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Activities of SIP-adus and Dynamic Map

SIS09 Challenge of Integrating Automated Vehicles into the Digital Infrastructure

October 22, 2019

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the University of Tokyo, a member of SIP-adus

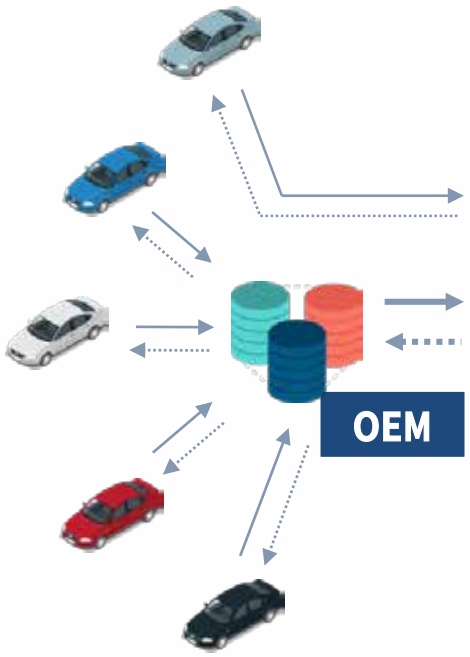
Contents of this presentation

1. **Results of the 1st Phase (2014-2018)**
2. **Ongoing activities within the 2nd Phase (2018-2022)**
3. **For further international collaboration**

1. Results of the 1st Phase (2014-2018)

Overview of Dynamic Map

Dynamic Map



API

API : Application Program Interface

Dynamic Data

Movement of Vehicles, Status of Pedestrians, Traffic Signals etc.

Semi-dynamic Data

Accidents, Traffic Jams, Detailed Weather etc.

Semi-static Data

Traffic Regulation, Road Construction, Weather etc.

Static Data
=High Definition 3D Map

Road, Lane, 3D Shape of Structures etc.

Combine various data

Digital Mapping

Various Uses

Platform

3D Common Platform Data

Point Clouds, Graphics, Probe Data etc.

