Introduction of Dynamic Map Session

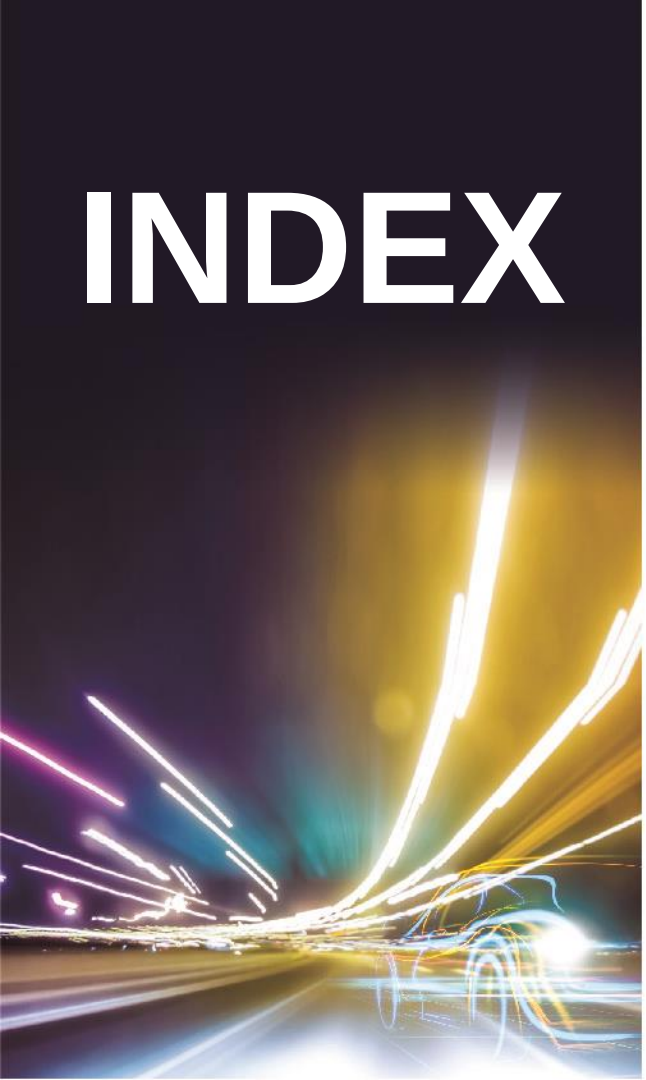
SIP-adus workshop 2019

Satoru NAKAJO, the University of Tokyo

13th November, 2019

SIP

Cabinet Office



1. Overview of the session

2. Activities of SIP-adus and related activities

3. Status of the international collaborations

1. Overview of the session

Overview of the session

Plenary (today):

Satoru Nakajo, the University of Tokyo
- Overview of Dynamic Map related activities
- Overview of OADF

Katsuya Abe, Director, ITS Policy and Program Office, Road Bureau MLIT

Hiroyuki Inahata, President, Dynamic Map Platform Co.,Ltd.

Jean-Charles Pandazis, ADASIS & SENSORIS coordinator, ERTICO

Christopher T.Thibodeau, CEO & President, Ushr

Breakout workshop (tomorrow, invited only):

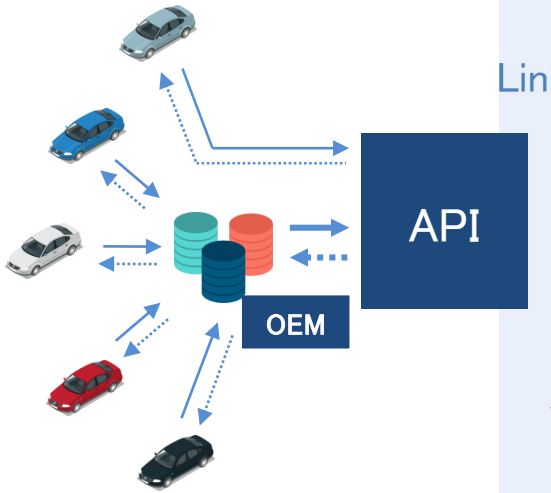
- ✓ For SIP-adus FOTs (2020 and the after),
- ✓ For further international collaborations,

2. Activities of SIP-adus

- **Results of the 1st Phase (2014-2018)**
- **The 2nd Phase of SIP-adus (2018-2022)**

Concept of Dynamic Map

Dynamic Map



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

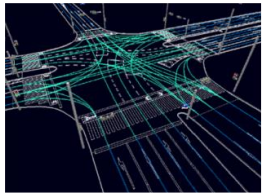
3D Common Platform Data

Point Clouds, Graphics, Probe Data etc.

