Cross-ministerial Strategic Innovation Promotion Program

The outline of SIP-adus FOT

(Strategic Innovation promotion Program
for Automated Driving systems for Universal Service)

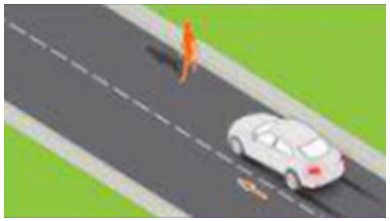
Nov.15 2016
International Corporation WG ,SIP-adus
Masato MINAKATA
(TOYOTA Motor Corporation)

Presentation Overview

- Goals of SIP-adus
- Objects of SIP-adus FOT
- Technologies for Automated Driving Systems
- Themes of FOT
- Main contents of FOT
- Participants/Test site
- Condition of the FOT participation
- Schedule

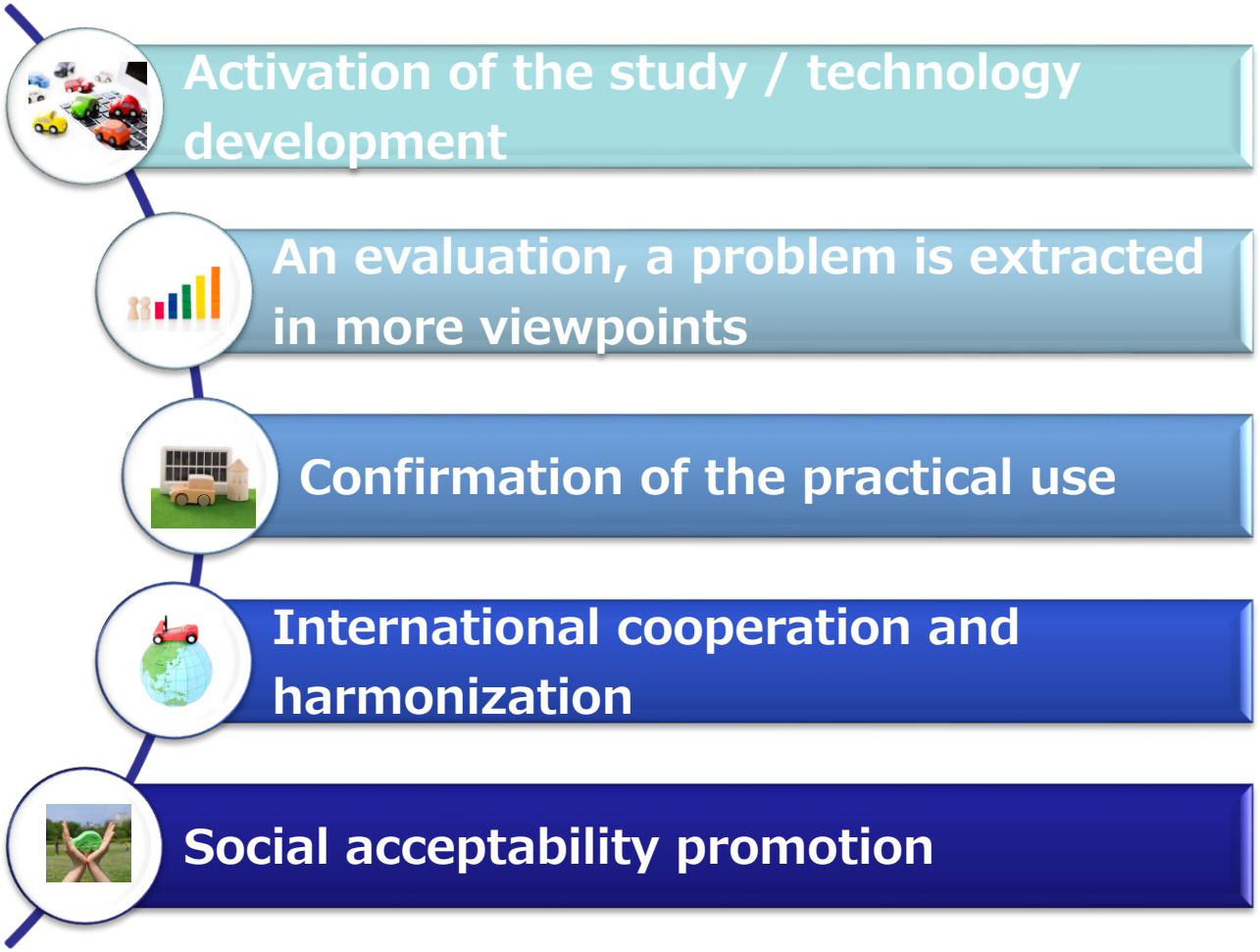
Goals of SIP-adus

SIP-adus is working on research and development from 2014.



