

Automated Vehicles Symposium 2019

SIP Automated Driving System

SIP-adus ; Automated Driving System for universal service

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Sub Program Director of SIP-adus

18 July. 2019



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0. Society 5.0

1. Outline of SIP

(Cross-ministerial Strategic Innovation promotion program)

2. 1st phase of SIP-adus (FY2014-2018)

3. 2nd phase of SIP-adus (FY2018-2022)

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Society 5.0

Data convergence

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

Economic advancement

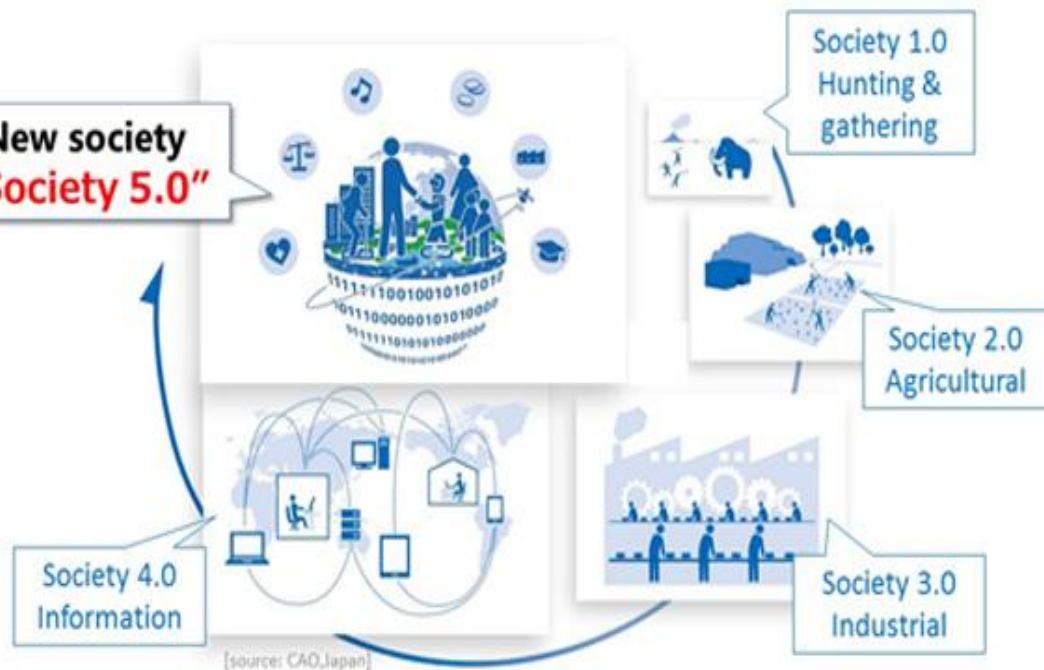
+

Solution of social problems

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

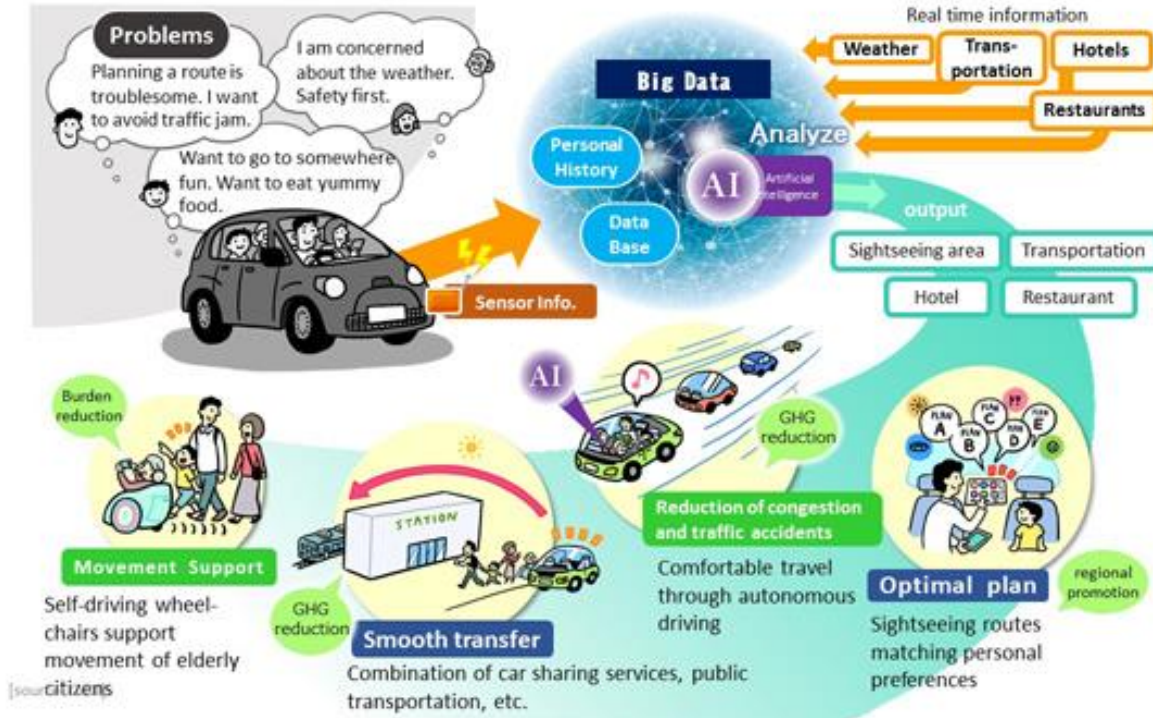
human-centered society in which anyone can enjoy a high quality of life full of vigor

New society
"Society 5.0"



(Cabinet office HP)

New value in the field of mobility



Optimal plan

Reduction of congestion and traffic accident

Smooth transfer

Movement support

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Outline of SIP

➤ Intensive R&D program

- ✓ promote 5-years R&D
 - 1st phase : FY2014 - FY2018
 - 2nd phase : FY2018 - FY2022
- ✓ from fundamental research to practical 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.*

* \50bil in total per year
(65% for SIP 11 themes, 35% for medical R&D)



Cross-Ministerial Strategic Innovation Promotion Program

Council for Science, Technology, and Innovation

Governing board
(CSTI Executive Members)

← Outside experts

Executive Director of SIP (Assigned from 2018)

Program Director (PD)
(assigned to Cabinet Office for each policy issue)

Steering Committee
PD (Chairman), relevant ministries,
experts, corporations,
Cabinet Office (secretariat)

Relevant ministries and management
corporations and other researchers

