility

5. Next generation urban transfer

- Validation of service level improvement (passenger comfort and reliability) for public transportation utilizing Advanced Rapid Transit (ART) technologies. ※3
- Validation of usability and efficiency of attribute-based travel support which gives the most suitable route information for the user via smartphone, and others.



※5 A technology related to the "next-generation urban transport system" which applies Automated Driving Systems technologies to public buses.

(Note) Test methods may be changed.

(reference) Scheduled area map

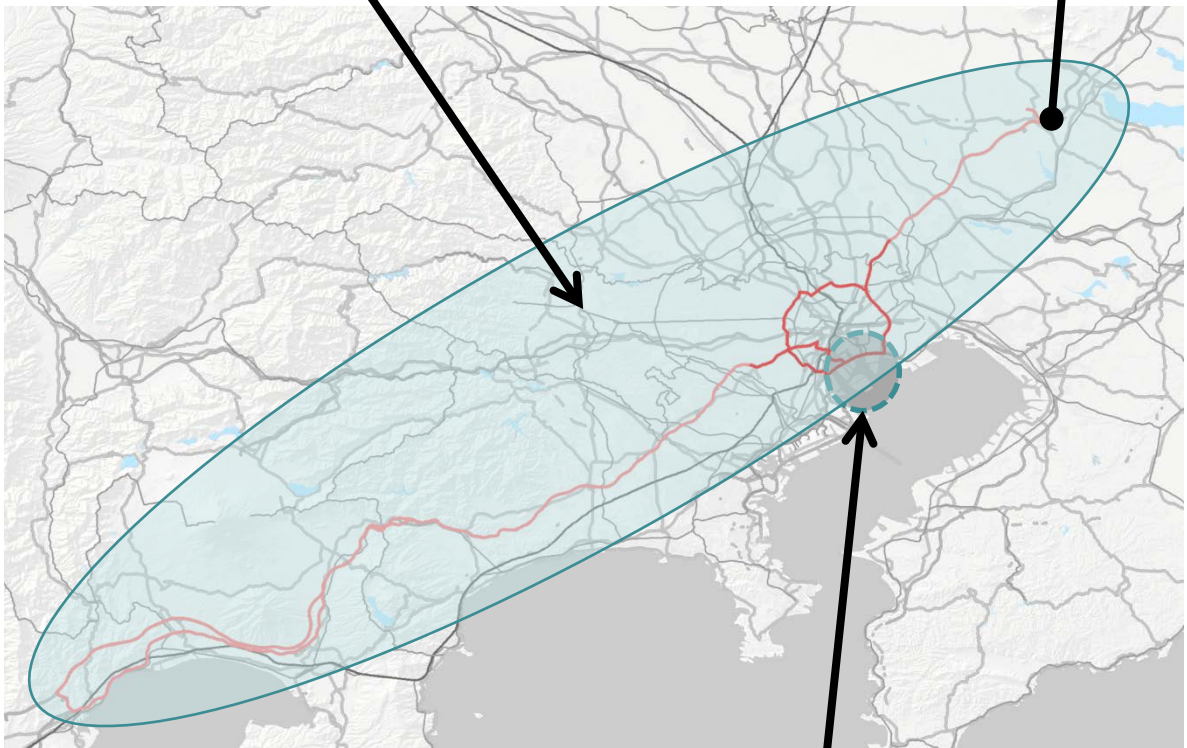
Expressway

Utilizing parts of the following expressway.

- = JOBAN expressway =
- = Metropolitan expressway =
- = TOMEI expressway =
- = SHIN-TOMEI expressway =
- Total: approx. 300km

Test facility

JARI* Test course



Arterial roads

Tokyo waterfront city area

(*JARI : Japan Automotive Research Institute)
(*Test area may be changed.)