Objects of SIP-adus FOT

SIP-adus will perform FOT in around September, 2017 for the purpose of the following.



Technologies for Automated Driving Systems

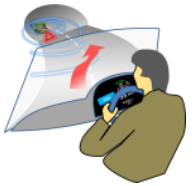
Vehicle

Sensor

Artificial intelligence

Actuator

HMI



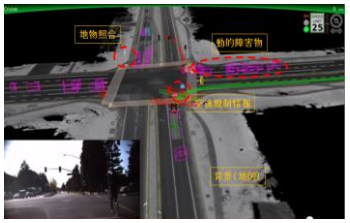
HMI:
Human Machine Interface

Cooperation with Human

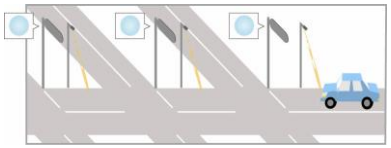
- A high self-position estimate
- Neighboring environmental cognition

These are important for Automated Driving System

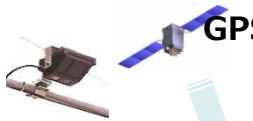
Dynamic Map



High-definition digital map

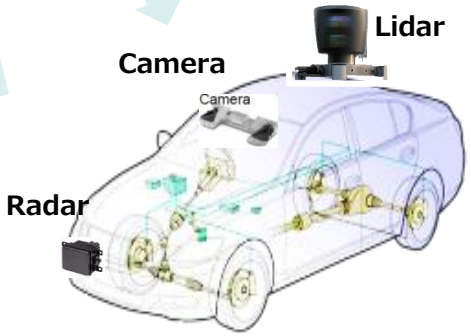


ITS Anticipative Information



GPS

Onboard sensor



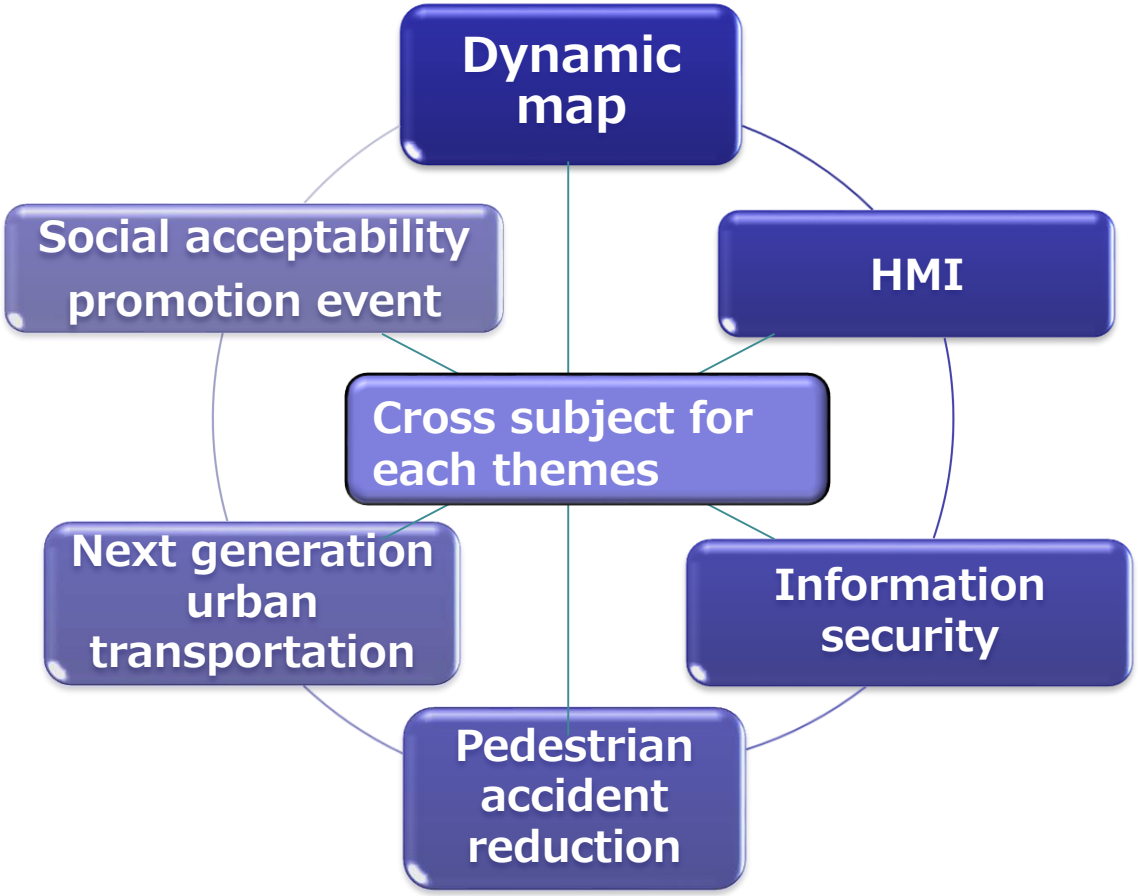
Basic Tech. — **Security, Simulation, Database, etc.**

