ITS World Congress 2021
SIS38 Connected & Automated Driving research cooperation
between Europe and Japan

SIP-adus
FOT in Tokyo waterfront area

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SIP

Cabinet Office

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Society 5.0

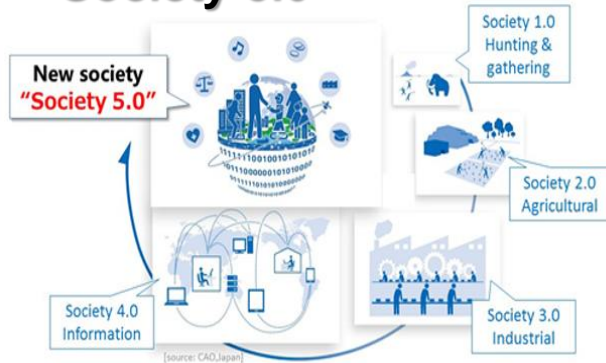**S**trategic **I**nnovation promotion **P**rogram

SIP 2nd   FY2018～FY2022

12 themes on going (SIP-adus is one of them)

adus ; **A**utomated **d**riving system for **u**niversal **s**ervice

➢ Promote cross-sector and **industry-academia-government collaboration**
➢ Intensive R&D program from **fundamental research to practical and commercialization**
➢ Promote Regulatory reform

1

SIP-adus Initiative

ADS (Automated Driving Systems)

Safe and secure mobility for all

Competition

Cooperation

Realization of Society 5.0

➢ **Technology**

    ①Dynamic Map
    ②Safety Assurance
    ③Cybersecurity
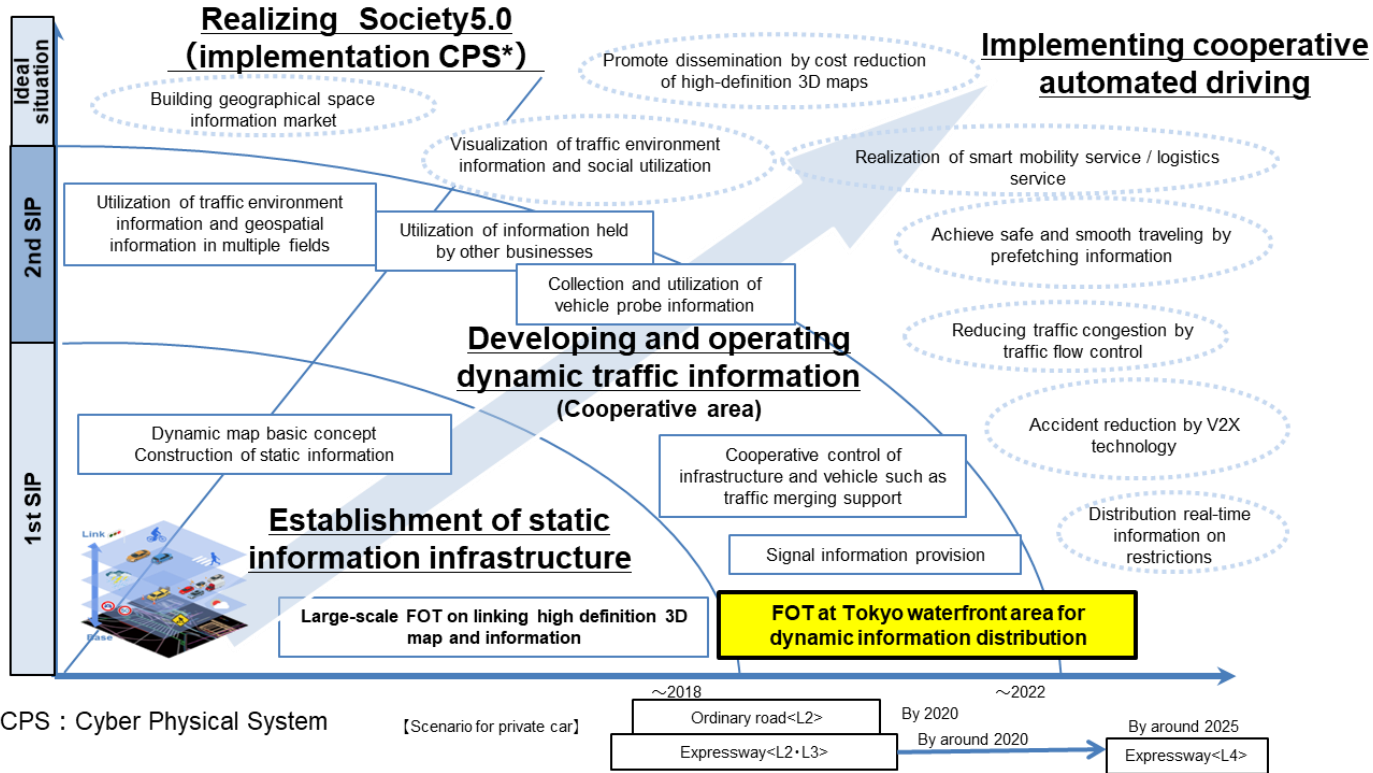   ④Geospatial dynamic data utilization
      etc.