11 Themes of SIP (FY2014)



Priority policy issues	Themes	Objective
Energy	Innovative Combustion Technology	Improving fuel efficiency of automobile engines
	Next-Generation Power Electronics	Integrating new semiconductor materials into highly efficient power electronics system
	Structural Materials for Innovation (SM ⁴ I)	Developing both ultra-strong and -light heat-resistant materials for airplane such as CFRP, alloys, intermetallic, and ceramic-coatings and Materials integration system to predict performance of materials.
	Energy Carriers	Promoting R&D to contribute to the efficient and cost-effective technologies for utilizing hydrogen
	Next-Generation Technology for Ocean Resources Exploration	Establishing technologies for efficiently exploring submarine hydrothermal polymetallic ore
Next-generation infrastructures	Automated Driving System	Developing new transportation system including technologies for avoidance accidents and alleviating congestion
	Infrastructure Maintenance, Renovation and Management	Developing low-cost operation & maintenance system and long life materials for infrastructures
	Enhancement of Societal Resiliency against Natural Disasters	Developing technologies for observation, forecast and prediction of natural disasters
	Cyber-Security for Critical Infrastructures	Development of technologies that monitor, analyze, and defend control and communication system as well as confirm integrity and authenticity of system components to protect critical infrastructures against cyber threats.
Local resources	Technologies for Creating Next-Generation Agriculture, Forestry and Fisheries	Realizing evolutionary high-yield and high-profit models by utilization of advanced IT etc
	Innovative Design/Manufacturing Technologies	Establishing new styles of innovations arising from regions using new technologies such as Additive Manufacturing