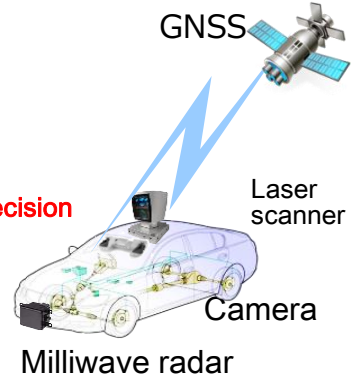
Dynamic Map FOT

Test details

a. Validation of specifications and precision of static, high-accuracy 3D map data
b. Validation of data updating and distribution systems
c. Validation of linkage of dynamic data delivered from infrastructure, etc.



a. Specifications and precision of map data



b. Updating and distribution of data

c. Use of dynamic data

- Information on road regulations
- Information on traffic congestion
- Road update information
- Information on falling objects, etc.

Functions of the Dynamic Map Center

・Linking of dynamic data from public information and infrastructure with the dynamic map

Objectives

- Confirmation of and agreement on final specifications toward practical implementation of the dynamic map
- Promoting standardization activities
- Promoting R&D on use of the dynamic map and development of applications

Benefits of participation

- Participation in opportunities to table desired features and proposals toward practical implementation of the dynamic map
- Participation in examining details of proposals for standardizations
- Acceleration of R&D at participating companies

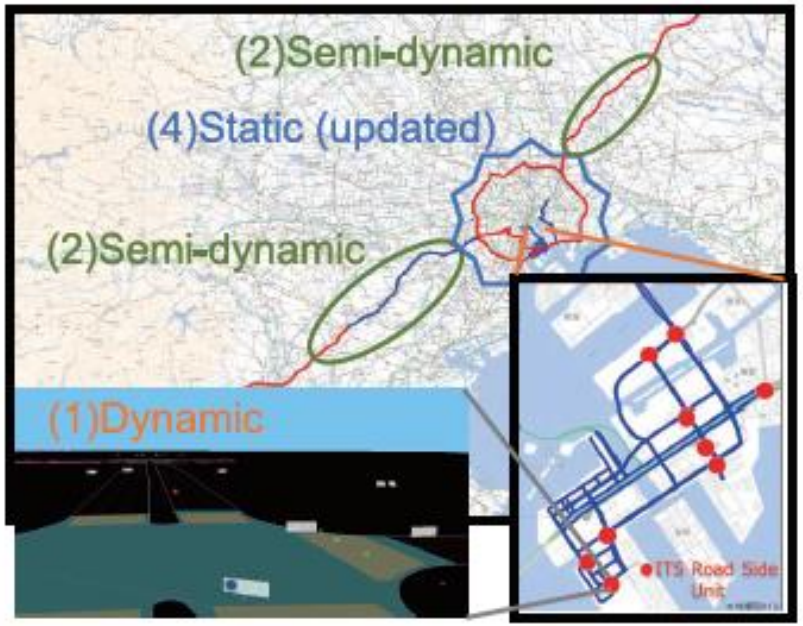
Dynamic Map FOT

Participants: 22 participants

ALPINE, BMW, MINI, BOSCH Invented for life, Calsonic Kansei, Continental, DAIHATSU, HONDA The Power of Dreams, mazda, Mercedes-Benz, 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