➢ **Int. cooperation/Standardization**

➢ **Public acceptance**

➢ **Deregulation/Regulatory reform**

◆ SIP-adus is working on the development and operation of **traffic environment information** through **FOT on public roads**.

2019-2020 FOT areas
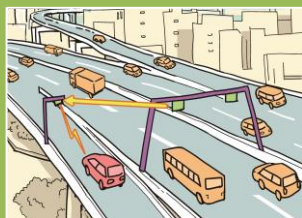
Period; October 2019 – march 2021

Tokyo waterfront city area

➢ **Signal display and change timing information** via ITS infrastructure
➢ Precise 3D map linked with signal info. etc

Tokyo metropolitan expressway

➢ **Merging assistance** on the main lane of highways
➢ ETC gate open/close info.
➢ Lane level traffic flow regulation info. Etc.

Haneda airport area (AD-Bus)

➢ Signal display and change timing information via ITS infrastructure
➢ **Magnetic marker**
➢ Bus stop, dedicated lane for bus service

Environment

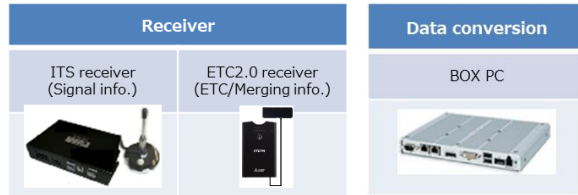◆ Establish an experimental environment for effective execution

✓ **High-precision 3D map** distribution
✓ Development of information distribution **infrastructure**
✓ Lending information **receiver**
✓ **Data conversion** to in-vehicle communication I / F

HP 3D map

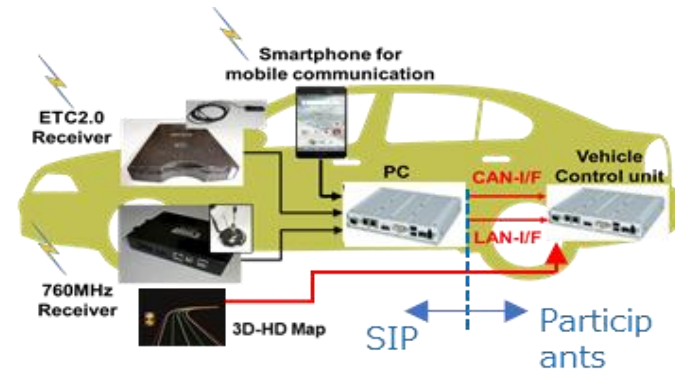
Equipments

Receiver	
ITS receiver (Signal info.)	ETC2.0 receiver (ETC/Merging info.)