SIP-adus

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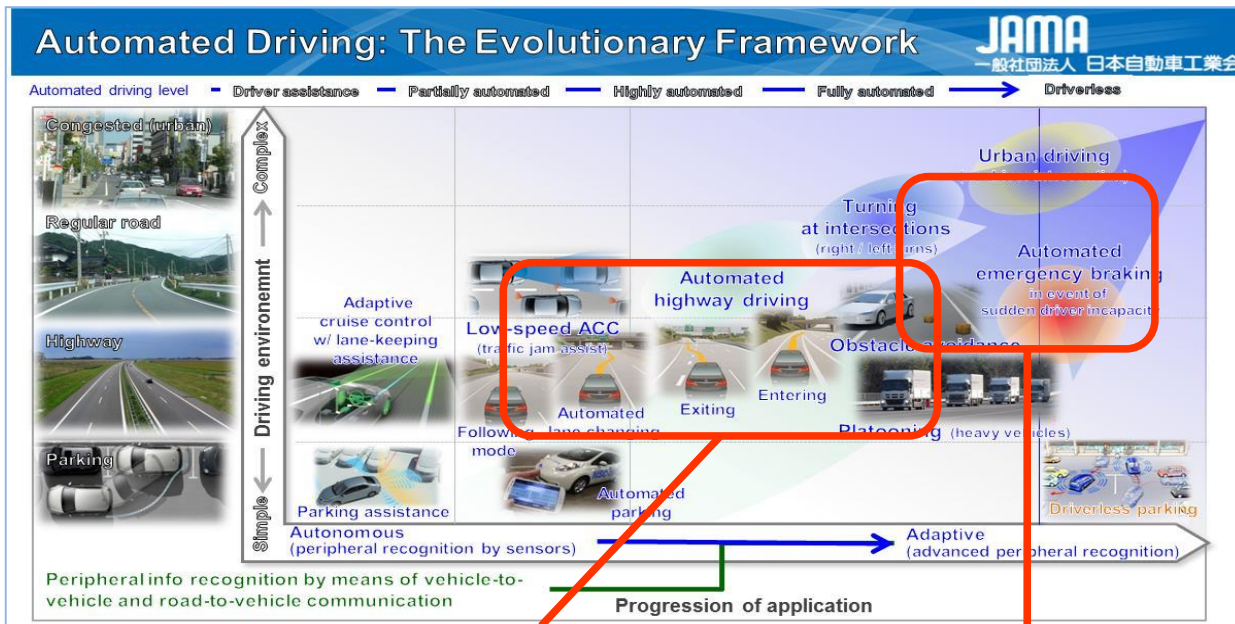
(Cross-ministerial Strategic Innovation promotion program)

2. 1st phase of SIP-adus (FY2014-2018)