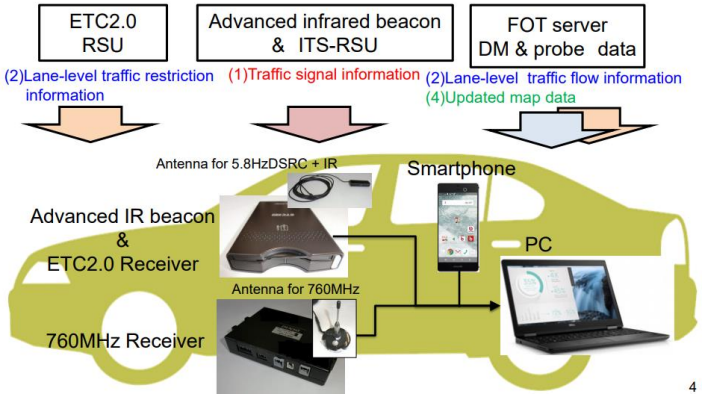
SIP

Dynamic Map FOT

Data for Dynamic Map FOT

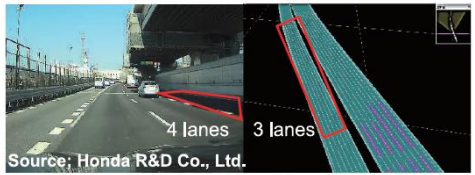
Data	Data: detail	Media
(1)Dynamic	Traffic signal information	Advanced infrared beacon & 760MHz
(2)Semi-dynamic	Lane-level traffic flow information (Probe data)	LTE
	Lane-level traffic restriction information	ETC2.0(5.8GHz)
(3)Semi-static	NA	NA
(4)Static	Map data	DVD
	Updated data	DVD+LTE

System for Dynamic Map FOT

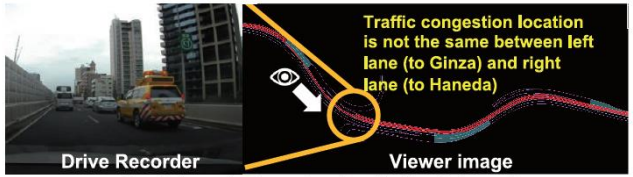


4

FOT situations

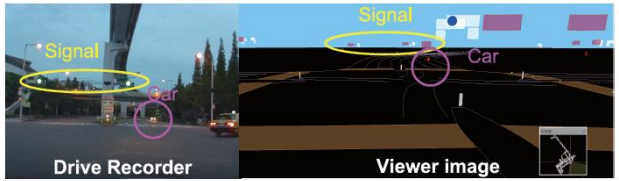


Change road shape (3 lanes >>4lanes) = Updated Map



Semi-dynamic: Lane-level traffic flow information

Semi-dynamic: Lane-level traffic restriction information



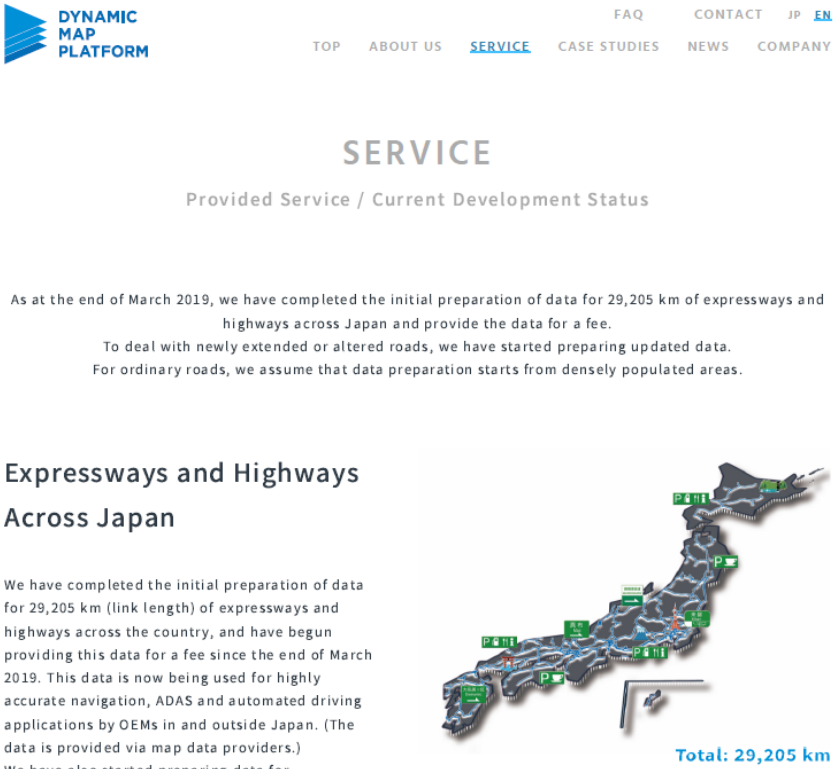
Dynamic: Traffic signal information, vehicle location

Result of Dynamic Map FOT

- ✓ The documents had created as result of the FOT.
- ✓ These documents are available via the website.

