National Research Project on Automated Driving to realize Society 5.0 - SIP-adus in Japan -

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SIP ; Strategic Innovation Promotion Program adus ; Automated driving for universal services

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ERTICO | ITS AMERICA | ITS | Federal Ministry of Transport and Digital Infrastructure | Hamburg | HAMBURG ITS World Congress 11 - 15 Oct 2021 Experience Future Mobility Now

Society 5.0

Data convergence

high degree of convergence between cyberspace (virtual space) and physical space (real space).

Economic advancement + **Solution of social problems**

provision of products and services that are needed to the people that need them at the time they are needed

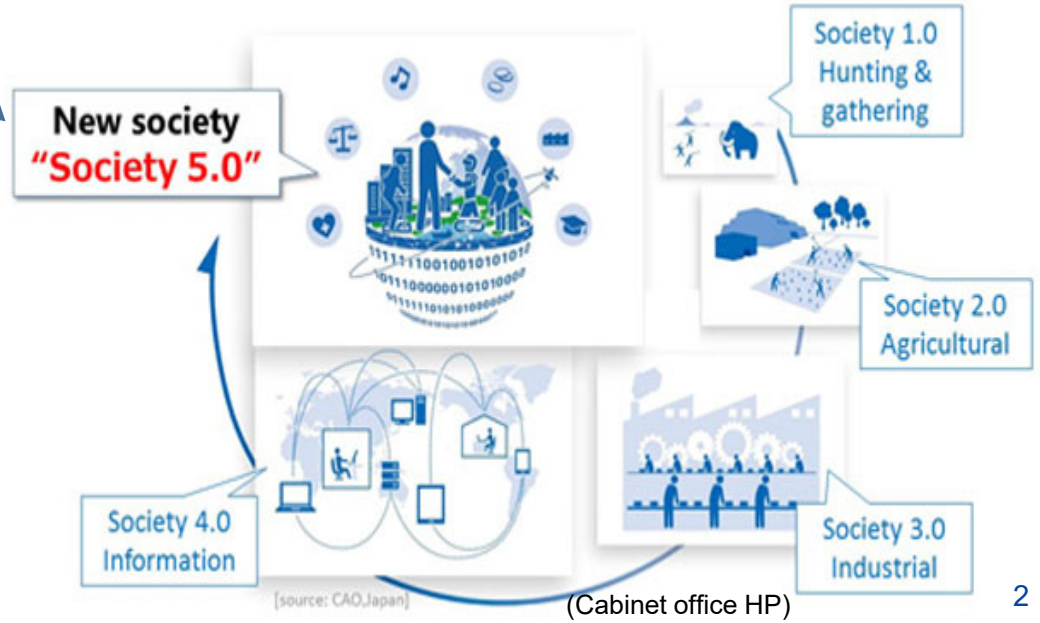
human-centered society in which anyone can enjoy a high quality of life full of vigor

SIP Strategic Innovation Promotion Program

SIP 2nd FY2018～FY2022

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

adus ; Automated driving for universal services



(Cabinet office HP)