Data conversion
BOX PC

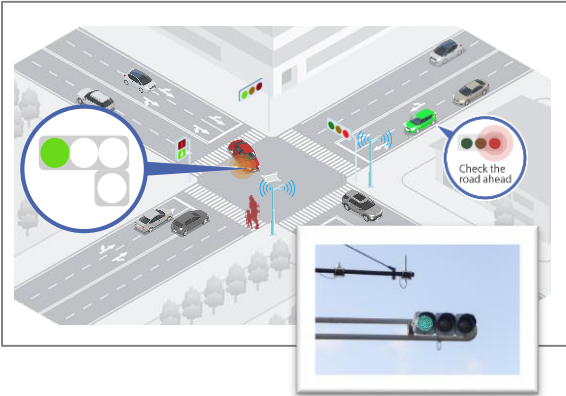| Vehicle information collection		
GNSS	Driving recorder	Locator

Infrastructure

Data conversion

Alphabetical order. A total of 29 institutions

SIP

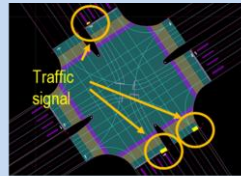# Results of FOT （Tokyo waterfront city area）

◆ Demonstrated the effectiveness of providing **signal information** via V2I

Installed V2I (760MHz) equipment at 33 intersections in Odaiba

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● Confirmed that **signal recognition** can be performed stably under various conditions based on **V2I information**.
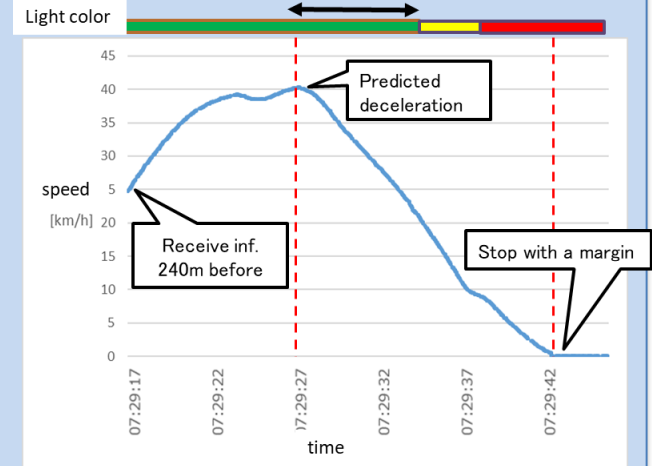

Superimpose display of the received V2I information on a high-precision 3D map

Ex.)Traffic signal color (green/yellow/red)

● Confirmed that **the dilemma zone* can be avoided** by V2I remaining seconds information

Light color

Predicted deceleration

speed [km/h]

Receive inf. 240m before

Stop with a margin

time

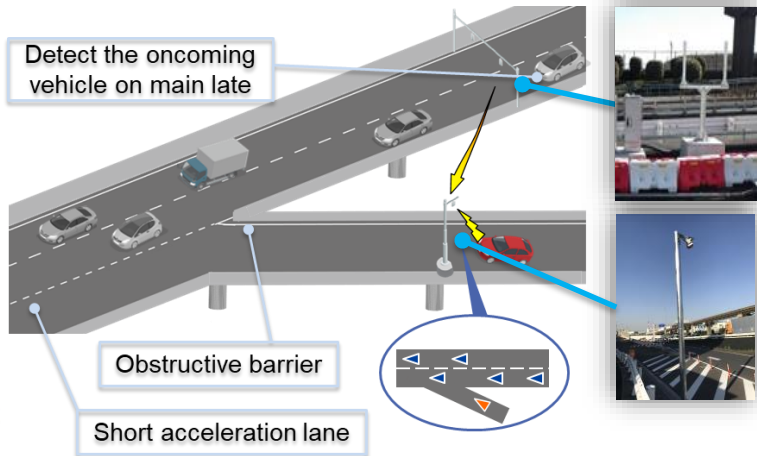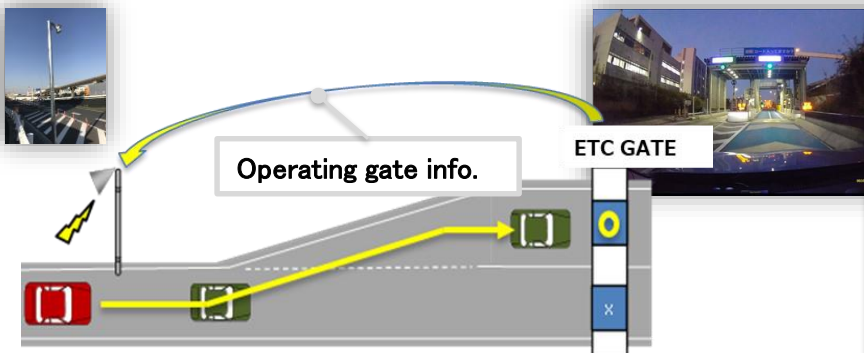07:29:17 07:29:22 17:29:27 07:29:32 07:29:37 07:29:42