[Ref. 1] SIP-adus

<Organization>

Council for Science, Technology and Innovation (CSTI)

Governing Board

Establish structure below for each theme

Program Director (PD)

Assigned for each policy issue under the Cabinet Office

Promoting Committee

PD (Chair)

Related ministries, management agencies, experts from academia and public sector

Relevant ministries and management corporations and other researchers

SIP-adus

Cross-Ministerial

Strategic Innovation Promotion Program
Innovation of Automated Driving
for Universal Services

Budget for SIP-adus

Fiscal 2014: approx. ¥2.53billion

Fiscal 2015: approx. ¥2.35billion

Fiscal 2016: approx. ¥2.71billion

Led by the PD, and cooperatively promoted by relevant ministries / agencies

(National Police Agency/ Ministry of Internal Affairs and Communications /Ministry of Economy, Trade and Industry /Ministry of Land, Infrastructure, Transport and Tourism)

Organization Structure

SIP-adus

Promoting Committee

Chair: PD Kuzumaki (Toyota)

Members: ITS related ministries, agencies, automakers, experienced academics, automotive organizations.

System Implementation WG

[1] Development and verification of automated driving system

[2] Enhance technologies for reducing traffic fatalities and congestion

Map Structuring TF

Research and development of HD-map and dynamic information

International Cooperation WG

[3] International coordination

Next Generation Urban Transport WG

[4] Deployment of next-generation urban transport

*Also acts as the CSTI Implementation Council WG4 for the Task Force concerning Initiatives in Science, Technology and Innovation aimed at the 2020 Tokyo Olympic and Paralympic Games

FOT Planning TF

Planning large-scale field operational test

[Ref. 2] Recent actions

- Last autumn, major car manufacturers announced a plan for real-world development of automated driving.

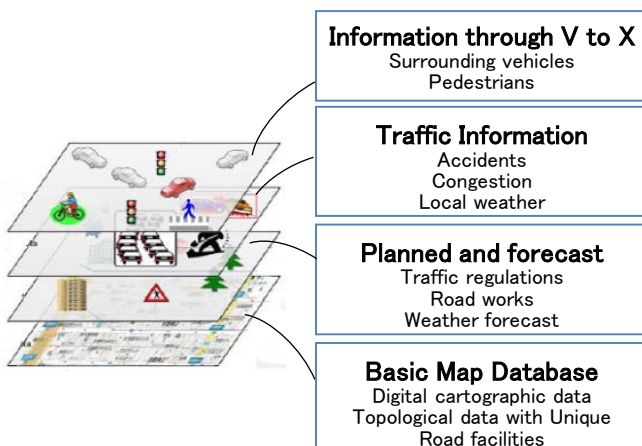
TOYOTA, HONDA: Launching the automated driving system under real-world conditions on expressways by 2020.

NISSAN: Planning the introduction of the automated driving technology on expressways by 2018, and arterial roads, including intersections, by 2020.

- SIP-adus aims to establish the technology that is required for ADS for regular people with a high reliability or superior user interface, and promote relevant research and development.
- So far, in four technological development areas, dynamic map (high-resolution map), HMI, security, and pedestrian accident reduction technology, basic system design, system development, and system verification have been carried out.
- Since the dynamic map will be put to practical use in 2018 by various manufacturers, SIP-adus promotes international collaboration to propose international standards of map data format by utilizing the output of research and development.
- To accelerate integration and realization of research and development and identify concrete issues concerning regulatory and legal aspects for the realization of automated driving system as well as to foster social acceptance, SIP-adus will commence large-scale field operational tests from next September.

~Main technical problem~ (example)

Studying and developing the technical specification of the dynamic map.



Dynamic map

Structure of digital map layered by time frame

- Data format, development of accuracy management system
- Position cross-reference system, use case definition
- Data trial manufacture, prototype development, and others

(FY2015, FY2016)

Based on the results of research and development of the dynamic map, SIP will make a proposal to the technical committee of the International Organization of Standardization (ISO)