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

SIP-adus
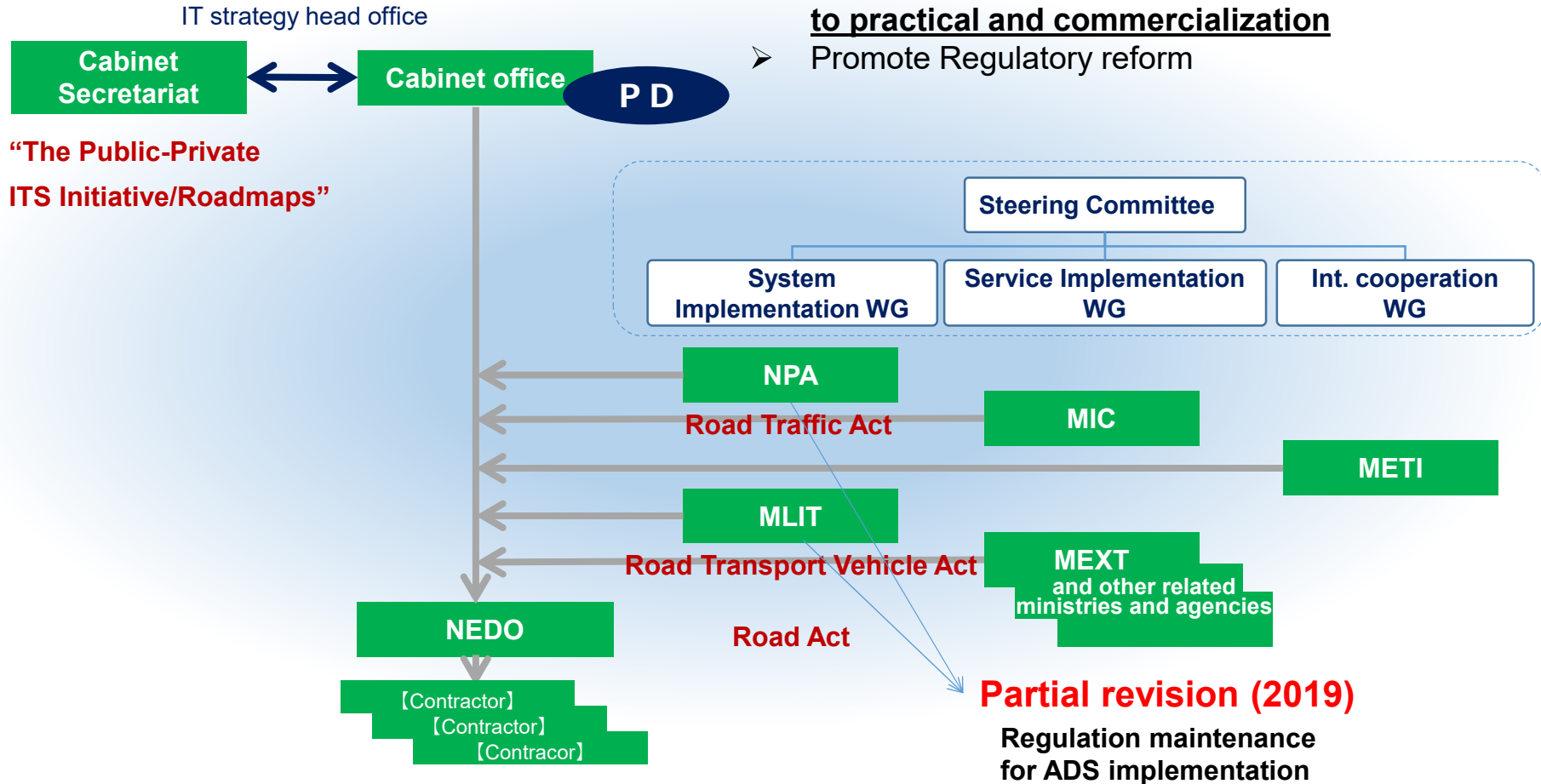## (automated driving for universal services)

Program Director
Seigo Kuzumaki

Contents

1. Framework and master schedule

2. Key challenges to be focused on

3. Main results of each projects and future plan

Framework to promote SIP-adus

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

IT strategy head office

Cabinet Secretariat ⟷ **Cabinet office** **P D**

"The Public-Private
ITS Initiative/Roadmaps"

Steering Committee

System Implementation WG	Service Implementation WG	Int. cooperation WG

NPA

Road Traffic Act

MIC

METI

MLIT

Road Transport Vehicle Act

MEXT
and other related ministries and agencies

NEDO

Road Act

【Contractor】
【Contractor】
【Contracor】

Partial revision (2019)