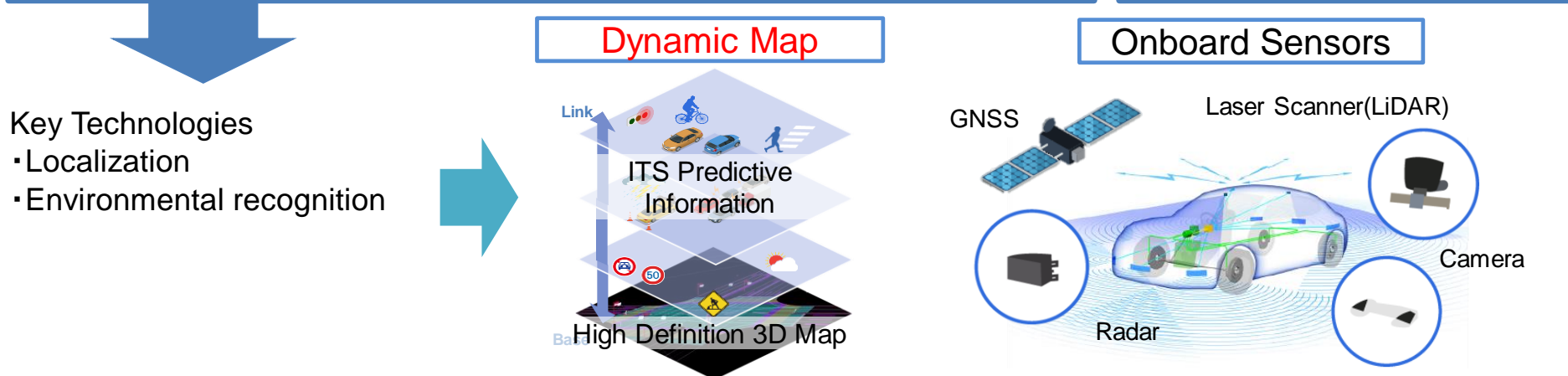
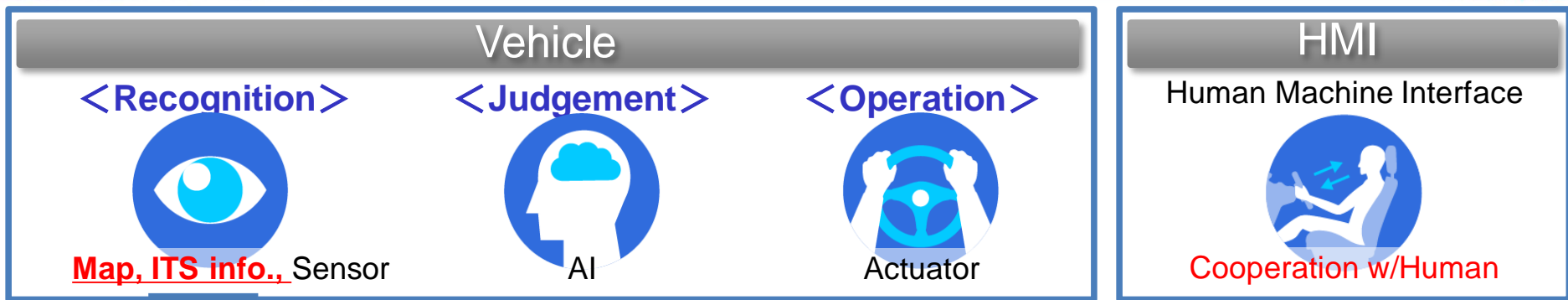
3. 2nd phase of SIP-adus (FY2018-2022)

Goal & Deployment milestone

- Ensuring safety and traffic jam reduction on the road
- Realization and deployment of Automated Driving System
- Realization of advanced next generation public bus service for vulnerable people.



