Regional activities and FOTs

SIP-adus Field Operational Test

— Mobility bringing everyone a smile —

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14 Nov. 2017

Cabinet Office

SIP

Goal of SIP-adus

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

Realization and spread of Automated Driving System

Ensuring safety and traffic jam reduction on the road

Realization of the advanced next generation public bus service

Technologies for Automated Driving Systems

➢ SIP places emphasis on R&D in cooperative area with industry, academia and government.

Vehicle

＜Recognition＞ ＜Judgement＞ ＜Operation＞



Map, ITS info., Sensor　　AI　　Actuator

HMI

Human Machine Interface

Cooperation w/Human

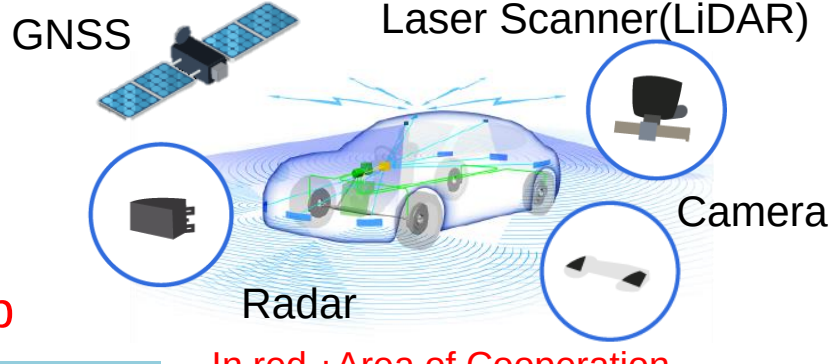
Important Technologies
- **Self-position estimation**
- **Neighboring environmental recognition**

Dynamic Map

ITS Predictive Information

High Definition 3D Map

Onboard Sensors



In red ：Area of Cooperation
⇒ Main Area of SIP-adus

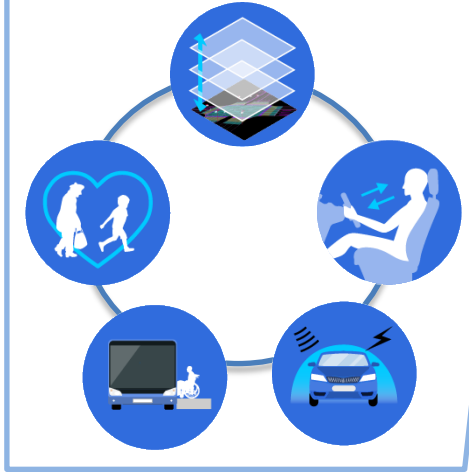
Basic Tech. Security, Simulation, Database, etc.