Regulation maintenance
for ADS implementation

NPA；National Police Agency

MIC；Ministry of Internal Affairs & Communications

METI；Ministry of Economy, Trade and industry

MLIT；Ministry of Land, Infrastructure, Transport and Tourism

MEXT；Ministry of Education, Culture, Sports, Science and Technology

Master Schedule & Goals

	FY 2018	FY2019	FY2020	Milestones for 2020	FY2021	FY2022	Goals for 2022
[I] Planning and promotion of FOTs		Planning, development, etc. of FOTs in Tokyo waterfront area	Deployment of FOTs / FOTs in local areas, etc.	• Deployment of FOTs in October 2019, and establishment and standardization of technologies • Realization of Lv4 mobility services in limited areas by 2020	Permanent deployment of infrastructure/practical application	Expansion of mobility service projects	• Determination of required infrastructure to be implemented in Tokyo waterfront area • Practical application of merging lane assistance system on Metropolitan Expressway • Local deployment of ART (FOTs → practical application) • Expansion of practical applications of mobility services (at least six locations)
[II] Technology development		Geographic data Architecture to development data for automated driving / Technology development for traffic signal information / Development and utilization of traffic environmental data (utilization of vehicle probe data) / Collection, integration, and distribution of small and medium-sized area information / Building a safety evaluation environment in cyberspace / New cyberattack techniques and countermeasure technologies / HMI and education methods in line with the sophistication of automated driving / Surveys on communication technologies for automated driving systems		• Implementation of a portal site, and validation of effectiveness of data sharing • Formulation of standard specifications for application to automated driving technologies • Goal setting for standardizing the traffic environmental data and establishing guidelines • Formulation of draft specifications for international standardization • Standardization of interface for standard platform, and demonstration of consistency with ADAS tests • Establishment of an organizational structure for evaluating IDS, and formulation of evaluation methods • Formulation of possible methods of communication • Validation and trial application to education • Development of use cases and issues to be addressed	Test operation / Full-scale operation / Modification / Validation / Operation / Demonstration toward full-scale operation/establishment of an organizational structure / Development of database toward commercialization / Development of guidelines for evaluating IDS / Standardization / Formulation of a roadmap for communication technologies		• Commencement of portal site services for multi-purpose deployment of data with geographical location • Commencement of providing traffic signal information with standard specifications • Commencement of providing traffic environmental data using vehicle probe data • Establishment of organization for sustainable operation of the data platform • Commencement of utilizing evaluation by third-party organizations • Development of IDS evaluation techniques and contribution to JASPAR's guidelines • Contribution to ISO standard of external HMI • Development of safe driving education programs and training materials • Contribution to the Public-Private ITS Initiative/Roadmaps
[III] Fostering of public acceptance		Providing Information to the public, etc. and promotion of understanding / Assessment of socio-economic impacts / Advanced driver assistance system for those who suffer from visual field loss		• Raising awareness via web / social media • Success of events • Measurement of effectiveness and evaluation • Quantitative estimation of impact by automated driving • Formulation of guidelines for designing driver assistance systems	Promotion of public understanding of automated driving based on long-term strategy / Policy change due to the output		• Establishment of organizational structure for continuous management of websites/social media information considering after SIP-adus period • Proposals of action plan based on impact assessment for Public-Private ITS Initiative/Roadmaps • Contribution to regulatory reform and technology development
[IV] International cooperation		SIP-adus WS/joint research with overseas entities	Formulation of intellectual property strategies	• Enhancement of international cooperation/promotion of international standardization • Formulation of standardization/ patent strategies	Promotion of continuous cooperative activities with overseas		• Setting of "international standardization" targets • Establishment of industry-academia organization for sustainable collaboration

Building the Traffic Environmental Info. Framework

Structure of ADS

In-vehicle sensor information

Lidar

Camera

Rader

Dynamic map

Link

Base

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
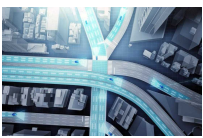**High-definition 3D Map**
Road, Lane, 3D Shapes of Structures etc.

Traffic environment info.