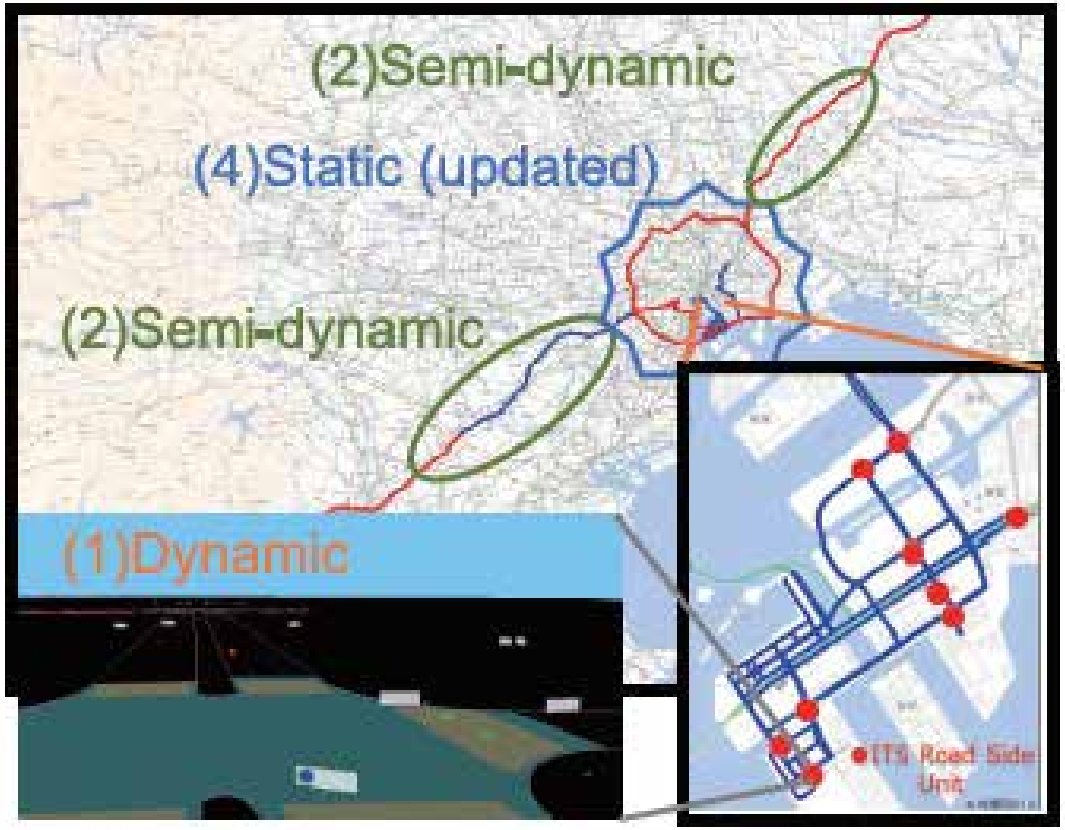
Dynamic Map FOT

Participants: 22 participants

ALPINE, 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
Valeo, VOLKSWAGEN Aktiengesellschaft, ZMP

* Participants of the FOT for Dynamic Map or HMI

Test area: over 758km of Map data

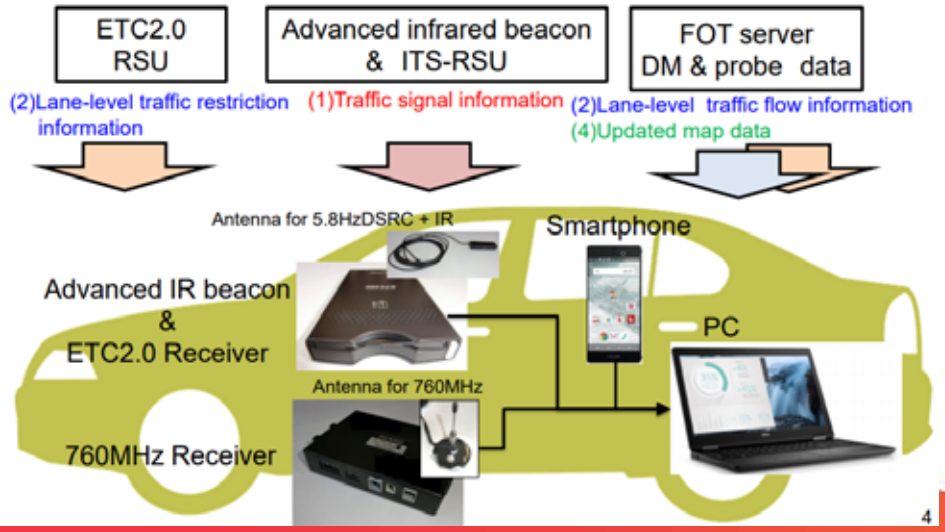


Dynamic Map FOT

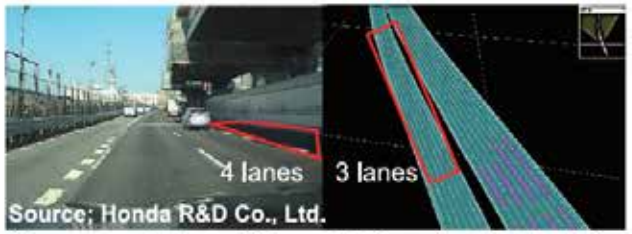
Data for Dynamic Map FOT

Data	Data: detail	Media
(1)Dynamic	Traffic signal information	Advanced infrared beacon & 760MHz
(2)Semi-dynamic	Lane-level traffic flow information (Probe data)	LTE
	Lane-level traffic restriction information	ETC2.0(5.8GHz)
(3)Semi-static	NA	NA
(4)Static	Map data	DVD
	Updated data	DVD+LTE