Steps to the Goal

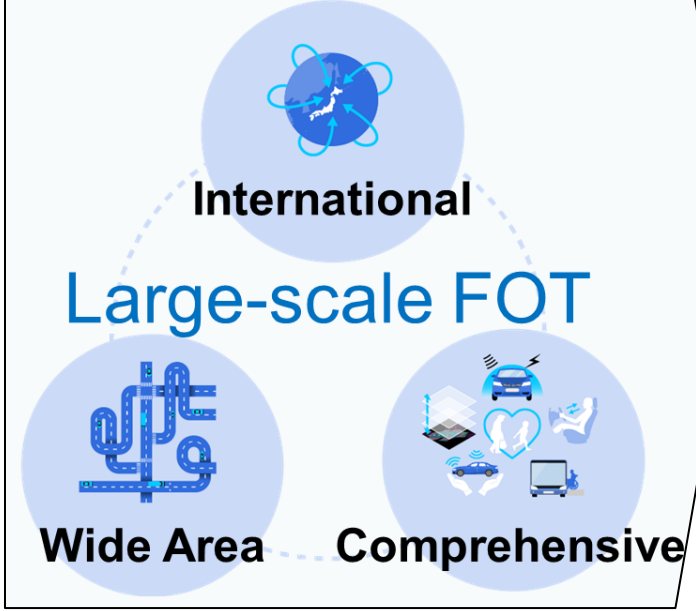
2014 | 2015 | 2016 | 2017 | 2018

- Framework Construction
- Investigation for various R&D theme

- Integration into 5 major R&D theme activity



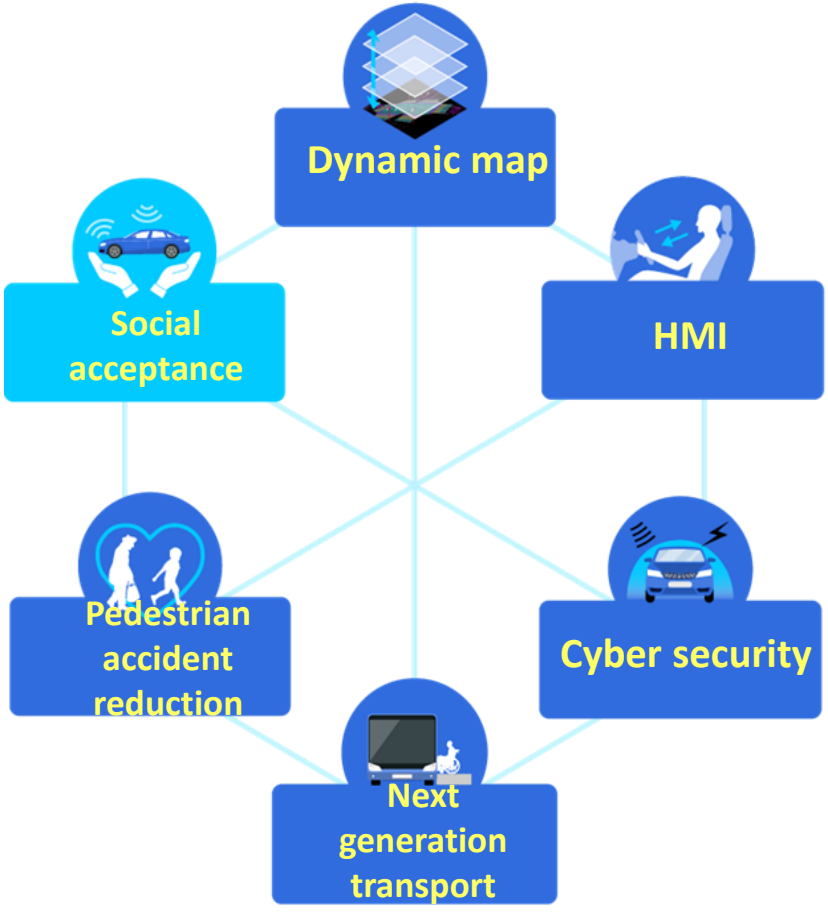
- Final step to the Goal



Implementation

Field Operational Test (FOT)

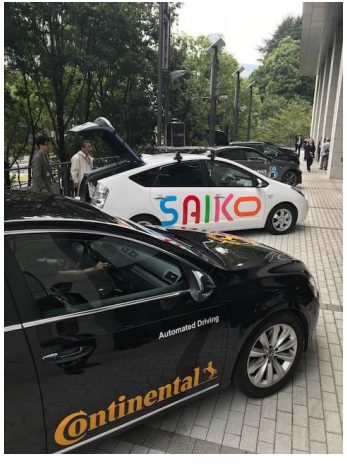
≪Main themes≫



≪Objectives≫

- Activation of the study / technology development
- An evaluation, a problem is extracted in more viewpoints
- Confirmation of the practical use
- International cooperation and harmonization
- Social acceptability promotion

Participants of FOT



ALPINE Driving Mobile Media Innovation
BMW
MINI
BOSCH Invented for life
Calsonic Kansei
Continental
DAIHATSU
HONDA The Power of Dreams
mazda
MLT MEIJI LogiTech
MITSUBISHI ELECTRIC
名古屋大学 NAGOYA UNIVERSITY
NISSAN MOTOR CORPORATION
OMRON
Pioneer
埼玉工業大学 SAITAMA INSTITUTE OF TECHNOLOGY
SUZUKI
SUBARU
TOYOTA
VOLKSWAGEN AKTIENGESELLSCHAFT
ZMP

(Each participant brings the vehicles of their own.)