Traffic light

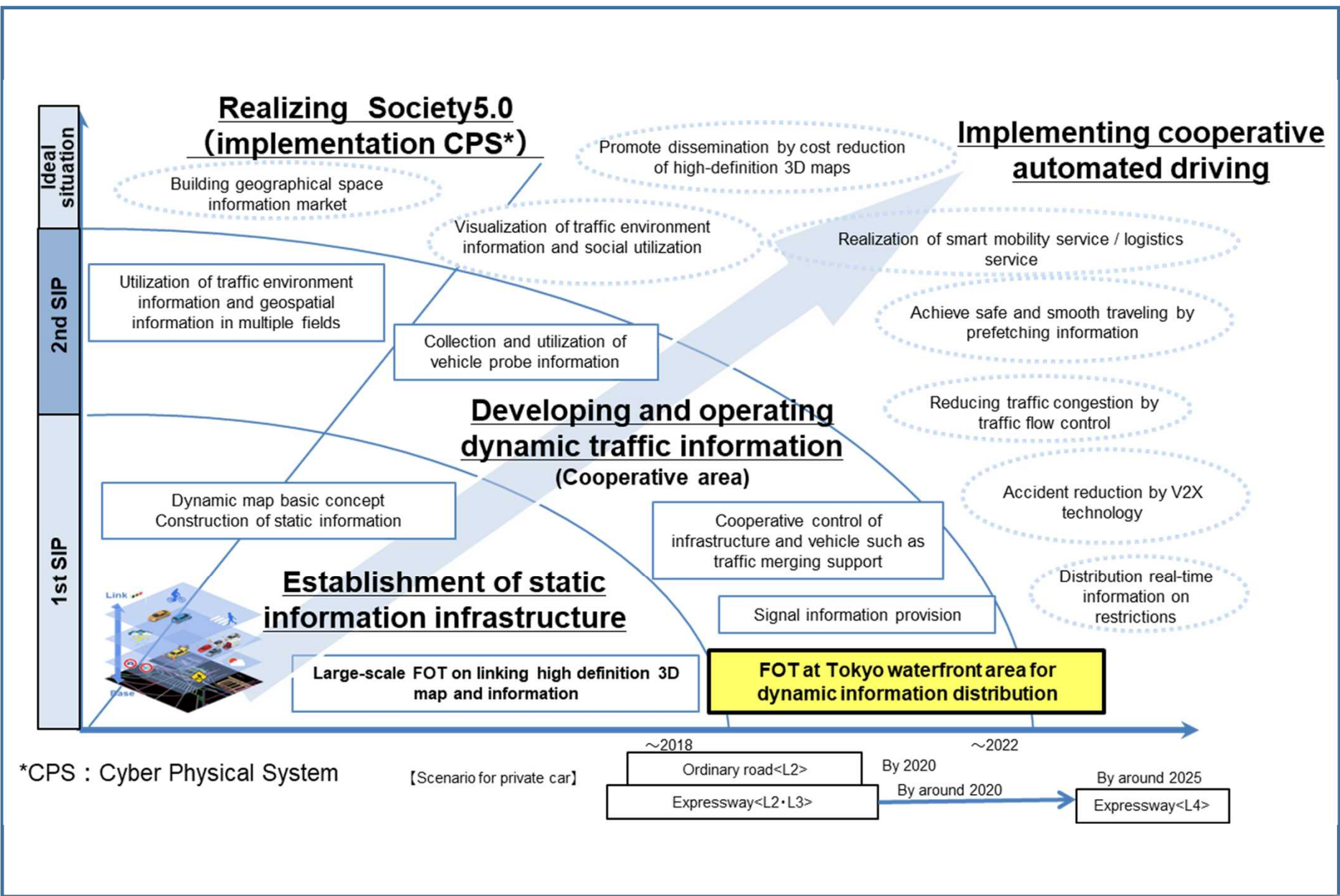Traffic Sign

Lane link

Road marking

Roadside edge

Localization

Pass planning

Advanced driver-assistance systems

Technology development in cooperative areas

Realization of Society 5.0
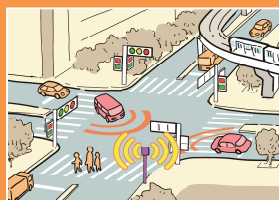
Building the Traffic Environmental Info. Framework

FOTs in Tokyo waterfront area

- **Promoting standardization in an internationally open experimental environment under public roads and mixed traffic**
- **Promoting R&D by drawing out private investment through a matching fund format with industry-academia-government collaboration**
- **Improving measures to foster public acceptance with planning test drive events, etc. in connection with the Tokyo Olympics and Paralympics**
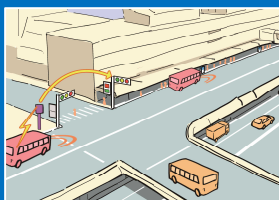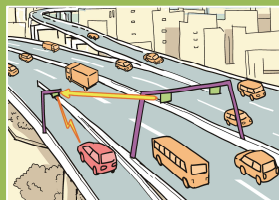

Tokyo Waterfront City area

- Signal display and change timing information via ITS infrastructure
- HD 3D map linked with signal info. etc

Haneda Airport area

- Signal display and change timing information via ITS infrastructure
- Magnetic marker
- Bus stop, designated lane for bus service

Metropolitan Expressway

- Merging assistance at main lanes of expressway
- ETC gate open/close info.
- Lane level traffic flow regulation info. Etc.