System for Dynamic Map FOT



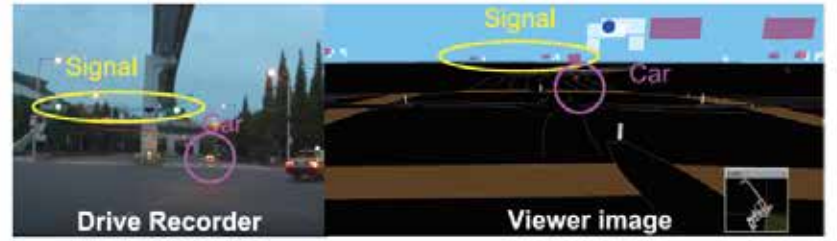
FOT situations



Change road shape (3 lanes >>4lanes) = Updated Map

Semi-dynamic: Lane-level traffic flow information

Semi-dynamic: Lane-level traffic restriction information



Dynamic: Traffic signal information, vehicle location

Result of Dynamic Map FOT

ü Reports were created as result of FOT.

http://en.sip-adus.go.jp/rd/

Result of the SIP-adus

- ü Created a company (DMP) to produce base map.
- ü Start providing map data for expressways and highways from Mar. 2019. (total 29,205km)
- ü Automated vehicle with DMP data have already released.

https://www.dynamic-maps.co.jp/en/index.html

2. Ongoing activities within the 2nd Phase

Tokyo Waterfront City Area FOT

Test Participants:

For a wide variety of people including overseas OEM, parts and system suppliers, universities, research organizations and venture companies.

Period:

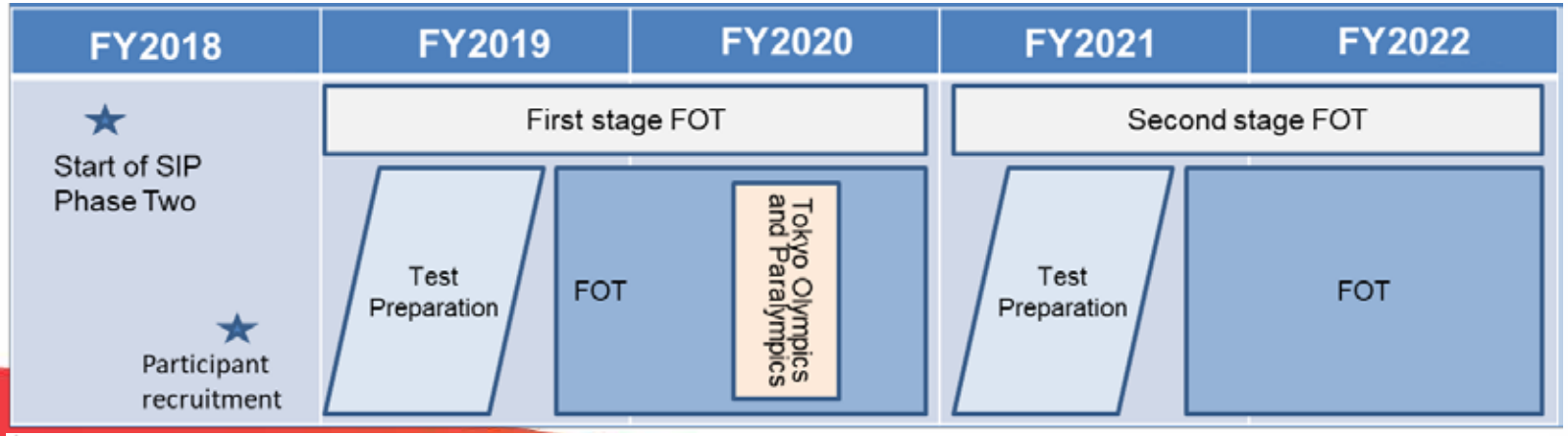
1st stage field operational test (2019 to2020)

- Ø **Field tests of necessary cooperative infrastructure technologies** to achieve level 4 autonomous driving on freeways and ordinary roads.