≪Period≫ Oct. 2017 ～ Mar. 2019

Test sites of FOT

Test facility

JARI* Test course;
New test facility for AV evaluation

Expressway

Utilize the part of the following expressway.

Total : app.300km.

Arterial roads

Tokyo waterfront city area app.25km

(*JARI : Japan Automotive Research Institute)

Vehicle Position Detection using Dynamic Map

GNSS

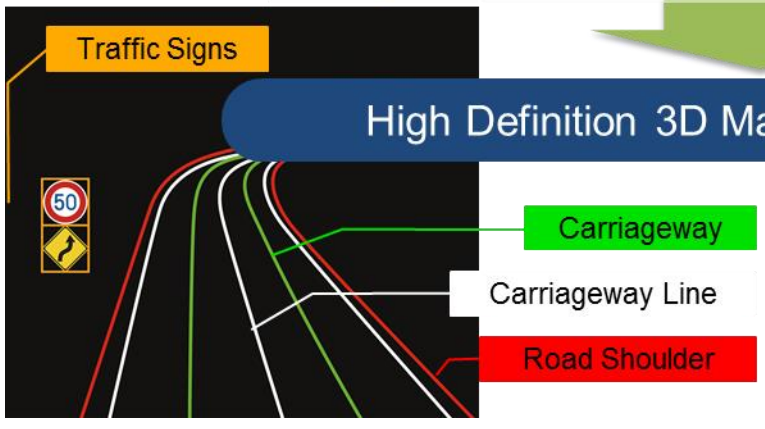
Laser Scanner(LiDAR)

Radar

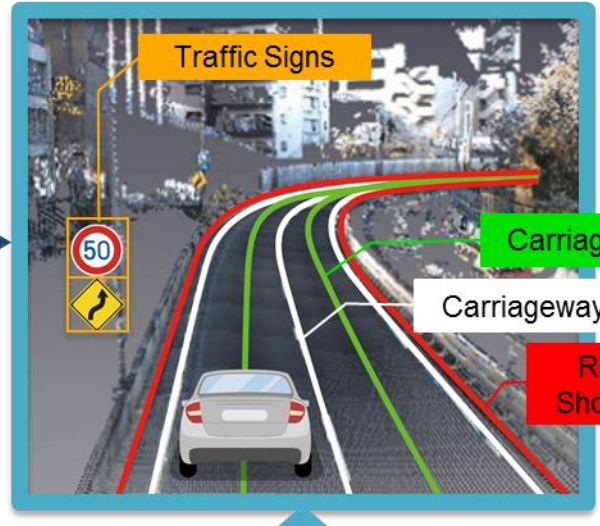
Camera

Sensed Data

Compare to estimate the position



High Definition 3D Map



Estimate the position of the vehicle

FOT for Dynamic map

- Dynamic map is evaluated through 3 steps FOT .