Orange : Tokyo Waterfront City area
Blue : Haneda Airport area
Green : Metropolitan Expressway

Participants from 29 institutions, including domestic and overseas automobile manufacturers, suppliers, universities, and other institutions.

Social Implementation of Mobility and Logistics Services in Local Regions, etc.

Objective

➢ **Gathering and deployment of the expertise of operation services, etc.** through accumulation of knowledge in FOTs and **improve the legal system, etc.** required for implementation and promote social implementation **to secure the means of mobility in underpopulated areas**

From November 30, 2019 at Michi-no-Eki **"Kamikoani"** (Akita Prefecture)

Commencement of automated driving mobility services

Improvement of the legal system

[Partial revision of the Road Act] (promulgated in May 2020)

Facilities that assist the operation of automated driving vehicles (e.g., magnetic markers) were regarded as accessories to roads.

Measures to cope with Issues in operation

◇ Establishment of new routes based on local needs
◇ Cost reduction Management operation combined with "Michi-no-Eki" operation
◇ Method of maintaining and managing infrastructure (electromagnetic induction wires)

Operation management systems

◇ Development and deployment of general-purpose operation management systems
◇ Cooperation with partners Cooperation with partners has been promoted by using the above tools and through communication with citizens.

Expand the projects to implement mobility services by FY2022 (at several locations) to help achieve the government's goal

(100 locations in 2030)

Architecture development about geospatial data

> **Enabling relation** and **sharing of data** by **compiling and structuring data** possessed by business operators in **various fields** to **solve social Issues and create new services**
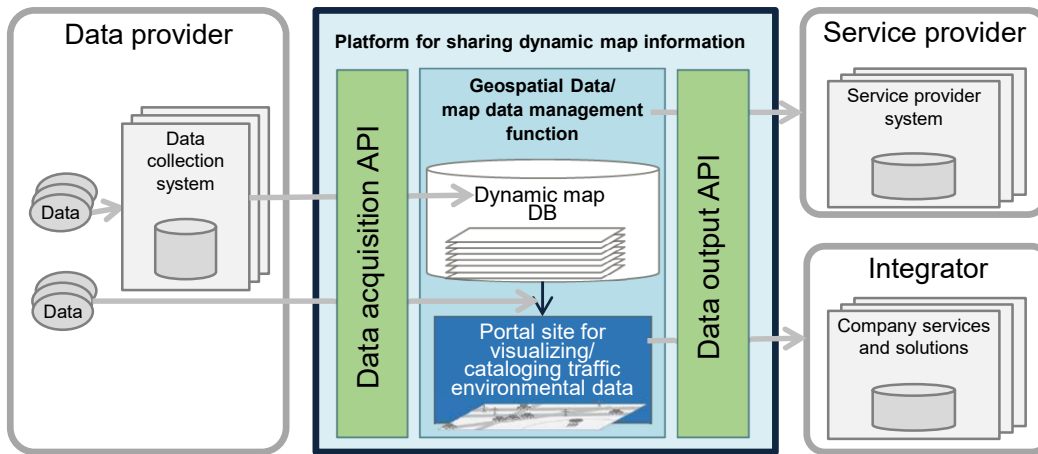
- **A data service app competition was held to solve issues faced by Kyoto.**
⇒ The best awarded app is considered for actual implementation.

*Awards ceremony (on November 7, organized by the Cabinet Office and cooperated by Kyoto City)

Data provider

Data collection system

Data

Data

Platform for sharing dynamic map information

Data acquisition API

Geospatial Data/ map data management function

Dynamic map DB

Portal site for visualizing/ cataloging traffic environmental data

Data output API

Service provider

Service provider system

Integrator

Company services and solutions

✓ **Data providers are matched with data users** on the portal site to **promote data sharing** by using an open API.