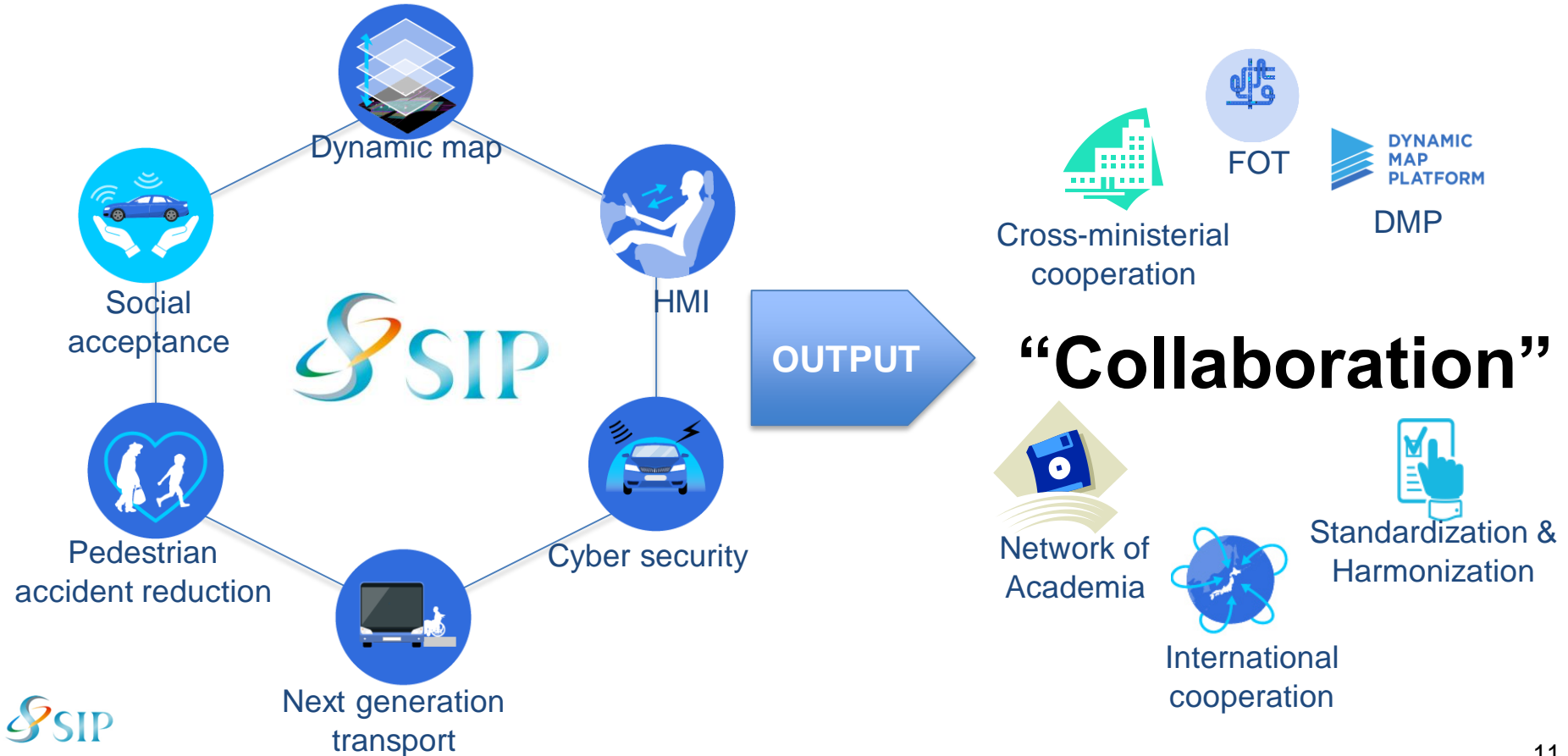
Main technology domain



Basic Tech. **Cyber Security, Simulation, Database, etc.** **In red : Area of Cooperation ⇒ Main Area of SIP-adus**

SIP-adus focus on R&D in Cooperative area with Industry, Academia and Government 10