＊It is the timing which the vehicle cannot pass the stopping line , and stop without sudden braking in yellow light.
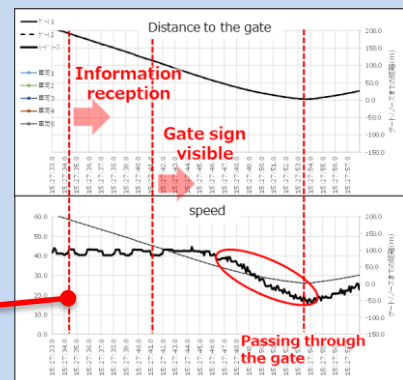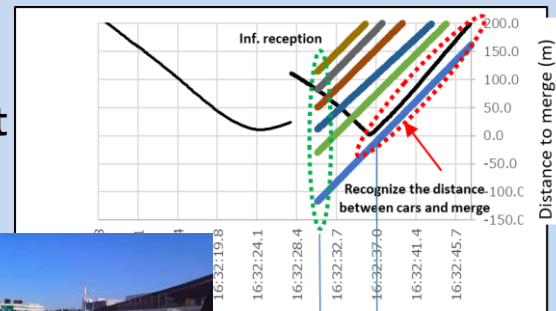
Results of FOT （Tokyo metropolitan expressway）

◆ Demonstrated the effectiveness of **merging support information** via V2I

- **Smooth course change and gate passage** due to early recognition of operating gates.

- Confirmed the possibility of **merging judgment and speed control** aiming at the gap by automated driving control.

◆ Demonstrated the realization of **next-generation ART*** using AD technology under mixed traffic. (＊ART : Advanced Rapid Transit)

Haneda Airport access road

SORA CITY
Bus P/F
International Terminal
Bus P/F

Road vehicle coordination equipment

PTPS** & Signal info. via V2I

Magnetic marker

Track guidance magnetic marker

Dedicated bus lane

(**PTPS: Public Transport Priority system)

● Demonstrated **level 4 AD bus** that does not require driver intervention and **on-time express delivery** by road-vehicle cooperation.