✓ **The portal site** has been **made accessible by limited users on a trial basis (first phase)** since the end of October 2020. It **will be made publicly available in spring 2021.**

✓ Collaboration will be made to **increase the number of partners (supporters)** of data providers and data users, respectively.
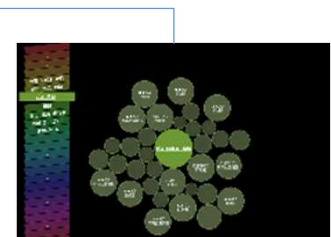
Portal site

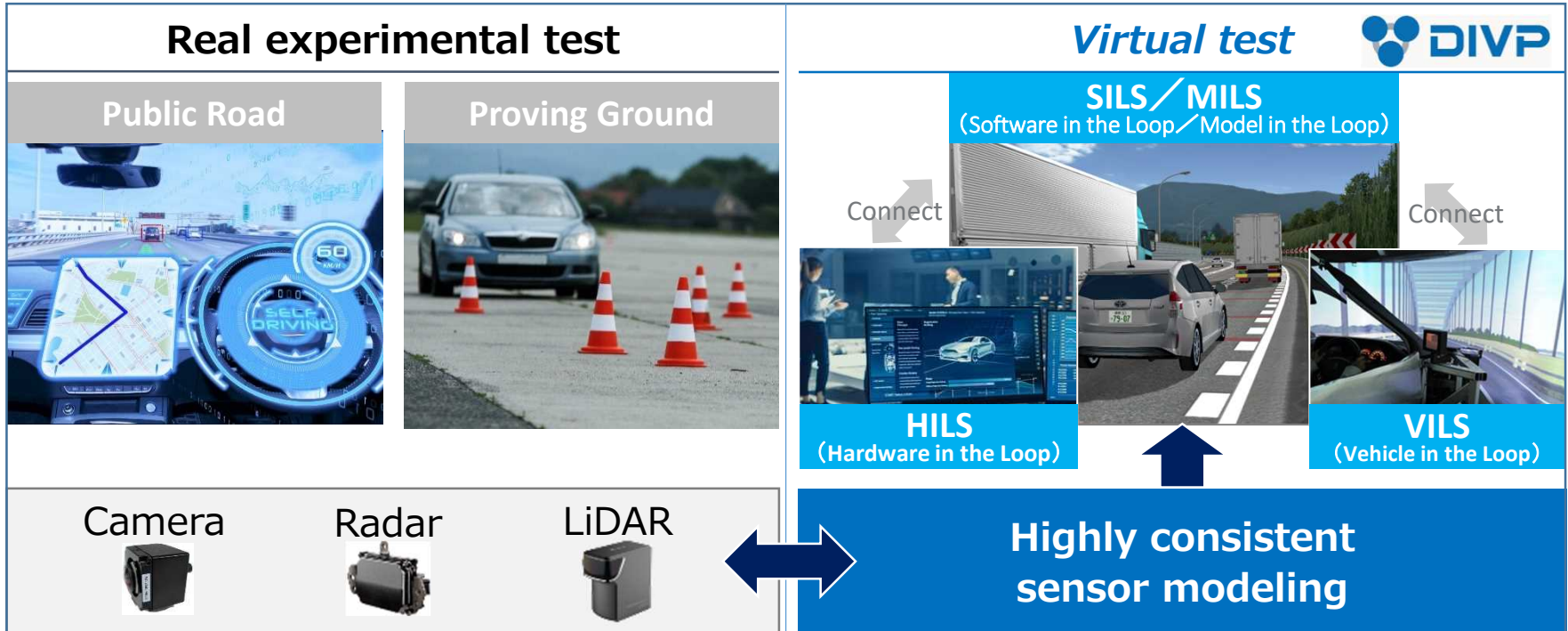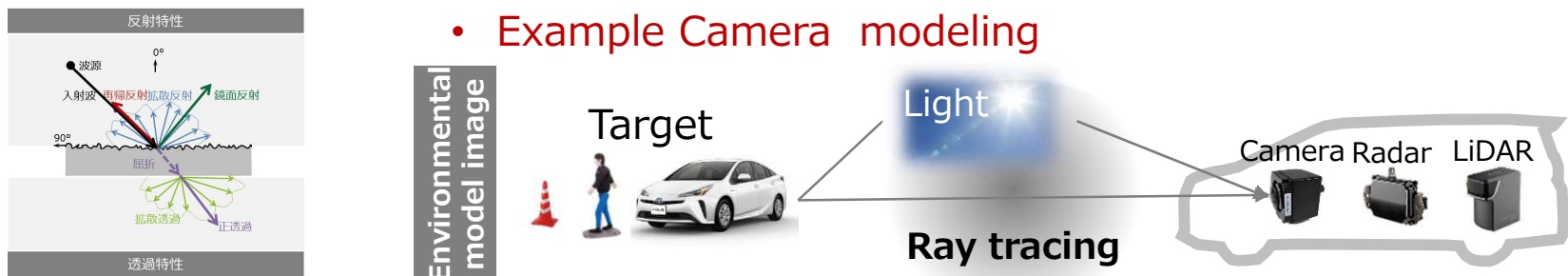**Matching of seeds with needs**
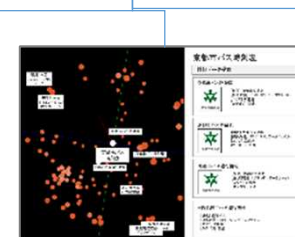
Similarity search