2nd stage field operational test (2021 to 2022)

- Ø **Modifications to the cooperative infrastructure technologies** that came to light in the 1st stage FOT
- Ø **Field operational testing for new R&D issues** in preparation to establish a test environment for the legacy cooperative infrastructure system

Schedule



*There is the possibility the FOT will not take place during the Tokyo Olympics and Paralympics.

Tokyo Waterfront City Area FOT

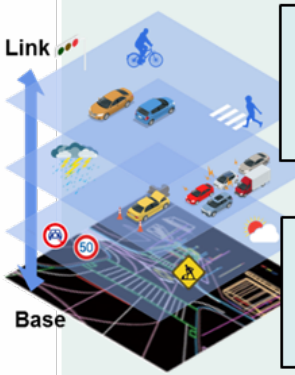
Objective:

The purpose of the FOT and consensus-building is to create standardized specifications for how information is delivered, how to link information and information delivery specifications by establishing a test environment utilizing traffic environment information.

Establish FOT utilizing traffic environment information → **FOT in actual traffic environment** → **Verification and consensus-building by participants for standardized specifications**

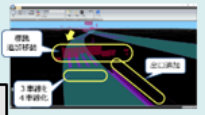
Signal information
Ordinary roads

Merging / ETC gate support information
Highways

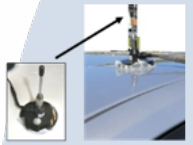


Lane level traffic information
Highways

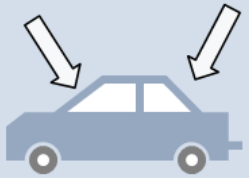
High-accuracy 3D maps
Ordinary roads | Highways



ITS wireless receiver for signal information



ETC2.0 on-board equipment



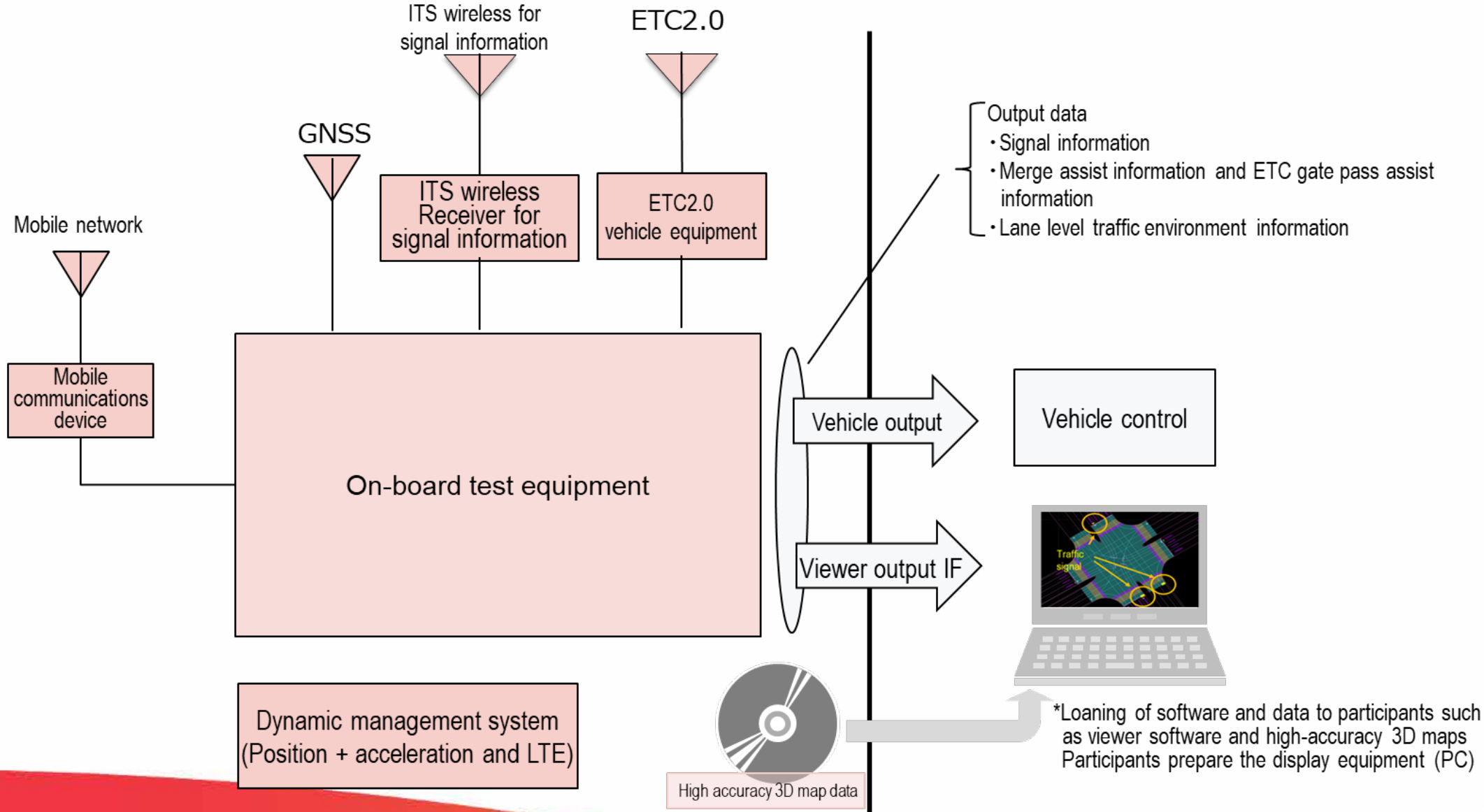
Field tests in actual traffic environment