● Demonstrated a bus that is friendly to all people by gentle acceleration / deceleration and **precise docking for accessibility** (45mm± 10 mm) by AD control.
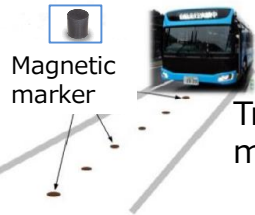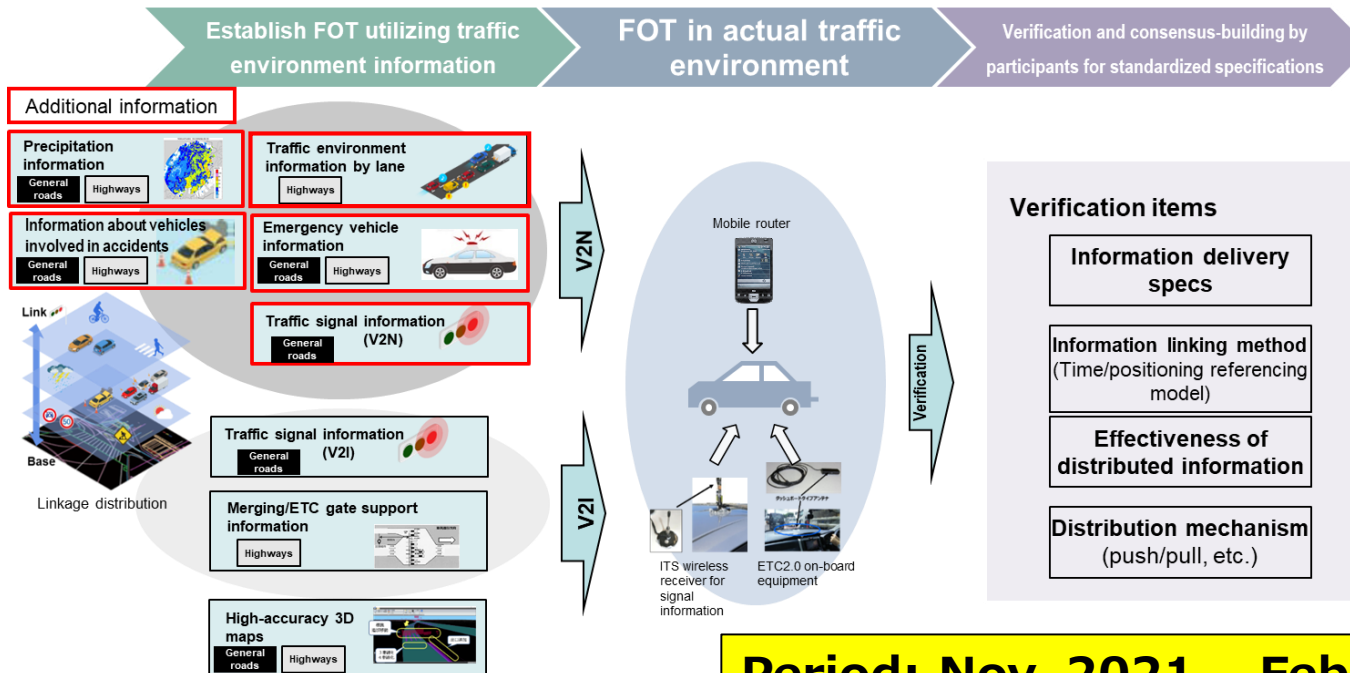
9

◆ SIP-adus is planning FOT that provide **dynamic traffic info. from a wide area** of infrastructure via **V2N** in 2021 with the aim of further expanding the operation design domain (ODD) of ADV and mobile / logistics services.

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

Period; Nov. 2021 – Feb. 2022

10

FOT in 2021（Simulation）

◆ SIP-adus is also working on the practical application of **a tool for the safety assurance of AD systems in virtual space**.
◆ FOT is realized by **developing and providing a simulation environment** for the Tokyo Waterfront City (Odaiba).
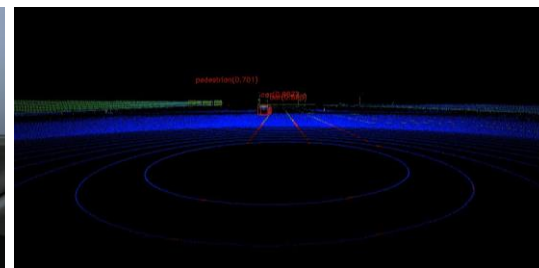
- Verification of the **reproducibility** of a realistic traffic environment

- Evaluate tool **usability** and simulation **effectiveness**

- Evaluation of **scenario setting tool** including movement of surrounding traffic participants

URL for FOT details and how to join
https://www.nedo.go.jp/english/news/ZZCD_100017.html

Euro-NCAP protocol

Camera output

LiDAR output

SIP 戦略的イノベーション創造プログラム
Cross-ministerial Strategic Innovation Promotion Program

Thank you