Category search

Building a safety evaluation platform in a virtual space

➤ Developing a simulation platform that replaces real vehicle evaluations with sensor modelling that is highly consistent with real phenomena, in order to perform reproducible safety evaluations of automated driving in various traffic environments.

Real experimental test

Public Road

Proving Ground

Camera   Radar   LiDAR

Virtual test ✔✔ DIVP

SILS／MILS
（Software in the Loop／Model in the Loop）

Connect   Connect

HILS
（Hardware in the Loop）

VILS
（Vehicle in the Loop）

Highly consistent sensor modeling

Source : Kanagawa Institute of technology, MITSUBISHI PRECISION CO.,LTD., DENSO Corporation, Pioneer Smart Sensing Innovations Corporation, Hitachi Automotive Systems, Ltd.

- **Example Camera modeling**

反射特性

波源
0°
入射波 再帰反射 拡散反射 鏡面反射
90°
屈折
拡散透過
正透過
透過特性

Environmental model image

Target

Light

Camera Radar LiDAR

Ray tracing

Model based on actual measurement data and physical principles for each material such as reflection / transmission characteristics
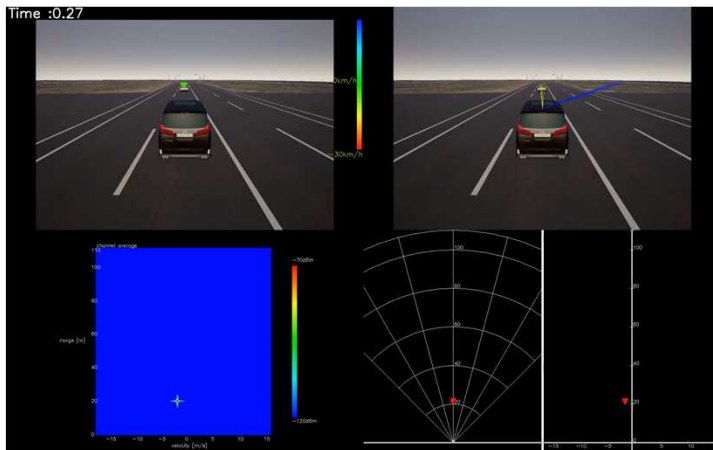
Building a safety evaluation platform in a virtual space

Camera Consistency verification result
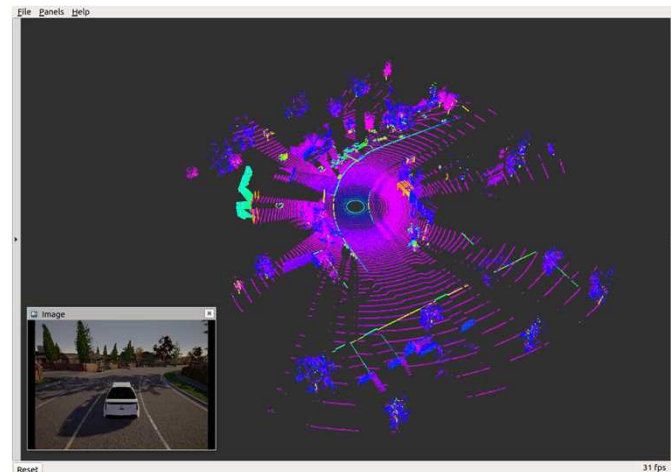
Real test result