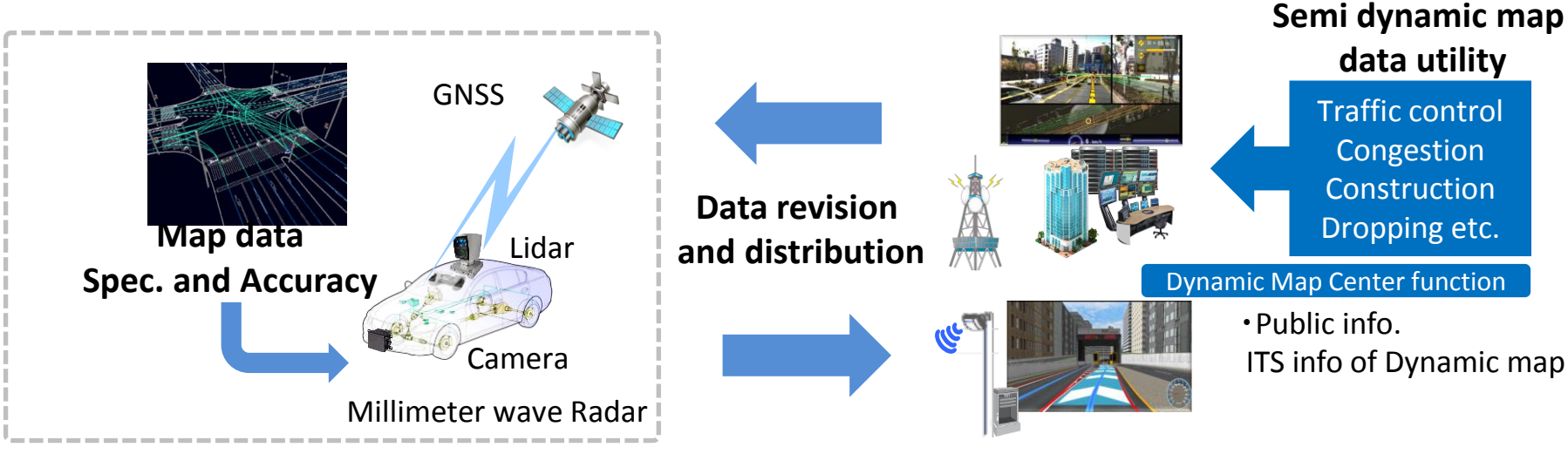
  (Step 1) To validate 3D high-definition digital map data. (**Ongoing**)

  (Step 2) To validate data collection and distribution method. (FY2018)

  (Step 3) To verify the utility of semi dynamic information. (FY2018)

  ✓ Map data is provided by SIP-adus.

  ✓ **Additional recruitment of participants is planned for FOT Step2&3.**



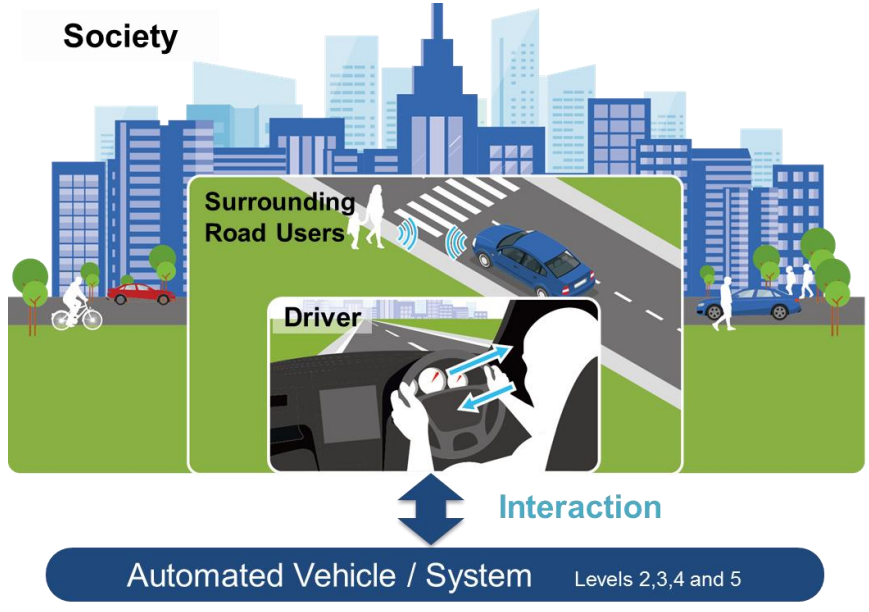
Human Machine Interface FOT

- SIP-adus is focusing on the three major HMI tasks for AV.