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

Result of the SIP-adus



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

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

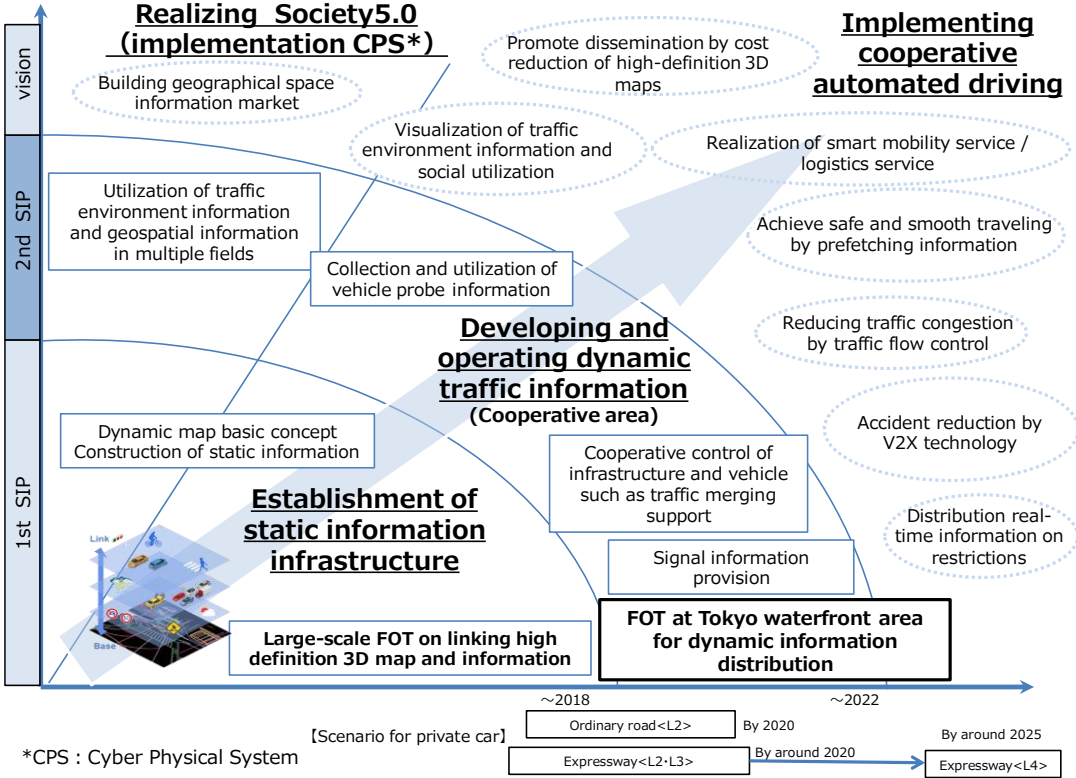
2. Activities of SIP-adus

- Results of the 1st Phase (2014-2018)
- **The 2nd Phase of SIP-adus (2018-2022)**

Overview of the 2nd Phase of SIP-adus

Roadmap for Establishing Traffic Environment Information:

The cooperative infrastructure system will be standardized and commercialized through the FOT by establishing a test environment for utilizing dynamic information such as the traffic environment information, etc. provided by the traffic infrastructure.