・In red : Area of Cooperation ⇒ Main Area of SIP

Themes of FOT

Past research and development results are unified by five important themes of FOT.

And also the FOT about the subject to cross each themes and the event for social acceptability promotion are planned.



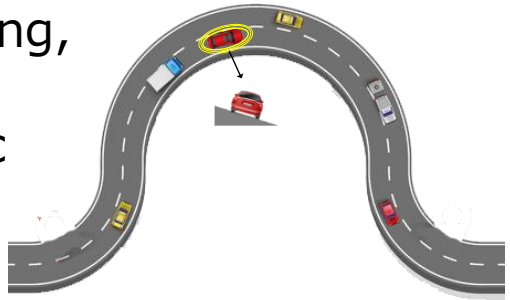
Main contents of FOT

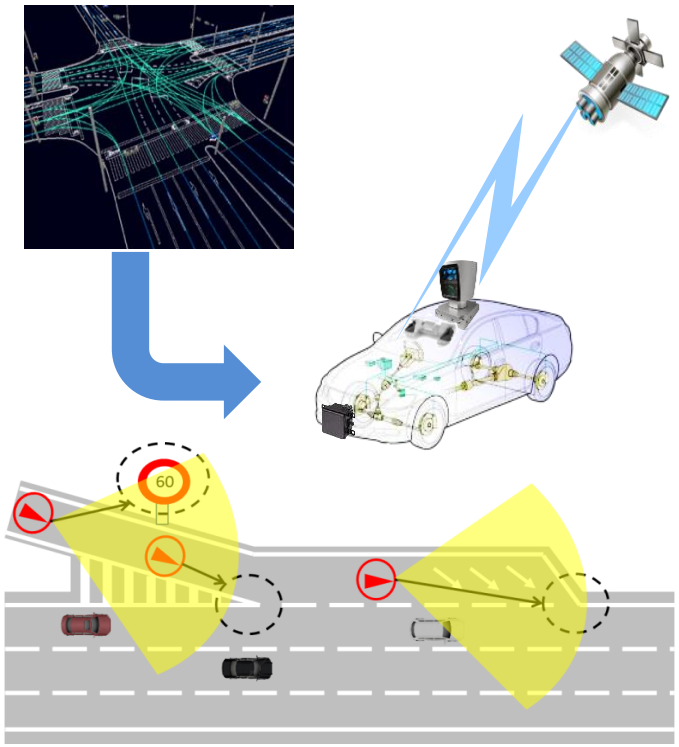
Dynamic Map(Example)

◎ 3D high-resolution digital map which is technology to become the key for ADS is developed, and is produced experimentally by SIP-adus.