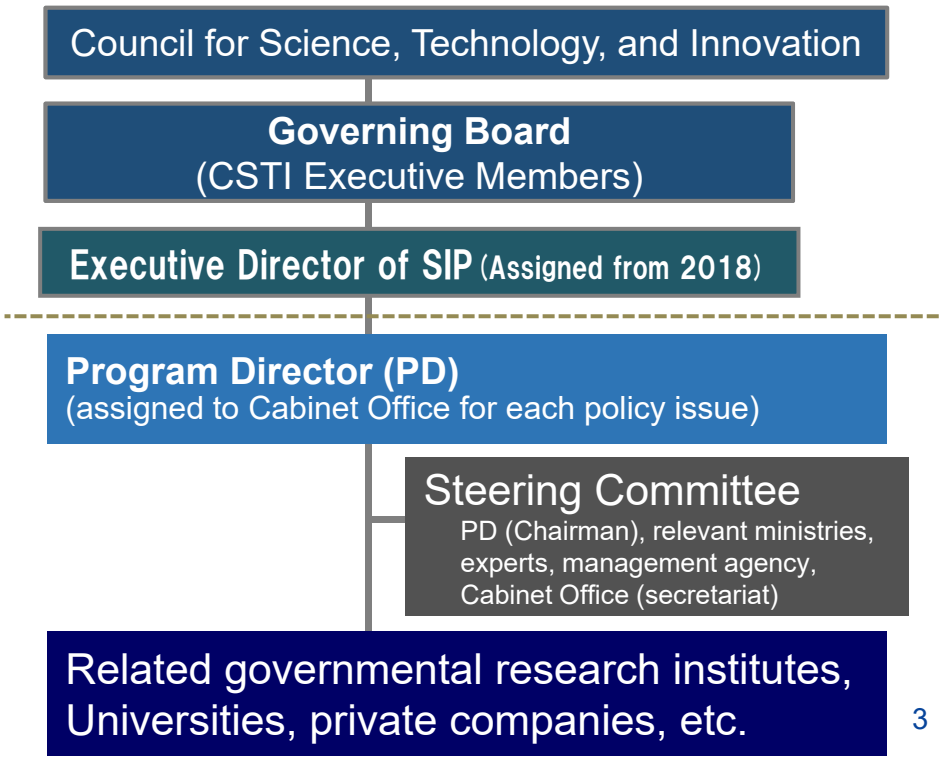
Outline of SIP

- **Intensive R&D program**
  - ✓ promote 5-year R&D (FY2018 - FY2022)
  - ✓ from fundamental research to social implementation and commercialization
- **Promote cross-sector collaboration**
  - ✓ enhancing cross-ministerial cooperation
  - ✓ promote industry-academia-government collaboration
- **Leadership and total Budget**
  - ✓ CSTI appointed Program Directors and allocates the budget for each research theme.*

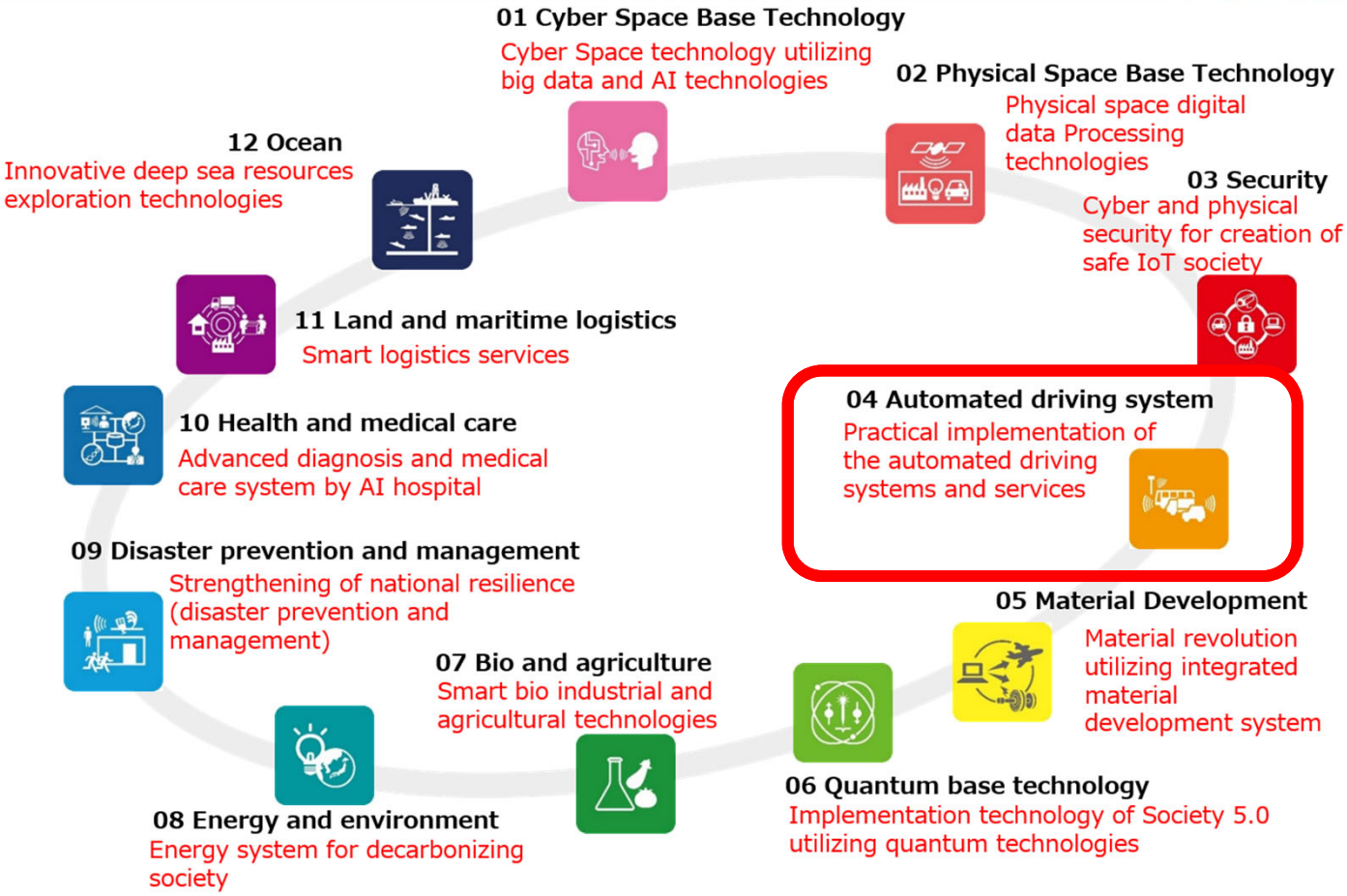
  * ¥28bil in total per year for SIP 12 themes

