

Overview of Field Operational Tests (FOTs) in the Tokyo Waterfront Area

in the Second phase of the Cross-Ministerial Strategic
Innovation Promotion Program - Automated Driving for
Universal Services (SIP-adus)

1. Organizer

Steering Committee, Cross-Ministerial Strategic Innovation Promotion Program – Automated Driving for Universal Services (SIP-adus)

2. Objective and outline of the FOTs

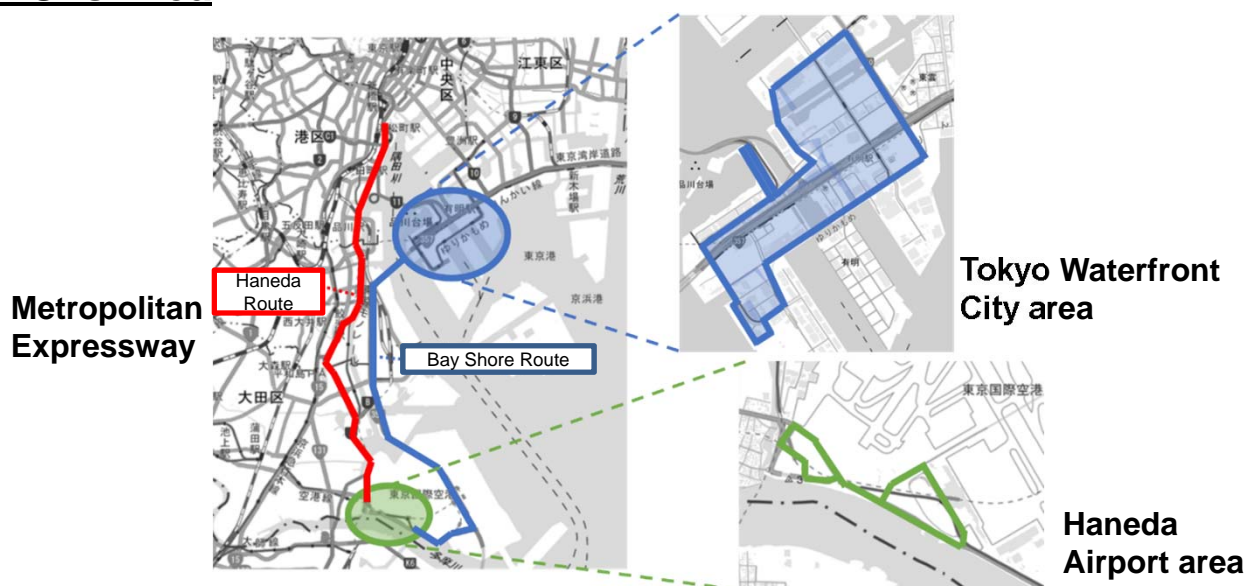
- Verification of automated driving technologies in cooperative areas that utilize dynamic traffic environmental data provided by advanced traffic infrastructure, such as traffic signal data on general roads, merging assistance information on expressways.
- Promotion of research and technology development in Japan by providing Field Operational Tests (FOTs) site and necessary equipment for FOTs that utilize traffic infrastructure data, and by establishing opportunities to collect and analyze experimental data in collaboration with industry, academia and government.
- Open evaluation with participants from Japan and other countries to promote international cooperation and standardization.
- Contribution to fostering public acceptance by assessing the impact on traffic flow in the environment where both automated driving vehicles and ordinary vehicles coexist and providing test ride opportunities to general public.

3. Schedule

October 15, 2019(*) to March 31, 2021

*: FOTs will be started sequentially according to the schedule of developing traffic infrastructure and preparation of participating institutions.

4. FOTs Area



Map source: Geospatial Information Authority of Japan (GSI)

5. FOT Participants

28 participants from automobile manufactures, suppliers, universities, etc. from Japan and other countries.