Task A: To investigate effects of **system information** on drivers' behavior.（FY2018）

Task B: To investigate effects of **driver state** on his/her behavior in transition. (Ongoing)

Task C: To investigate effective ways to functionalize AV to **be communicative**.(FY2018)

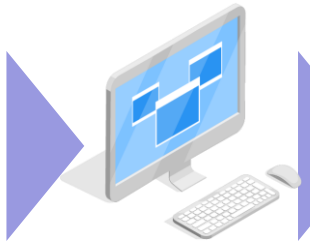


FOT @T/C and real traffic environment

Cyber Security

➢ For CV and AV, Cyber security becomes the technology to take the high priority.

◆Common Architecture Model
◆Use Cases of Automated Driving（JAMA）
◆Thread Info.（JPCERT/CC, Auto-ISAC）
◆Evaluation（Attack）Info.（Auto-ISAC）

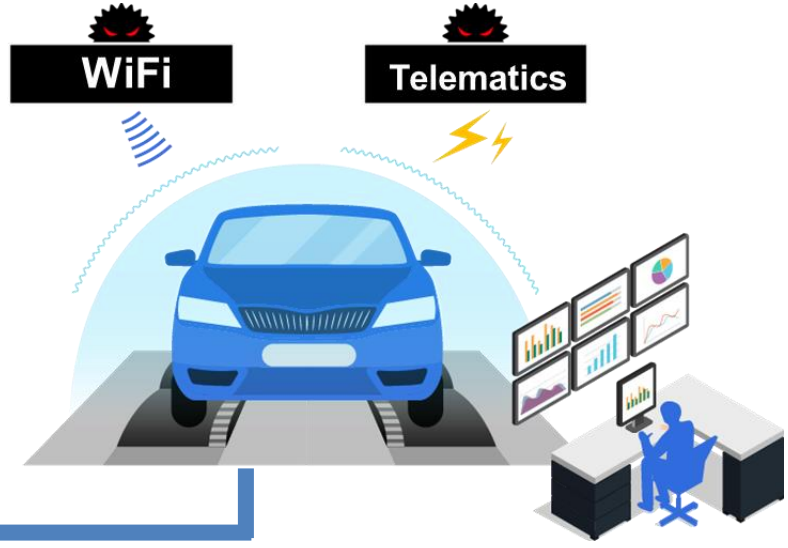


◆Countermeasure
◆Level of Countermeasure

Threat Analysis Tool

Comparison with Current Threat Analysis (JasPar)

Vulnerability Evaluation

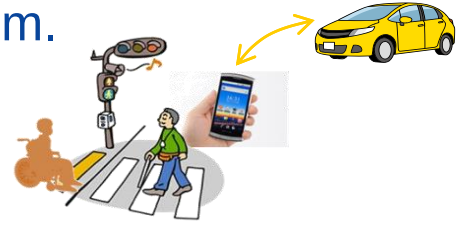


Cyber Security Evaluation Guideline

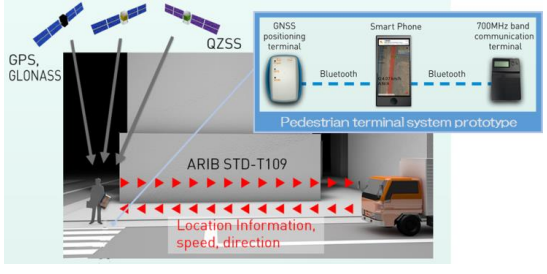
FOT using Evaluation Guideline will start in FY2018