Verification Items

- **Information delivery specs**
- **Information linking method** (Time / positioning referencing model)
- **State of road-to-vehicle collaboration**
- **Delivery method** (Communications method)

*The technological topics may increase/decrease according to R&D progress

Overview of the test equipment



Participants for the FOT (-2020)

AISAN TECHNOLOGY CO.,LTD.
Valeo Co., Ltd.
SB Drive Corp.
Epitomical Limited
Kanazawa University
Continental Automotive Corporation
Saitama Institute of Technology
JTECT CORPORATION
SUZUKI MOTOR CORPORATION
SUBARU CORPORATION
Sompo Japan Nipponkoa Insurance Inc.
DAIHATSU MOTOR CO., LTD.
Chubu University
Tier IV, Inc
TOYOTA MOTOR CORPORATION
Nagoya University
NISSAN MOTOR CO.,LTD.
BMW Group
Hino Motors, Ltd.
Field auto Inc.
Volkswagen Group
Bosch Corporation
Honda Motor Co., Ltd.
Mazda Motor Corporation
MITSUBISHI MOTORS CORPORATION
Mitsubishi Electric Corporation
Meijo University
Mercedes-Benz Co., Ltd.

28 participants (31 May 2019)

3. For further international collaboration

For further international collaboration

- ü Actively participating standardization activities.
  - Ø ISO (TC204/WG3 and other WGs)
    - Ø ISO17572-4 (Precise relative location referencing profile will be published soon!)
      - SIP-adus is planning to use this standard at the FOT next year
  - Ø OADF (Open AutoDrive Forum) meeting
    - ü participate as a Steering Committee member
      - SIP-adus is thinking about using some OADF members' standards at the FOT
- ü The activities of SIP-adus are Open basis
  - Ø Focus on FOTs with real data
  - Ø Open the results of the project (on web, workshops, etc.)

For further international collaboration

- ü SIP-adus Workshop (in Tokyo, Japan)
  - Ø **We will hold the workshop from 12th to 14th Nov. in Tokyo this year**
  - Ø **All the presentation and the discussion will be held “in English”**
  - Ø http://en.sip-adus.go.jp/evt/workshop2019/

Thank you!

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