SIP

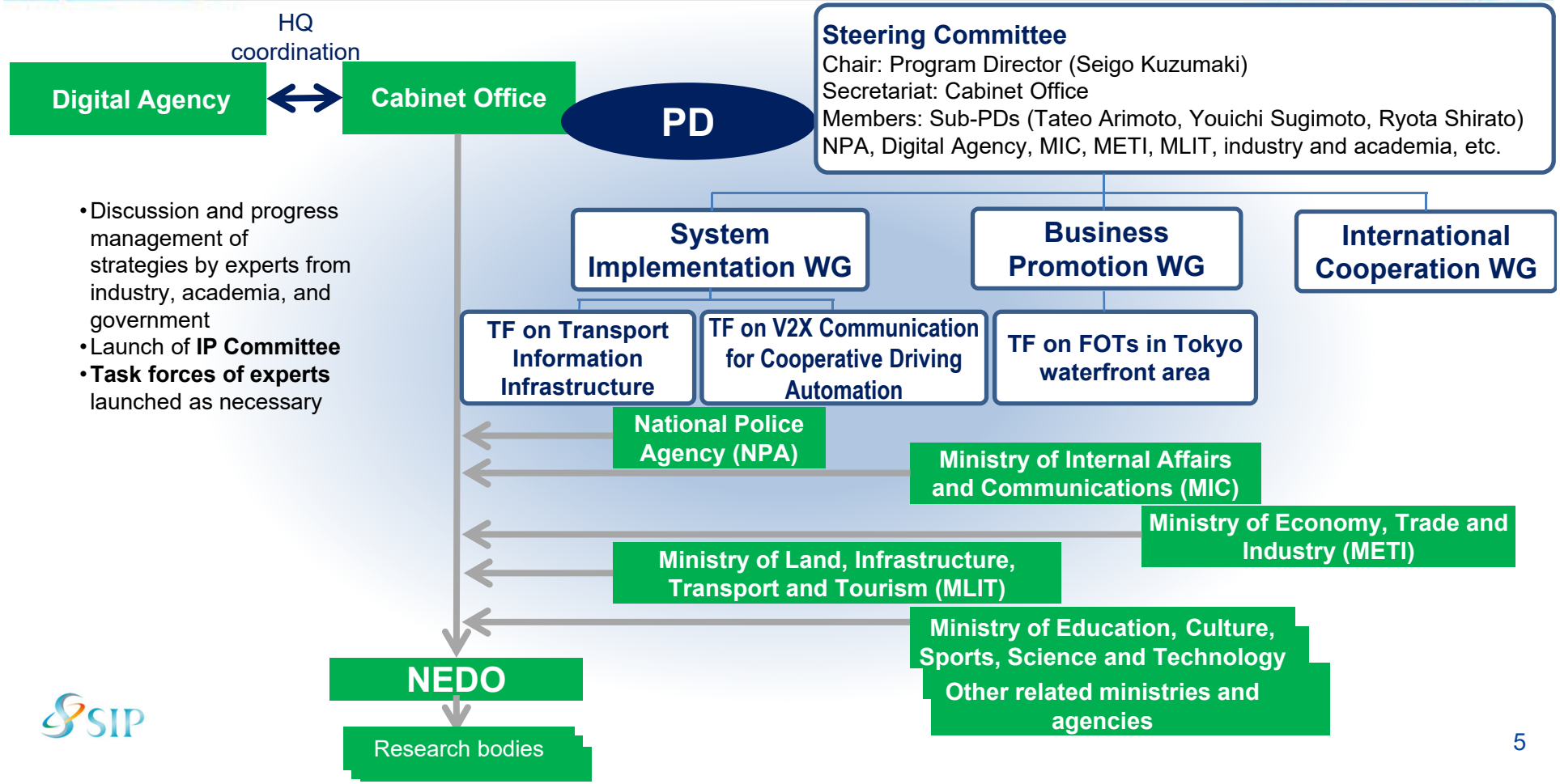
Cross-ministerial Strategic Innovation Promotion Program