Pedestrian Accident Reduction

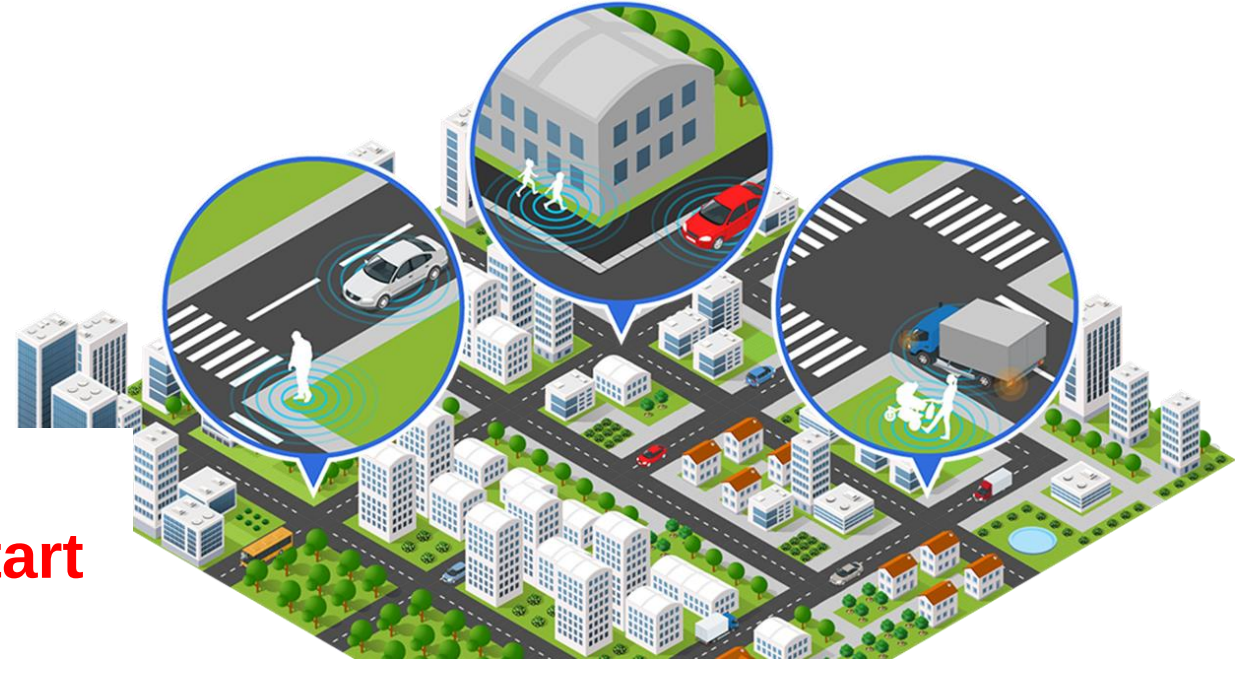
- Mitigate pedestrian accidents using V2P communication system.



- Exchange high accuracy positions and situations between pedestrians and vehicles for support recognition.



- Evaluate system performance and effectiveness under real traffic world.