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

✓ The map data is provided by SIP-adus.





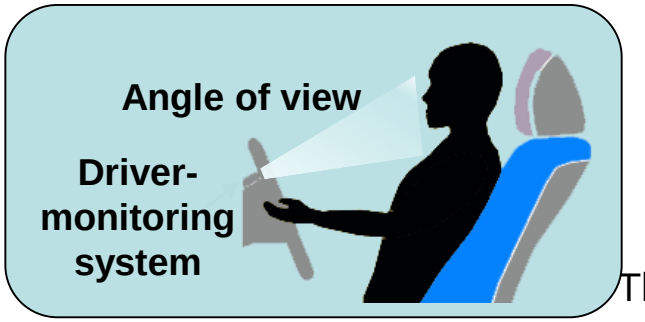
Main contents of FOT

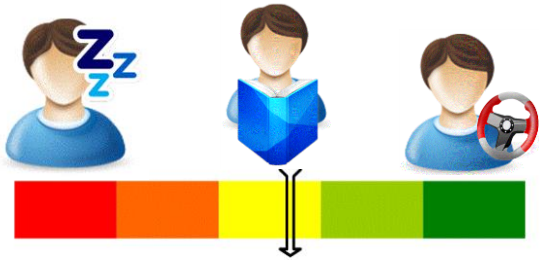
HMI(Example)

◎ In SIP-adus, various kinds of studies on HMI are performed for reliable and secure ADS implementation.

- Measurement, data collection and analysis of the driver state under actual driving environment through continuous long driving (2hours～3hours).
- Study and validation of the decision index of the driver state.
- Verification of HMI methods and devices .

✓ Driver-monitoring system is provided by SIP-adus





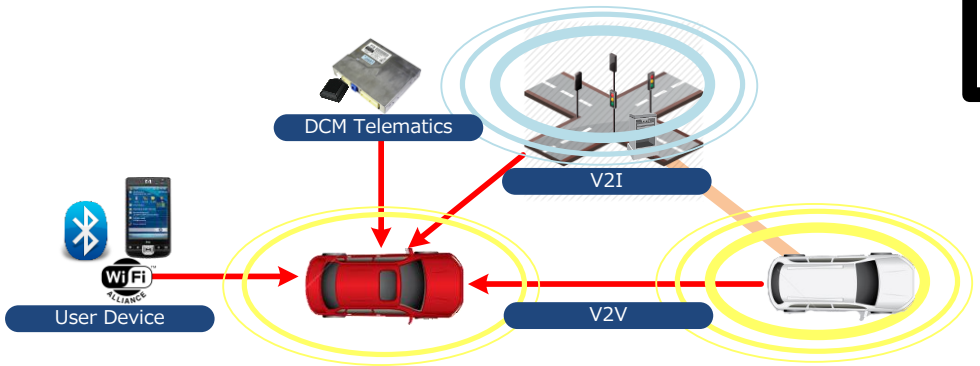
The image of the driver state index

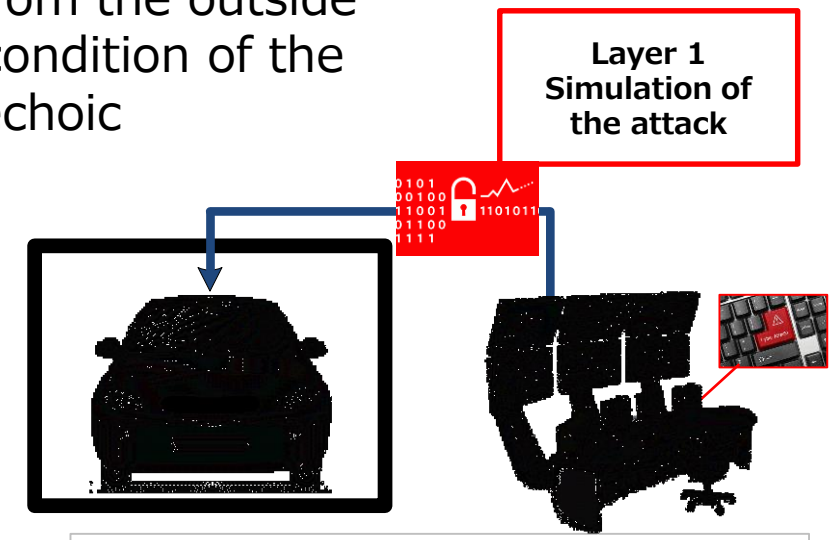
Main contents of FOT

Information Security(Example)

◎ SIP-adus works on the menace analysis, the examination of security requirements, the collection and the study of the evaluation method.