SIM result （Clear sky）

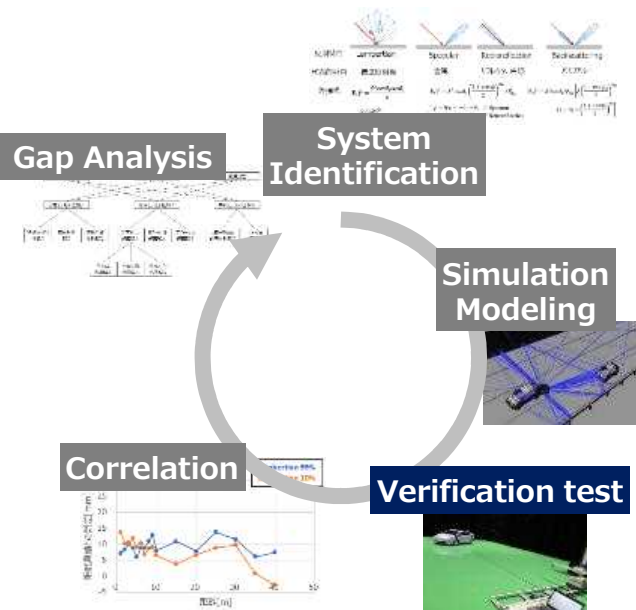## Radar simulation

LiDAR simulation

Building a safety evaluation platform in a virtual space

Basic verification in 2019, experimental verification using NCAP scenes and malfunction scenes using the test site in 2020
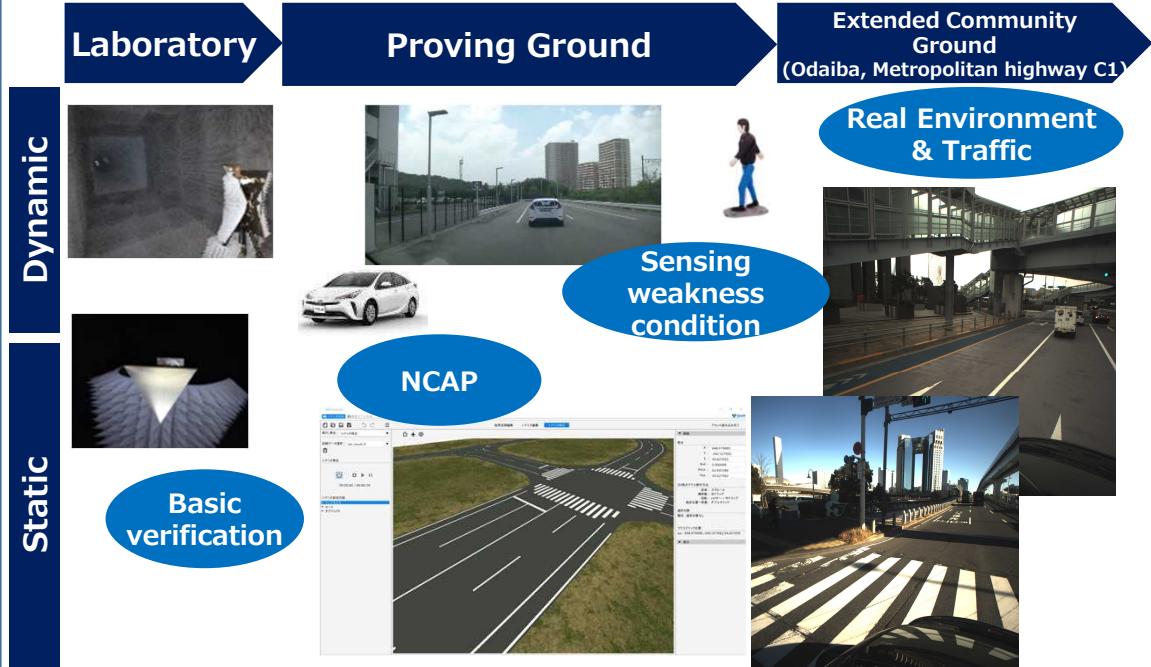⇒ **To verify virtual proving ground performance of Odaiba by using FOTs in the Tokyo waterfront area in 2021**

Measurement based approach

Gap Analysis · System Identification · Simulation Modeling · Verification test · Correlation

Source : DENSO Corporation, SOKEN, INC, MITSUBISHI PRECISION CO.,LTD.