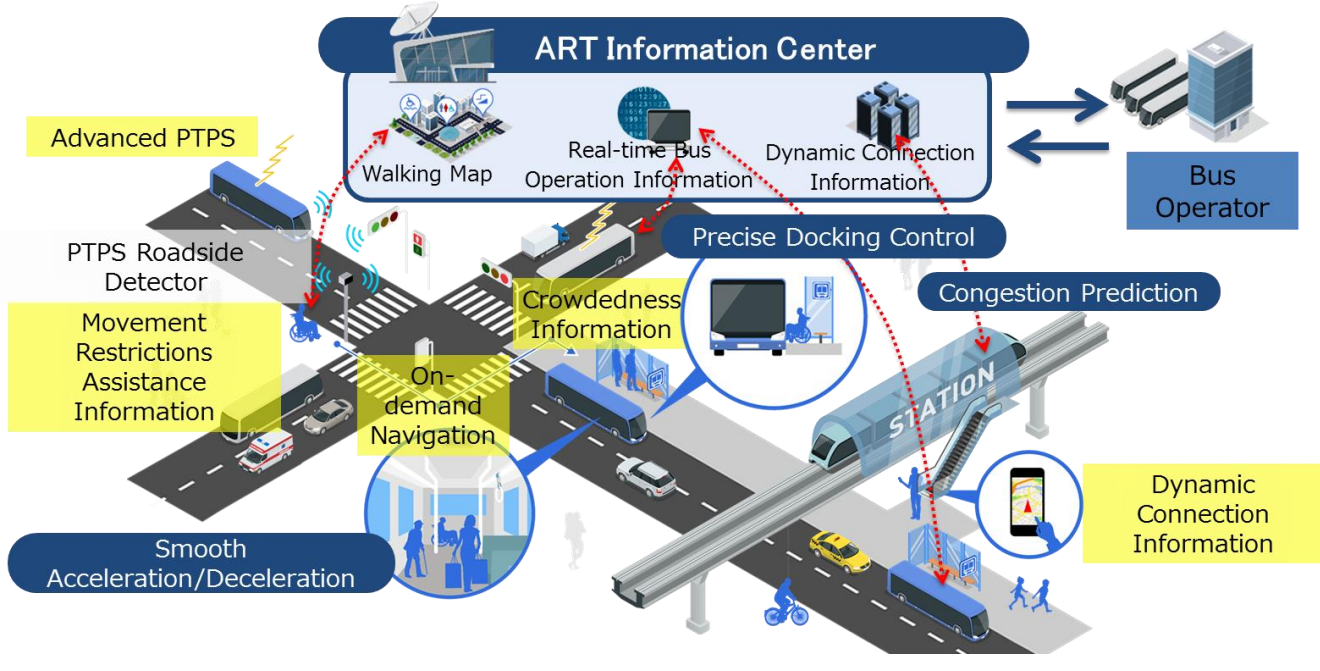


FOT @ Tokyo water front city area will start in FY2018

Next Generation Urban Transportation

- Next generation urban transportation is realized by the ITS technologies and the automated driving technologies.

- Evaluate system performance and effectiveness under real traffic world.



FOT @ Tokyo water front city area will start in FY2018

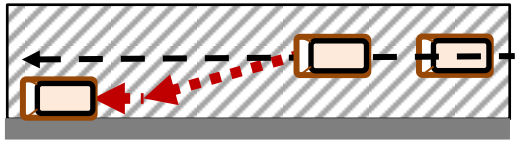
ART: Advanced Rapid Transit

FOT for MaaS

Automated driving Bus FOT

・Technologies
(Quasi-Zenith Satellites System , Precise docking, Magnetic Nail, High-precision Digital Map, Automatic Brake Control)

・Steps of FOT in Okinawa
(Mar.) Shore road→(Jun.) Isolated island→(Nov.) City area

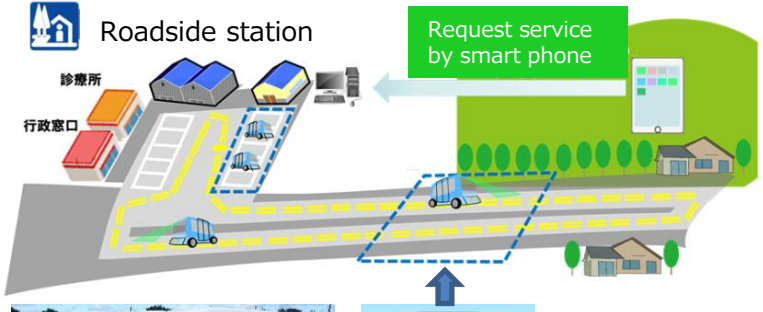


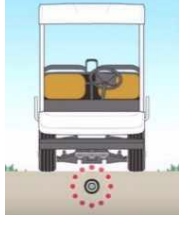
Precise Docking demonstration

Roadside station-based FOT

Public mobility service for people and freight at the local area that have the issues of the depopulation and the aging.