- Validation of the evaluation method.
  (The cyber attack that is simulated from the outside of the vehicle under the operating condition of the automated driving system at the anechoic chamber.(Layer 1))
- Inspection of the defense functions of automated driving vehicle.
  (Black-box testing)





Layer1: Communication of Out Car
Layer2: E/E Architecture
Layer3: In Car Bus Protocol
Layer4: ECU Software Structure

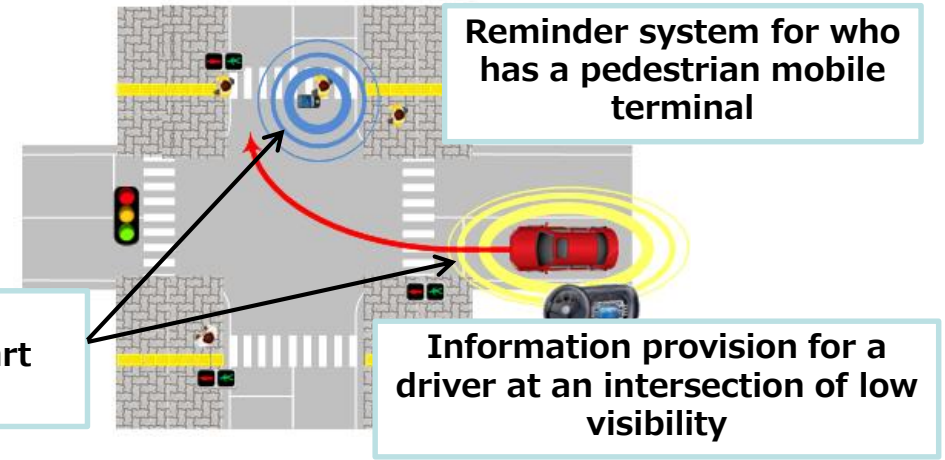
Main contents of FOT

Pedestrian accident reduction(Example)

◎ In SIP-adus, for pedestrian accident reduction, the analysis of the accident cause and the technical countermeasure are researched and developed.

- Validation of a pedestrian mobile terminal (smart phone) which mounts V2P communication technologies and high-precision position measuring system for the prevention of cognitive mistakes which make up the majority of pedestrian fatalities.
- Validation of the effectiveness of the caution system for both pedestrians and drivers.

✓ Pedestrian mobile terminal is provided by SIP-adus.

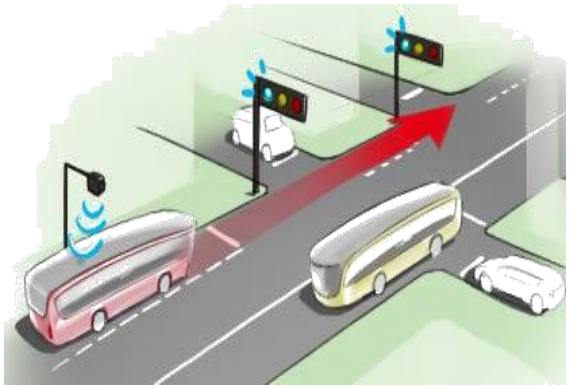


Main contents of FOT

Next generation urban transportation(Example)

◎ In SIP-adus, the research and the development of the various themes to provide the accessibility for all people including a movement limited person from the starting point to the destination are worked on.

- Validation of effectiveness for the convenience and the speed of the public bus utilizing the Advanced Rapid Transit (ART) technologies.



- Validation of usability and efficiency of attribute-based travel support which gives most suitable route information for the user via smart phone

Participants/Test site

Expected participants

- ✓ Open to Non-SIP-adus members
- ✓ Open to domestic and foreign participants

OEM/Supplier/University/Research institute etc.