Enhancement roadmap

Laboratory → Proving Ground → Extended Community Ground (Odaiba, Metropolitan highway C1)

Dynamic / Static

Real Environment & Traffic
Sensing weakness condition
NCAP
Basic verification
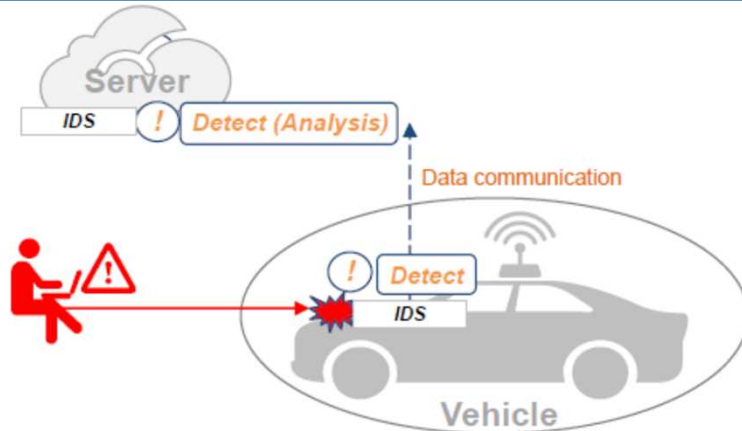
(NCAP; New Car Assessment Program)

Promoting commercialization by 2022

Countermeasure for New Cyberattack Techniques

> **To establish performance evaluation methodology for intrusion detection/prevention systems (IDS*, etc.)** as security technologies after the product introduction to the market phase **and establish guidelines** of the Japanese automotive industry

Results up to the current fiscal year

- The trend of IDS products and the latest attack techniques were surveyed.
- An **industry-academia-government promotion committee** was established.
- With **basic evaluation techniques** formulated, efforts have been made to conduct **evaluations with a larger sample size and confirm effectiveness** with cooperation from IDS product vendors.

***IDS** (Intrusion Detection System)
A system for **detecting** and **notifying** signs of attacks (e.g., reconnaissance and intrusion by attacker) by **monitoring** and analyzing events on the network

Evaluation using actual equipment

Efforts will be made to **establish guidelines** in cooperation with an industry organization (JASPAR).

JASPAR (Japan Automotive Software Platform and Architecture)

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International Cooperation

(1) Promotion of cooperation activities between Japan and Germany 🇩🇪

i) Ongoing cooperation (started from September 2019)

"Human Factors"   **"Impact Assessment"**

ii) Newly started cooperation research fields [joint press release by Japan and Germany on June 2, 2020].

"Safety Assurance"   **"Cybersecurity"**

(2) Promotion of cooperation activities between Japan and EU 🇪🇺

i) Online meeting with the European Commission at working-level

ii) Information exchange with respective projects in EU

TransAID   **HADRIAN**   **HEADSTART**

(3) SIP-adus Workshop 2020

➤ The **7th international conference** was held on November 10 (status report meeting), and 11 to 12(online symposium), 2020.

➤ This workshop aims **Japan to lead the international discussion on automated driving, addition to providing information** by utilizing the personal networks built through ongoing activities.

Result: **About 160 participants attended in-person conference** (status report meeting).
Minister of State for Science and Technology Policy Shinji Inoue delivered the opening address.
In the virtual conference (online symposium), **28 speakers from overseas and 33 speakers from Japan gave lectures.**
More than 1,000 participants attended virtually from Japan and overseas.

Fostering Public Acceptance

> To accelerate efforts to foster public acceptance by formulating a **long-term plan** and by planning and arranging opportunities for **interactive communication** depending on the targets to be reached

◆ **Website "Community to Think about a Society with Automated Driving: SIP café — Automated Driving —"** **(continued from 2019)**

- ✓ **Interactive information dissemination** through articles edited by high-profile journalists

◆ **Media communications** **(continued from 2019)**

- ✓ **Workshops and test ride events** with media on an ongoing basis

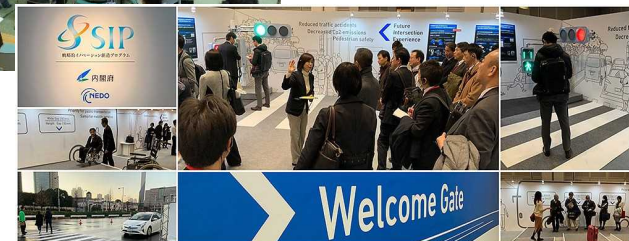◆ **Interactive communication events** **(to be held in January and March 2021)**

- ✓ **Citizens' Dialog** will be held while taking measures against COVID-19.

◆ **SIP-adus showcase event 2020** **(to be held on March 25 and 26, 2021)**

- ✓ The possibility of holding a hybrid (real/virtual) event is being considered.

◆ **Evaluation** **(continued from 2019)**

- ✓ The **results of questionnaire surveys are turned into KPIs** for respective factors of public acceptance. **Longitudinal surveys will be carried out** and **feedback will be contributed to action plan** (more than 10,000 respondents nationwide, once a year).

Thank you

https://sip-cafe.media/