Sep. 2017～ :Total 13 areas are planned





Electromagnetic induction line

FOT for MaaS

Automated driving Bus FOT

■ : Completed ■ : Ongoing

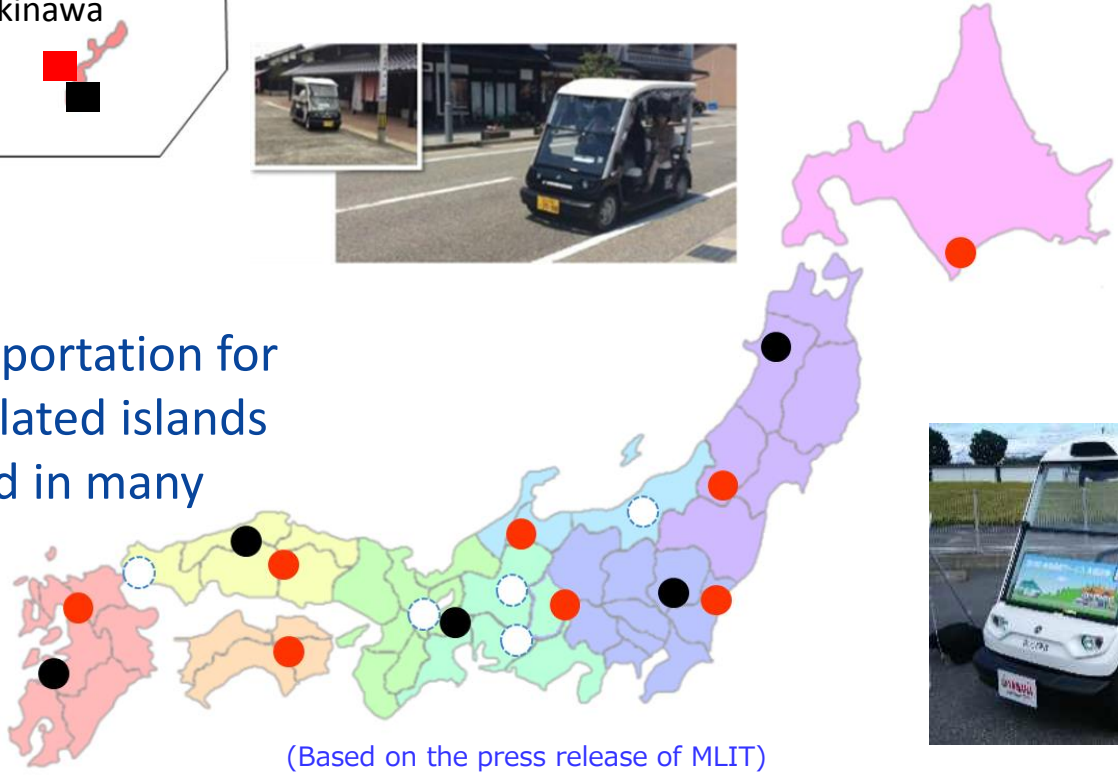
Okinawa

Ishigaki-jima

(Based on the press release of CO)

Roadside station-based FOT

● : Regional assignment ● : Public offering ◌ : Feasibility study



(Based on the press release of MLIT)

- New type public transportation for depopulated area, isolated islands so on, are being tested in many place in Japan.

Summary

- SIP-adus has started Large-scale FOT from Oct. 2017.
- In parallel, FOTs of MaaS are also started at various locations in Japan.
- Additional recruitment of participants for FOT is planned.
- Detailed and updated information for SIP-adus large-scale FOT will be updated in web-site.

http://www.nedo.go.jp/english/sip_ai2017.html#overview


Thank you for your attention.
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