Test site

Expressway

Experiment for the realization of the ADS at the expressway in 2020.

Arterial roads

Experiment for the system implementation to ADS under the complicated blend style traffic environment.

Test facilities

Experiment on having secured security and a repetition evaluation.

Test site

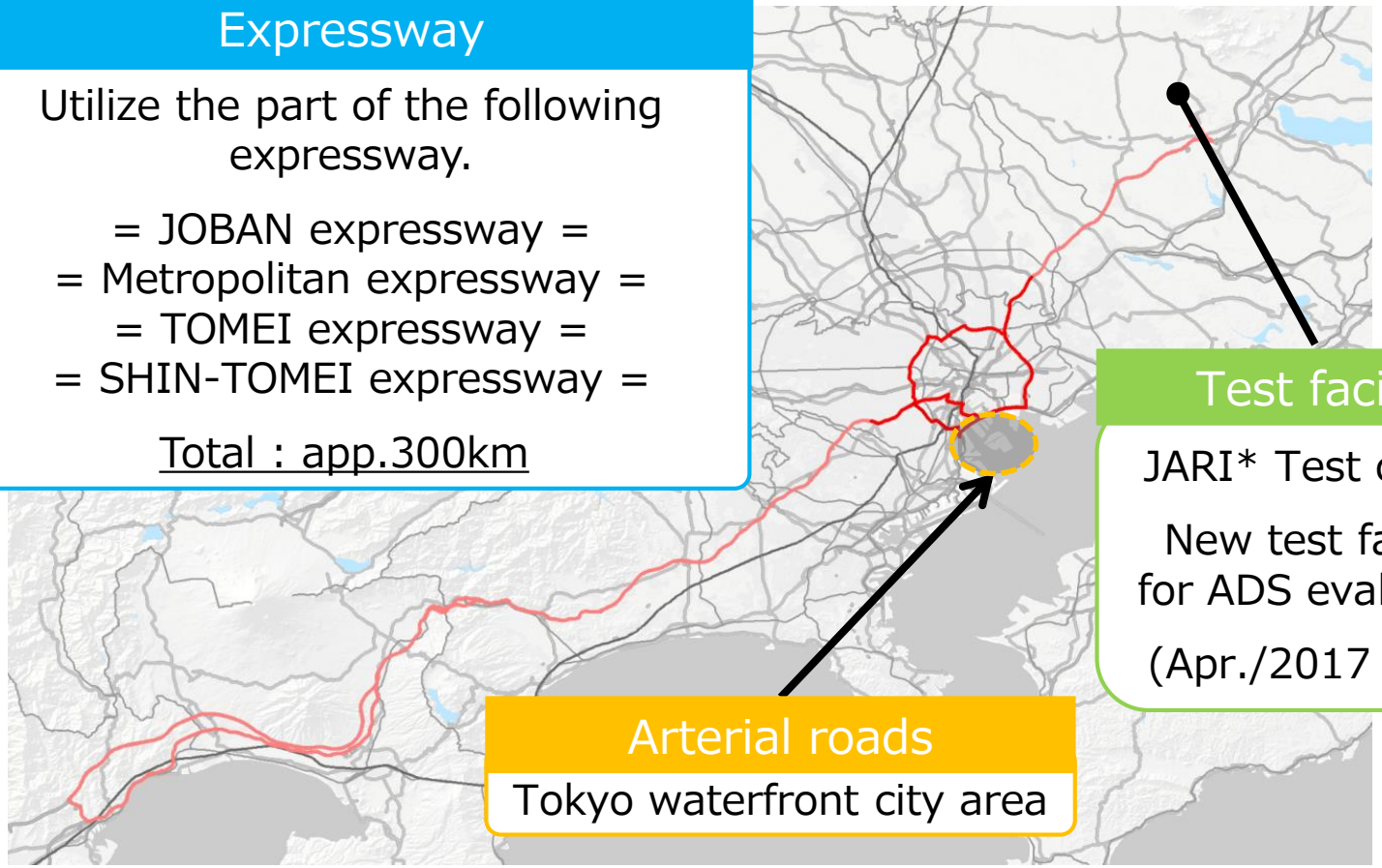
Expressway/Arterial roads/Test facility

Expressway

Utilize the part of the following expressway.