*CPS : Cyber Physical System

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:

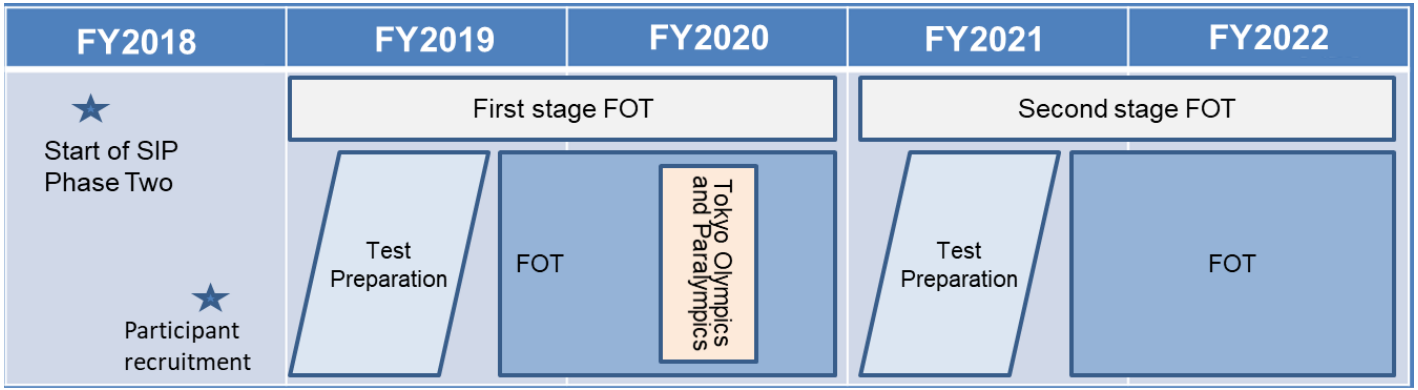
1st stage field operational test (2019 to2020)

- **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)