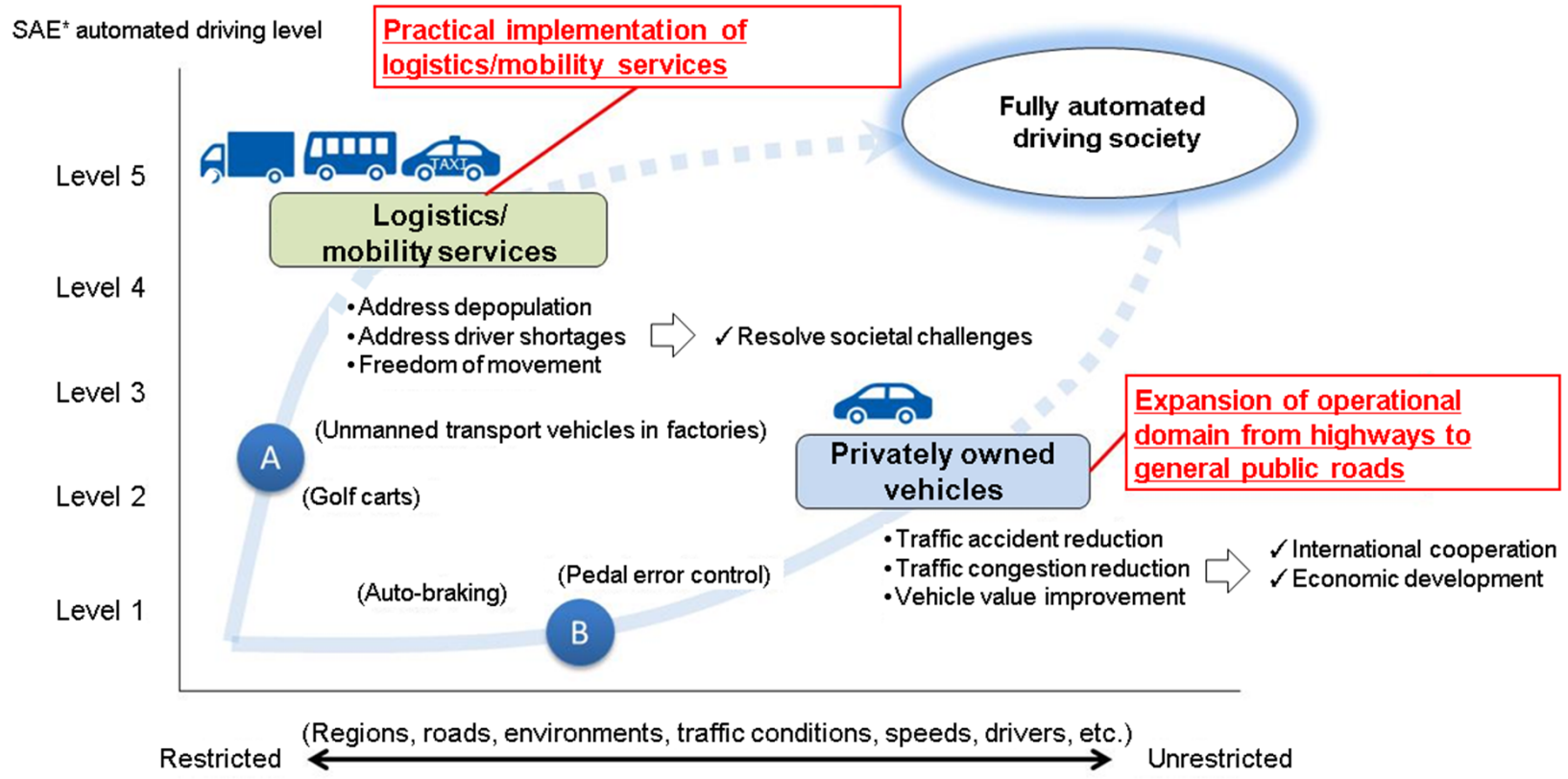
2nd phase of SIP (FY2018-2022) - 12 Programs