Output of 1st phase of SIP-adus



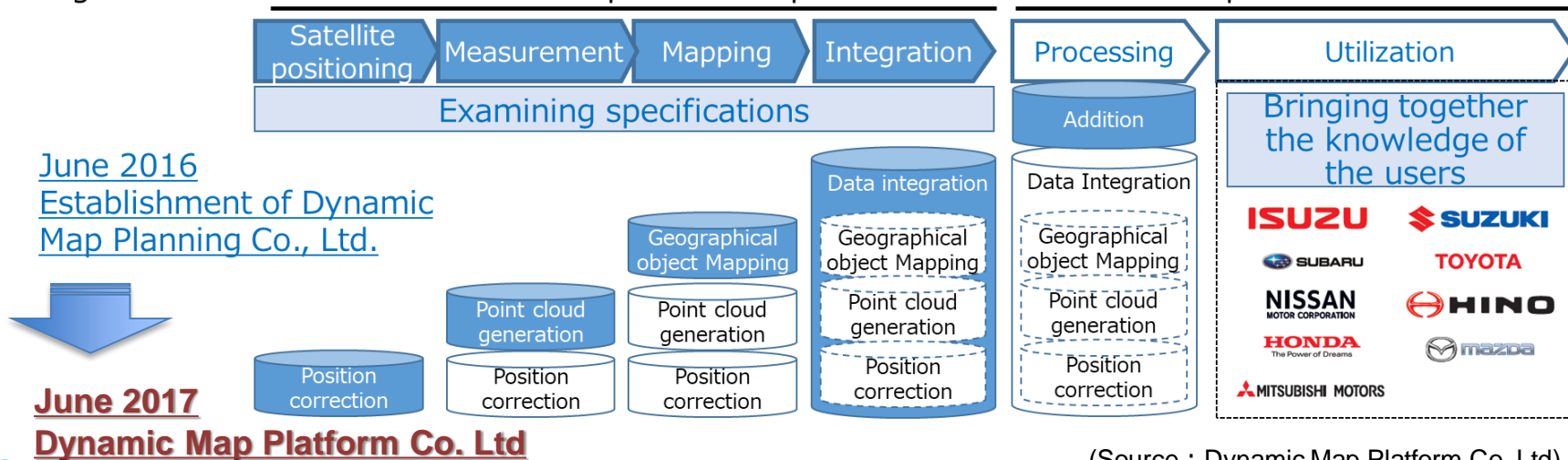
Dynamic Map Platform Co. Ltd

- The knowledge of the companies were brought together for the practical application of three-dimensional high-precision maps



“High-Precision Three-Dimensional Map Data” Cooperation Areas

Competitive Areas



(Source : Dynamic Map Platform Co. Ltd)

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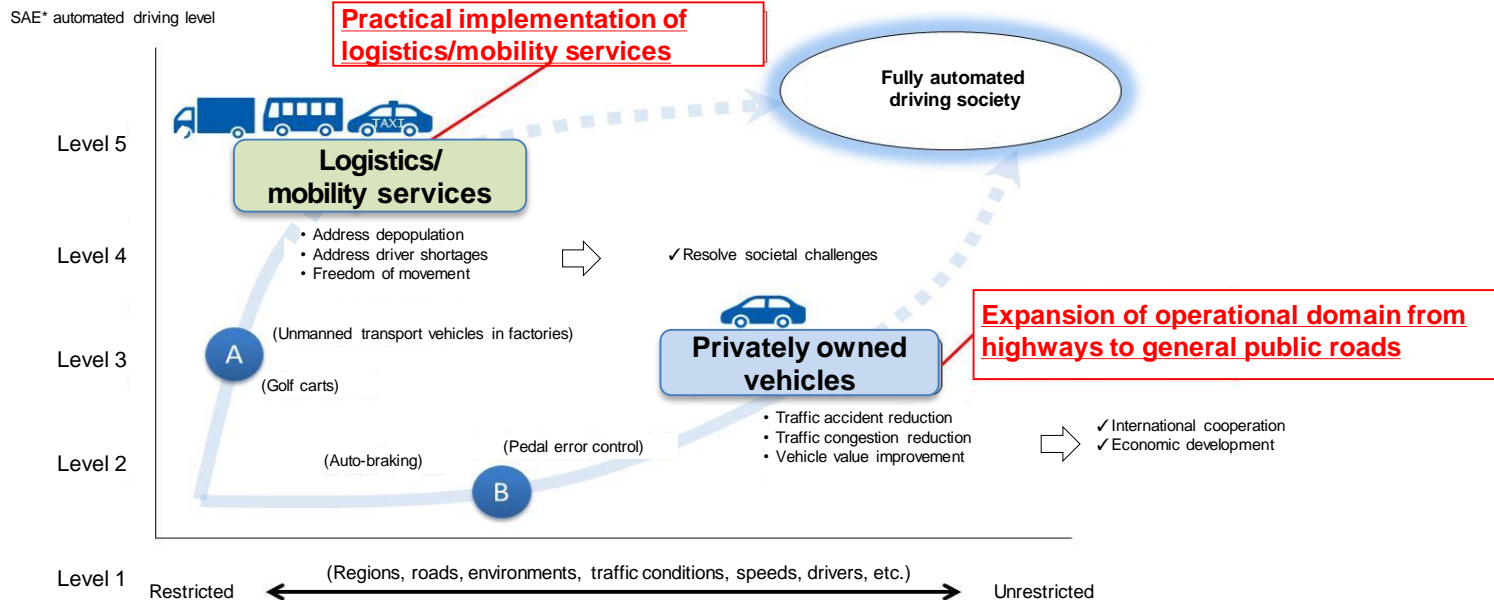
2. 1st phase of SIP-adus (FY2014-2018)

3. 2nd phase of SIP-adus (FY2018-2022)

Overview of 2nd Phase of SIP-adus

The operational domain of automated driving will be **extended from highways to arterial and general public roads**, and automated driving systems will be **implemented in mobility services including public transport and logistic operations**.