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

Schedule

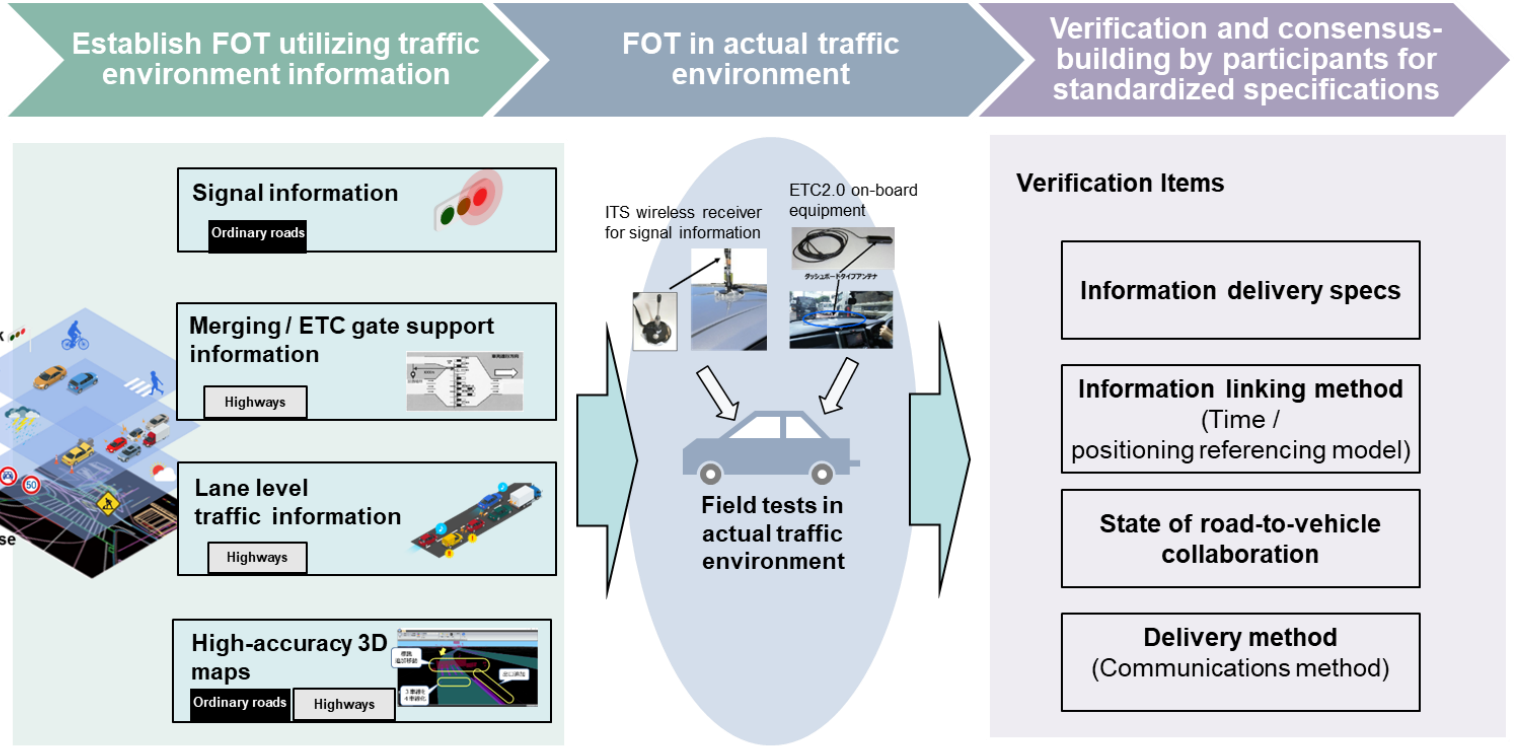


*There is the possibility the FOT will not take place during the Tokyo Olympics and Paralympics.

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.



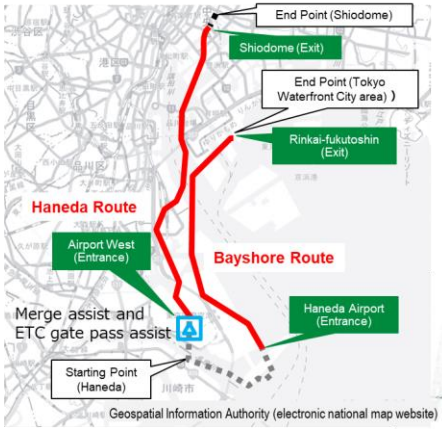
*The technological topics may increase/decrease according to R&D progress

Tokyo Waterfront City Area FOT

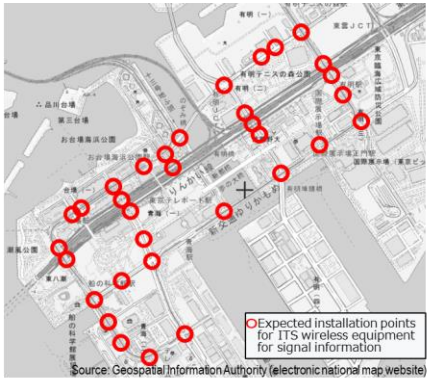
Test zone and Verification contents:

- ✓ FOT will be performed in three different areas, envisioning three different scenarios.
- ✓ Test participants can participate in FOTs in one or more areas.

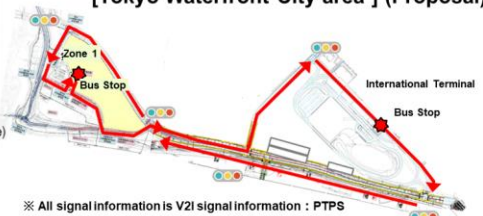
Test zone	Verification contents
Waterfront City area	**Impact assessment of cooperative infrastructure system field test** on Ariake and Odaiba **ordinary roads** using a level equivalent to SAE level 2 – 4 autonomous vehicles and road traffic
Haneda Airport area	**Impact assessment of cooperative infrastructure system field test** in the Haneda Airport zone **with next-generation city traffic ART** (a level equivalent to SAE level 2 / 4) using autonomous driving technology and road traffic
Metropolitan Expressway routes connecting Haneda Airport and the Waterfront City area, etc. (including ordinary roads)	**Field operational test of cooperative infrastructure system** (merge assist and ETC gate pass assist) **on water front highway** using a level equivalent to SAE level 2 – 4 autonomous driving cars and impact assessment of road traffic



[Expressway Connecting Haneda Airport with the Tokyo Waterfront City, etc.] (Proposal)



[Tokyo Waterfront City area] (Proposal)



[Haneda Airport Zone] (Proposal)