Promoting structure of SIP-adus



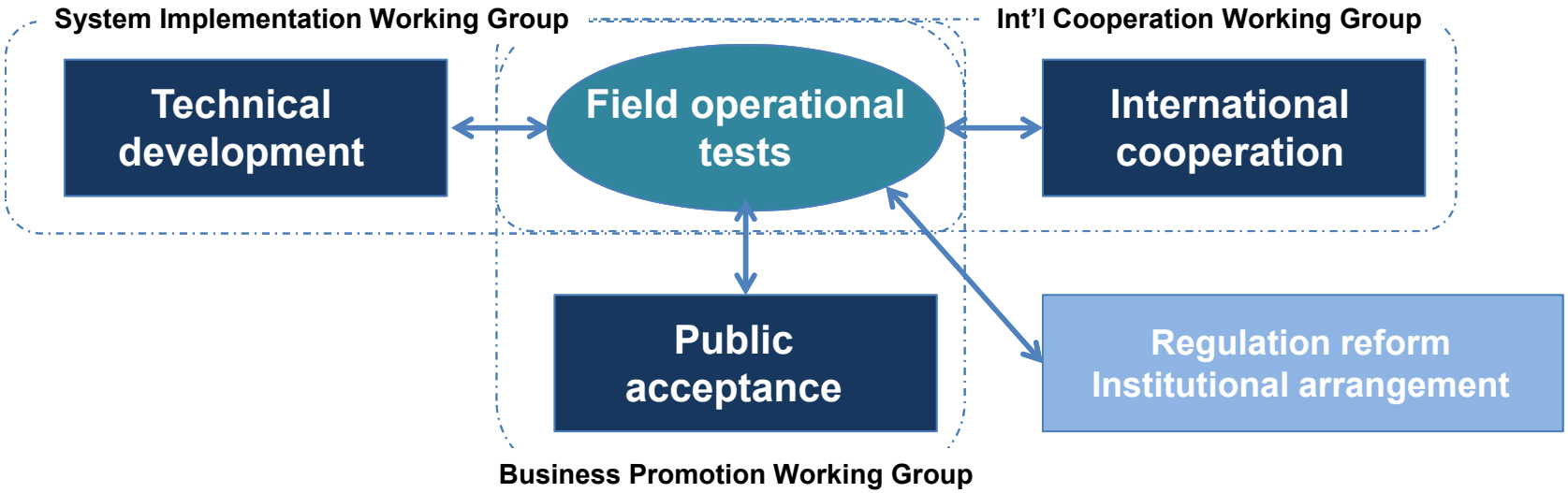
Overview of 2nd Phase of SIP-adus



*SAE (Society of Automotive Engineers): Standardization body in the U.S.