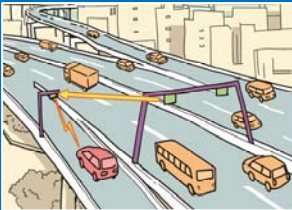
Alphabetical order
A total of 28 institutions

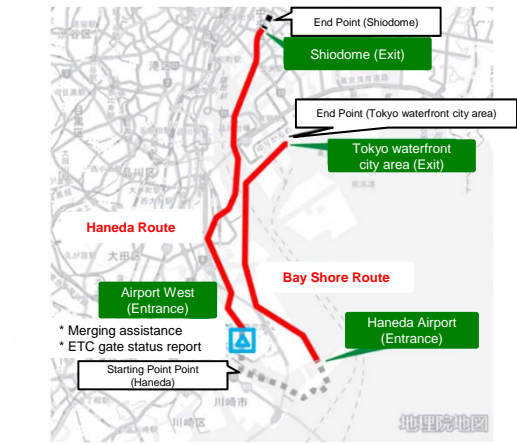
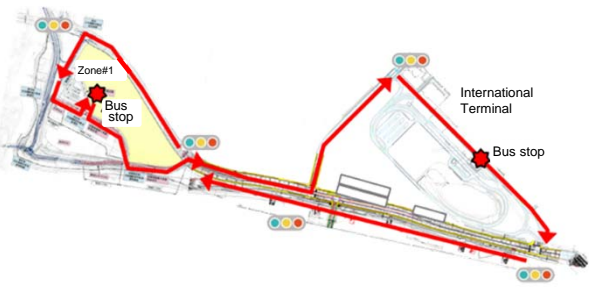
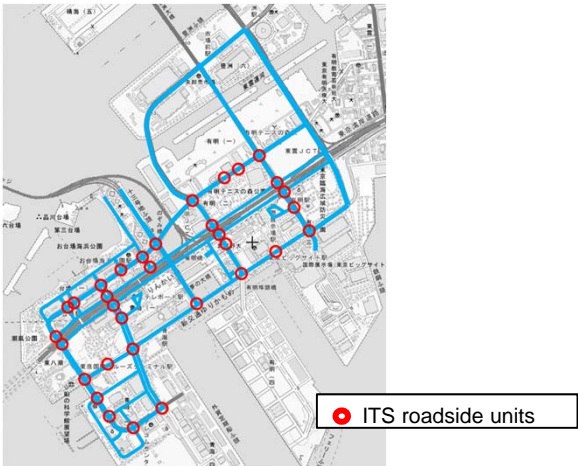
AISAN TECHNOLOGY CO., LTD.
 BMW Japan Corp.
 Bosch Corporation
 Chubu University
 Continental Automotive Corporation
 Daihatsu Motor Co., Ltd.
 Epitomical Limited
 Field auto Inc.
 Hino Motors, Ltd.
 Honda R&D Co., Ltd
 JTEKT Corporation
 Kanazawa University
 Mazda Motor Corporation
 Meijo University
 Mercedes-Benz Japan Co., Ltd.

MITSUMISHI ELECTRIC CORPORATION
 Mitsubishi Motors Corporation
 Nagoya University
 Nissan Motor Co., Ltd.
 Saitama Institute of Technology
 SB Drive Corp.
 Sompo Japan Nipponkoa Insurance Inc.
 Subaru Corporation
 SUZUKI MOTOR CORPORATION
 Tier IV, Inc.
 TOYOTA MOTOR CORPORATION
 Valeo Japan Co. Ltd.
 VOLKSWAGEN Group Japan KK.

(In alphabetical order)

6. Traffic infrastructure that SIP-adus develops

Area	Traffic Infrastructure
Tokyo Waterfront City area	<ul style="list-style-type: none"> An environment to provide traffic signal data from traffic signals (ITS roadside units) High-precision 3D maps linked with traffic signal data, etc. 
Haneda Airport area	<ul style="list-style-type: none"> An environment to provide traffic signal data from traffic signals (ITS roadside units) Routes with magnetic markers embedded Temporary bus stops Dedicated lanes etc. 
Metropolitan Expressway that connects Haneda Airport with Tokyo Waterfront City areas	<ul style="list-style-type: none"> An environment that provides merging assistance information An environment that provides ETC gate data An environment that provides traffic congestion data for each lane 
Common	<ul style="list-style-type: none"> High-precision 3D maps linked with traffic signal data On-board equipment to receive traffic signal data, merging assistance information and etc.