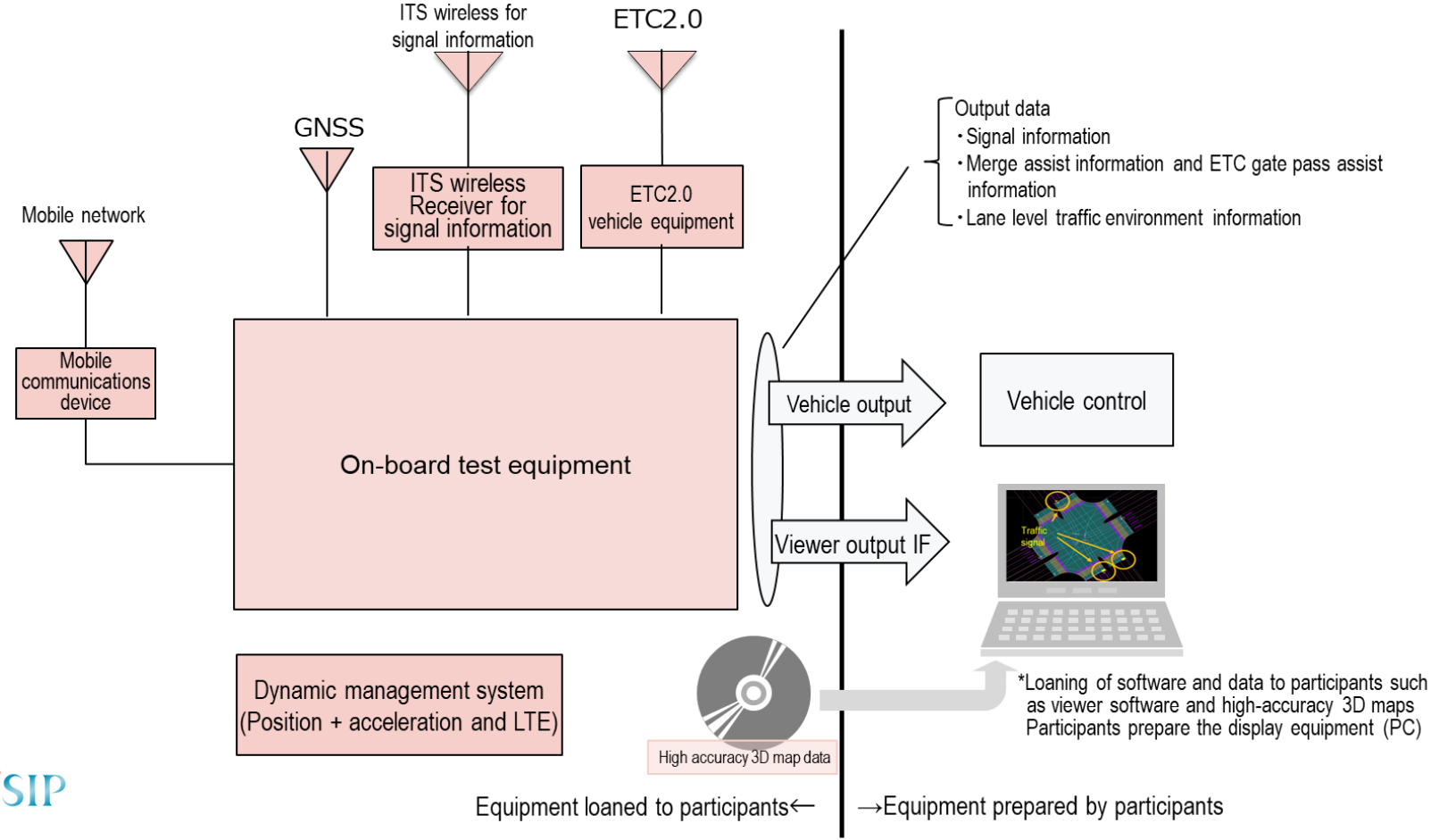
Participants for the FOT (-2020)

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.