= JOBAN expressway =
= Metropolitan expressway =
= TOMEI expressway =
= SHIN-TOMEI expressway =

Total : app.300km



Test facility

JARI* Test course

New test facility for ADS evaluation

(Apr./2017 open)

Arterial roads

Tokyo waterfront city area

(*JARI : Japan Automotive Research Institute)
(There is possibility of the partial change.)

Condition of the FOT participation

What a participant to SIP-adus FOT should know.

The experiment vehicles shall be suitable for Japanese safety standards, and the safety of the public road driving must be checked by the participant.

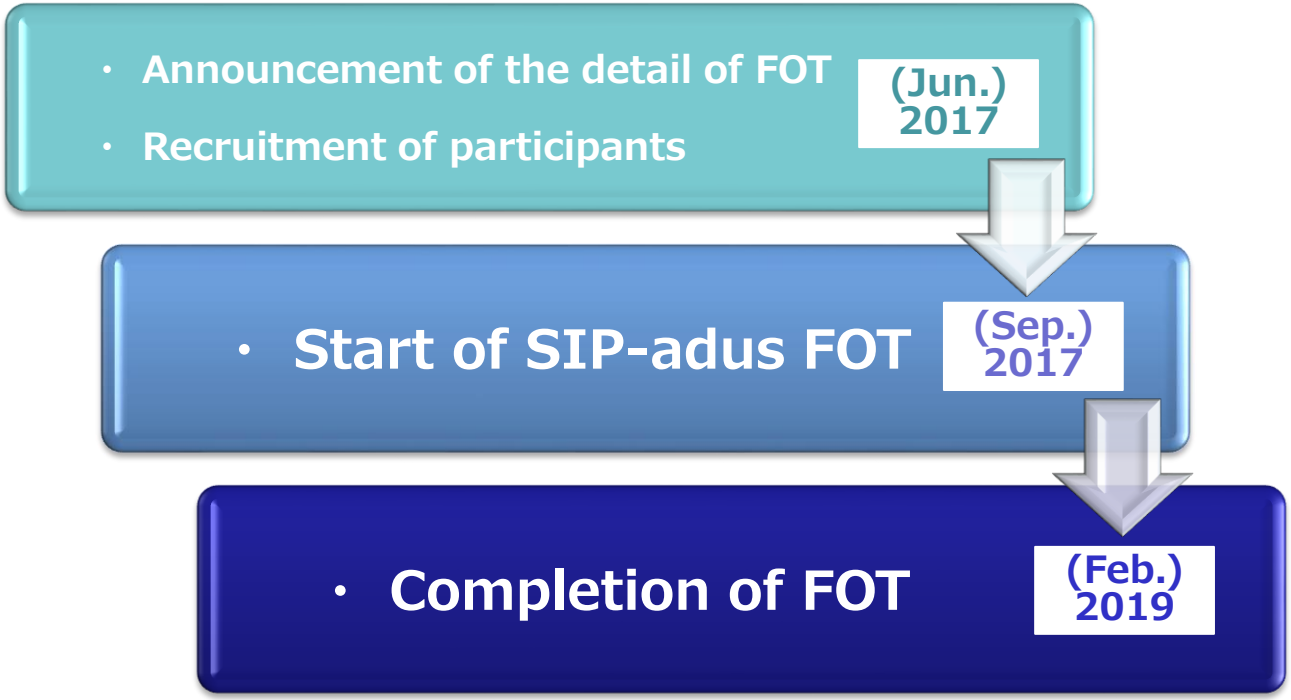
The SIP-adus FOT accomplishes according to
"Guidelines for public road testing of Automated Driving Systems"
that the National Police Agency published.

It is necessary for the participant to prepare for experiment vehicles, a driver and an operator of the logger.

- ✓ The more detail information will be announced at the timing of the recruitment of participants in around June 2017.

Schedule

The preparations for SIP-adus FOT are promoted for the start in around September, 2017.



(There is possibility of the partial change.)

□ **The official schedule and overview are announced on SIP-adus website. (http://www.sip-adus.jp/)**

Mobility bringing everyone a smile!

Thank you for your kind attention!