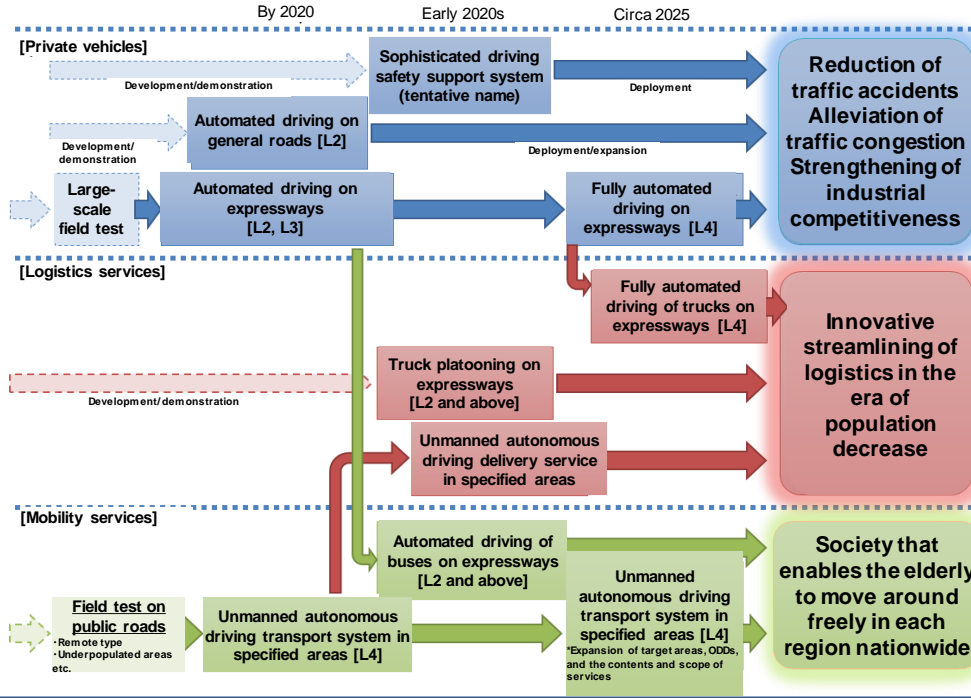
⇒ Safe and comfortable mobility for everyone in society.



Objectives

Public-Private ITS Initiative/Roadmaps 2018

Scenario for the commercialization and service of fully automated driving by 2025



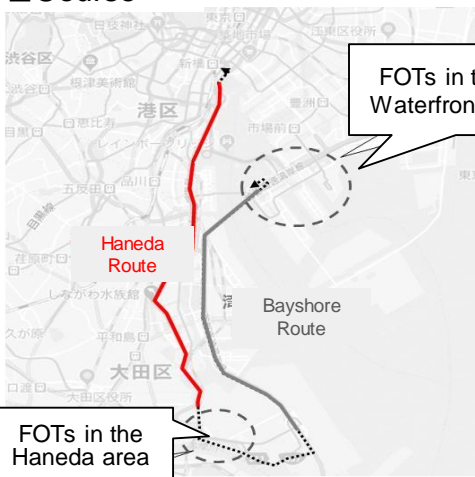
- The **cooperative areas** technologies essential for implementation will be established by 2023
- The effectiveness of the technologies will be validated through FOTs, involving various **businesses and local government**, and **multiple example cases for commercialization will be created.**

Deployment Milestones

Investment and business planning by private operators will be promoted by:

- 1) taking full advantage of the Olympic and Paralympic Games Tokyo 2020
- 2) conducting FOTs based on the plans of businesses and local government