Focus themes

【4 pillars】



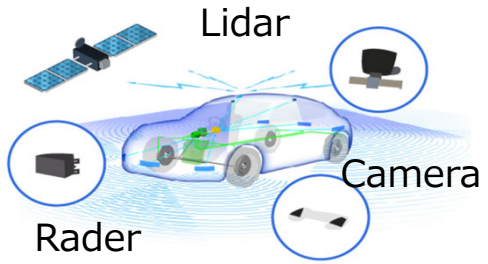
【Focus themes】

（Ⅰ） Traffic environment information (Dynamic map)
（Ⅱ） Traffic environment data portal
（Ⅲ） Virtual validation platform for ADS safety assurance
（Ⅳ） Evaluation methodology of Intrusion detection system

Dynamic map

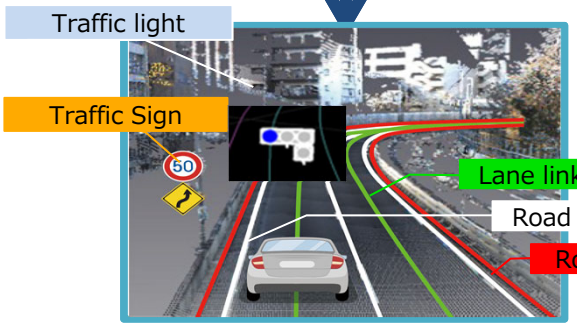
Structure of ADS

In-vehicle sensor information



Dynamic map

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-precision 3D Map
	Road, Lane, 3D Shapes of Structures etc.



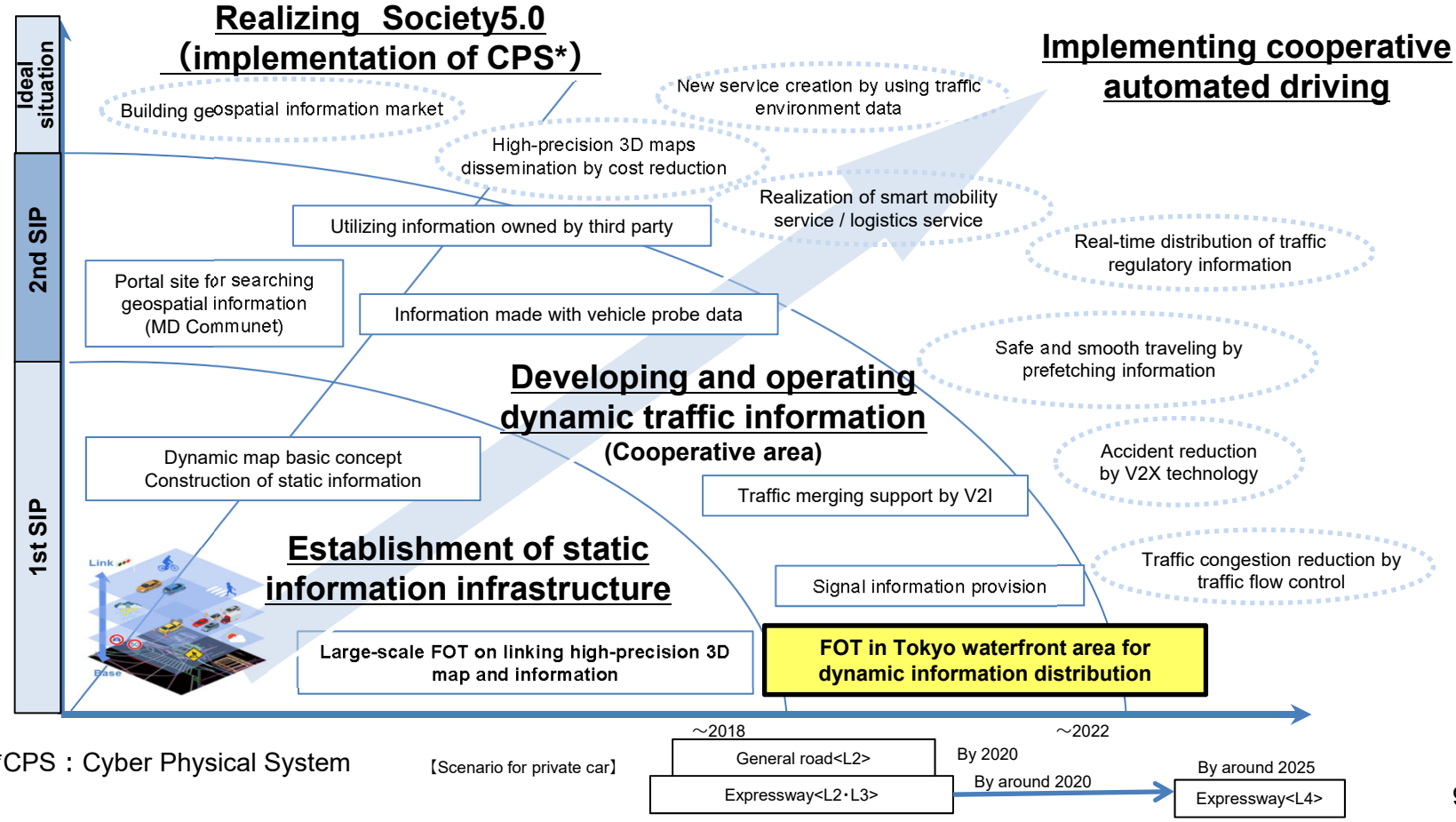
Traffic environment info.