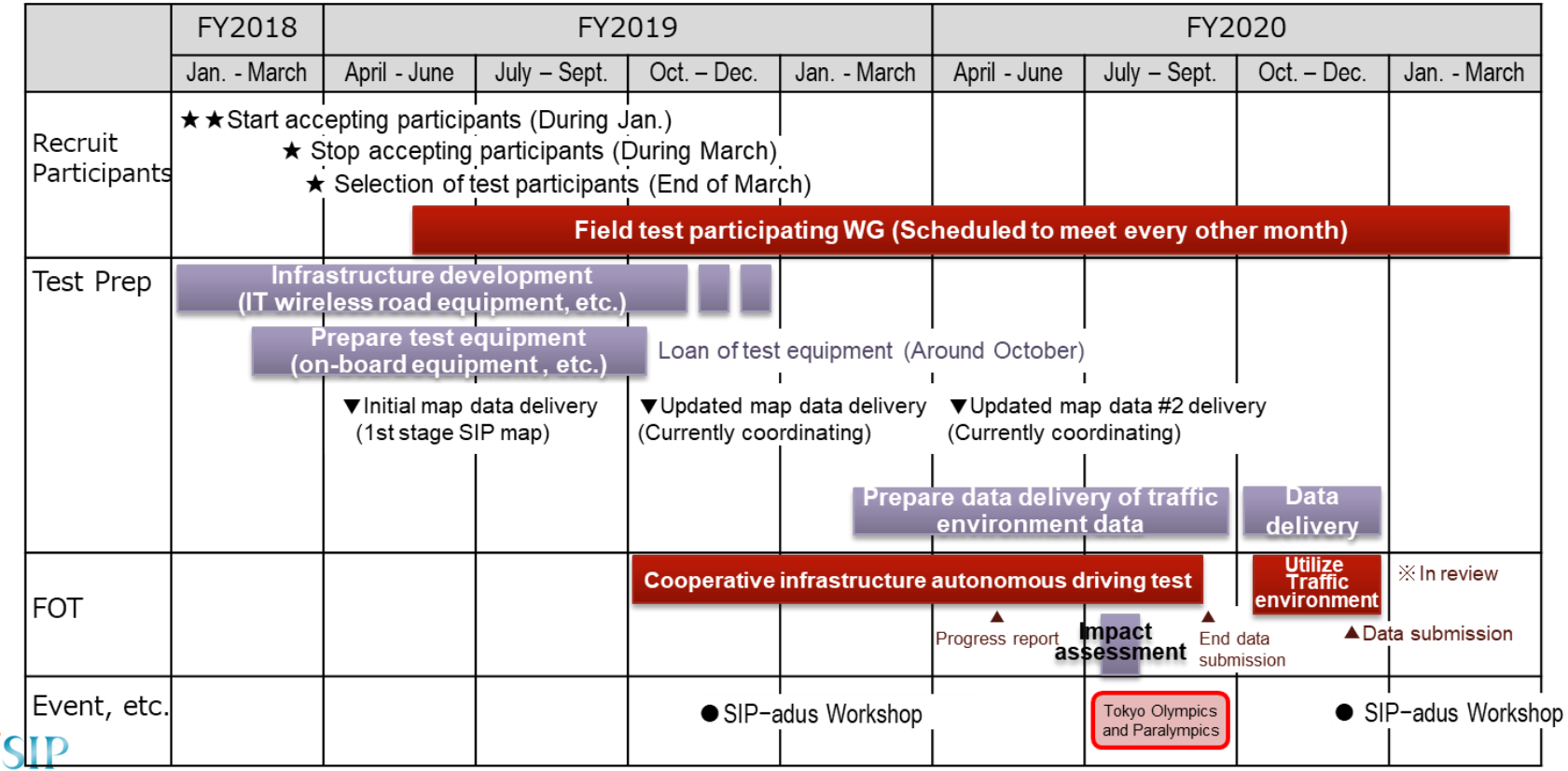
28 participants (31 May 2019)

Overview of the test equipment



Tokyo Waterfront City Area FOT

Implementation Schedule:



*There is the possibility the field operational test will not take place during the Tokyo Olympics and Paralympics.

3. Status of the international collaborations

Status of the international collaborations

- ✓ Actively participating standardization activities.
  - ➢ ISO (TC204/WG3 and other WGs)
    - ➢ ISO17572-4 (Precise relative location referencing profile) will be published soon!
      - SIP-adus is planning to use this standard at the FOT next year with the concept of CRP (Common Reference Points).
  - ➢ OADF (Open AutoDrive Forum) meeting
    - ✓ participate as a Steering Committee member
      - SIP-adus is thinking about using some OADF members' standards at the FOT
- ✓ Presentations, discussions on worldwide
  - ➢ ITS world congress, AVS, etc.


Thank you
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