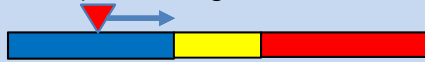


7. Major experiments of FOTs

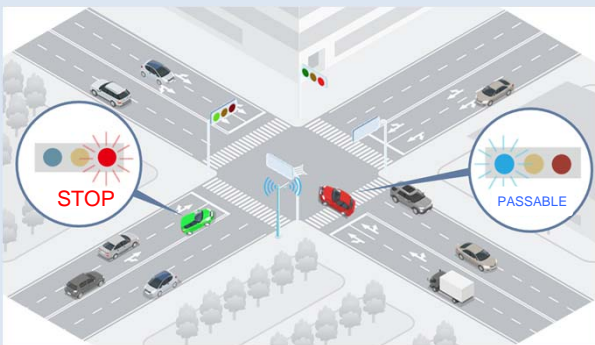
(1) Distribution of traffic signal data

Verify effectiveness of traffic signal data provided via ITS roadside units

- Recognition improved by use of dual information systems through traffic infrastructure and on board sensor
- Avoidance of dilemma zones* through use of predictive traffic signal data (remaining seconds data of traffic signal to change)



*Timing when it is not possible to pass the stop line when the light is yellow, but it is also not possible to stop without braking suddenly.



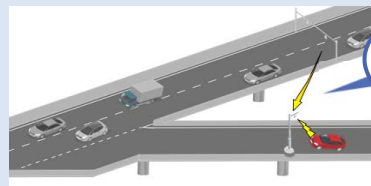
Expected Output

- Verification of effectiveness of distributing traffic signal data to drivers.
- Identification of environmental conditions required to setup traffic infrastructure and its prioritization
- Confirmation of specifications aimed at standardization, reflecting FOT results

(2) Delivery of merging assistance information

Verify effectiveness of merging assistance information provided by roadside sensor that supplements in-vehicle sensor

- Safe and smooth merge by providing main lane data

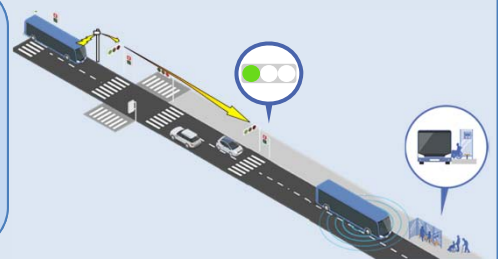


Detection of vehicle on the main lane of expressway and delivery those data to vehicles merging road.

(3) Automated driving bus

Verify level-4 equivalent next-generation public transport system in mixed traffic flow

- Automated steering with magnetic markers
- Improved scheduled service by dedicated bus lanes and PTPS (Public Transport Priority Systems)
- Smooth accessibility by acceleration and deceleration control when starting and stopping and precision docking system to the bus stop for universal service



(Reference) Second phase of SIP-adus

Vision	Promote research and development on issues that should be addressed jointly by industry, academia, and government toward “practical implementation of logistics and mobility services using automated driving technology” while “expanding the practical implementation of automated driving from expressways to general public roads”. Aim to reduce accidents and traffic jams, and to solve the shortage of drivers for logistics and mobility services through the practical application and widespread use of automated driving.	
Project Term	FY2018 through 2022 (total in 5 years)	
Budget	FY2018 budget : 3 billion yen FY2019 budget : 3.12 billion yen FY2020 budget request : part of 28 billion yen (Reference) Promotion of the construction and validation projects of the automated driving architecture FY2018 supplementary budget : 0.4 billion	
Program Director	Seigo Kuzumaki	Fellow Advanced R&D and Engineering Company TOYOTA MOTOR CORPORATION
Relevant Ministries/ Agencies	Cabinet Office, National Police Agency, Ministry of Internal Affairs and Communications, Ministry of Economy, Trade and Industry, Ministry of Land, Infrastructure, Transport and Tourism, New Energy and Industrial Technology Development Organization as a management agency	

Note: SIP is the Cross-ministerial Strategic Innovation Promotion Program for achieving science, technology and innovation as a result of the Council for Science, Technology and Innovation exercising its headquarters function to accomplish its role in leading science, technology and innovation beyond the framework of government ministries and traditional disciplines. The program strives to promote research and development in a seamless manner from the basic research stage to the final outcome by endeavoring to strengthen cooperation among industry, academia and government under the strong leadership of the Program Director (PD).