- Localization
- Pass planning
- Advanced driver-assistance systems

Technology development in cooperative areas

Realization of Society 5.0

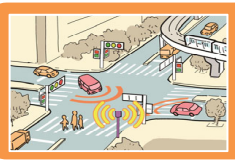
Building the Traffic Environment Info. Framework



*CPS：Cyber Physical System

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

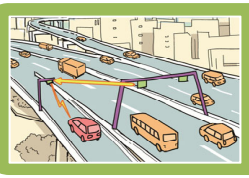


(a)Tokyo Waterfront City area

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

(b)Haneda Airport area

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



(c)Metropolitan Expressway

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

◆ From this Fall, FOT will be expanded to provide **dynamic traffic information from a wide area** of infrastructure via **V2N** with the aim of further expanding the operational design domain (ODD) of ADV and mobility / logistics services.

Participants of FOT in Tokyo waterfront area

- 22 institutions including domestic and foreign automobile manufacturers, auto parts suppliers, universities, start-ups and others

Alphabetical order. A total of 22 institutions

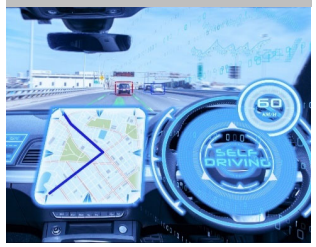
※As of July 2021

Safety Assurance

- 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

SIP

Simulation evaluation of Tokyo waterfront area

- **Build Odaiba Virtual-PG environment**
  - ✓ **Modeling of FOTs in Tokyo waterfront area**
  - ✓ Model building of traffic participants （3D model） pedestrian/bicycle/vehicle etc.
  - ✓ **Reproduction of weather conditions** （sunlight, rain, nighttime）

- **Evaluate tool usability and simulation results**
  - ✓ Evaluation of scenario setting tool including traffic participants
  - ✓ Comparative evaluation of sensor detection data and simulation

SIP

International cooperation

(1) Japan-Germany research cooperation


“Human Factors”


“Impact Assessment”


“Safety Assurance”


“Cybersecurity”

(2) Japan-EU research cooperation

i) HEADSTART - SAKURA/SIP-adus (Safety Assurance)

- Agreed to develop joint white paper

ii) HADRIAN - SIP-adus Human Factors (Human Factors)

- Regular meeting to exchange the information

iii) SHOW - ITS Japan/UTmobI (Automated mobility services)

- Signing MOU in October

SIP-adus Workshop 2021

✓Date : November 09-10, 2021

✓Format : Virtual conference

- ✓ All sessions will be streamed online, additionally streamed in Central European Time and Eastern Standard Time for worldwide participants.

Plenary Session(provisional)

as of September 9

	November 09 (start at 9:00)	November 10 (start at 9:00)
AM (JST)	Opening / Regional Activities	Dynamic Map
	Impact Assessment	Connected Vehicles
PM (JST)	Service and Business Implementation / FOTs + Human Factors (Joint Session)	Safety Assurance
		Cybersecurity
	Japanese Government	Closing
For European Region	start at 9:30(CET)/17:30(JST)	start at 9:30(CET)/17:30(JST)
For Americas	start at 11:00(EST)/*1:00(JST)	start at 11:00(EST)/*1:00(JST)

* The time will be the next day

For further information, please visit our website **https://en.sip-adus.go.jp/evt/workshop2021/**


Thank you
SIP-adus web site
https://en.sip-adus.go.jp