■ Course



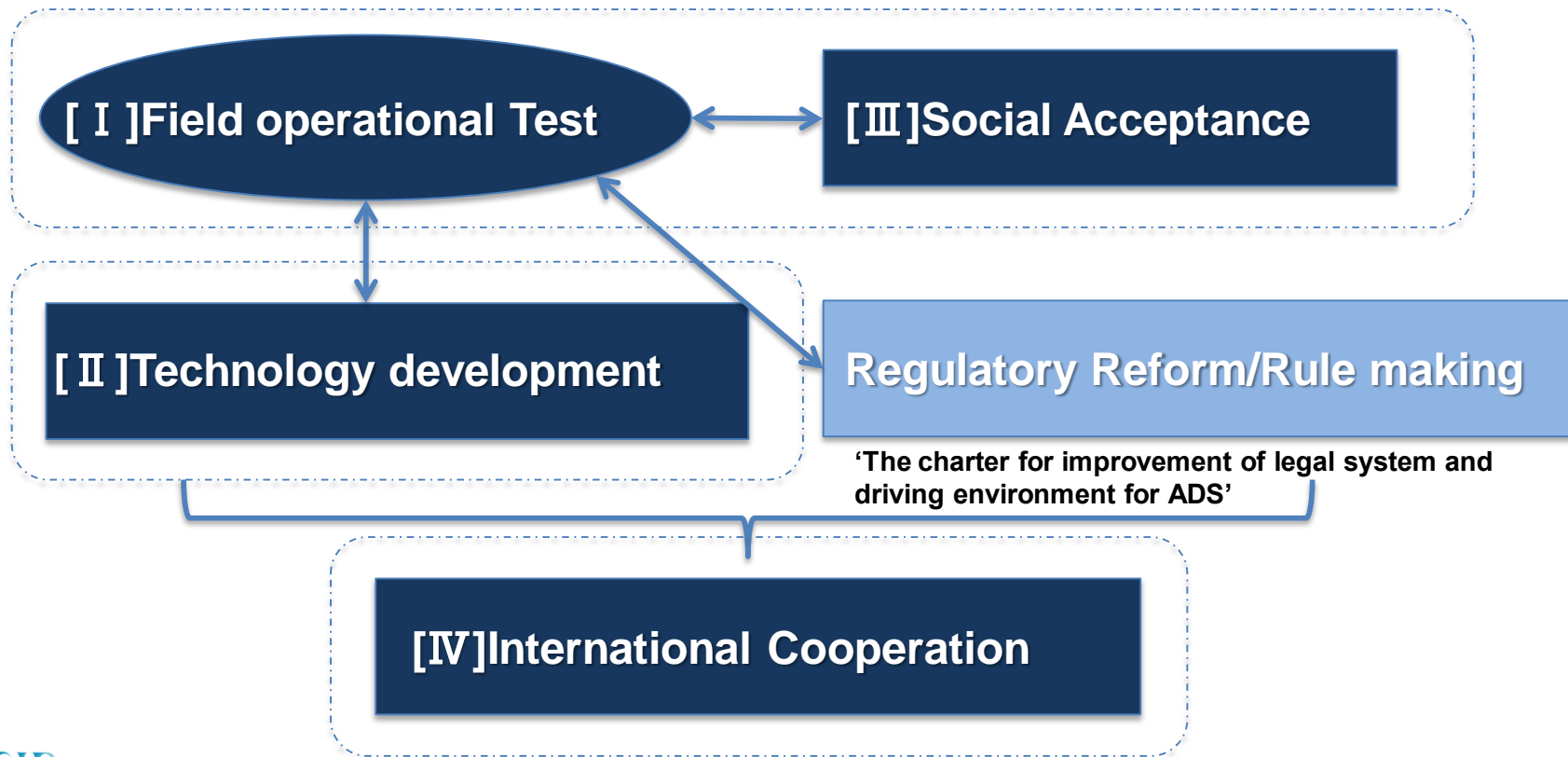
FOTs with **matching fund**



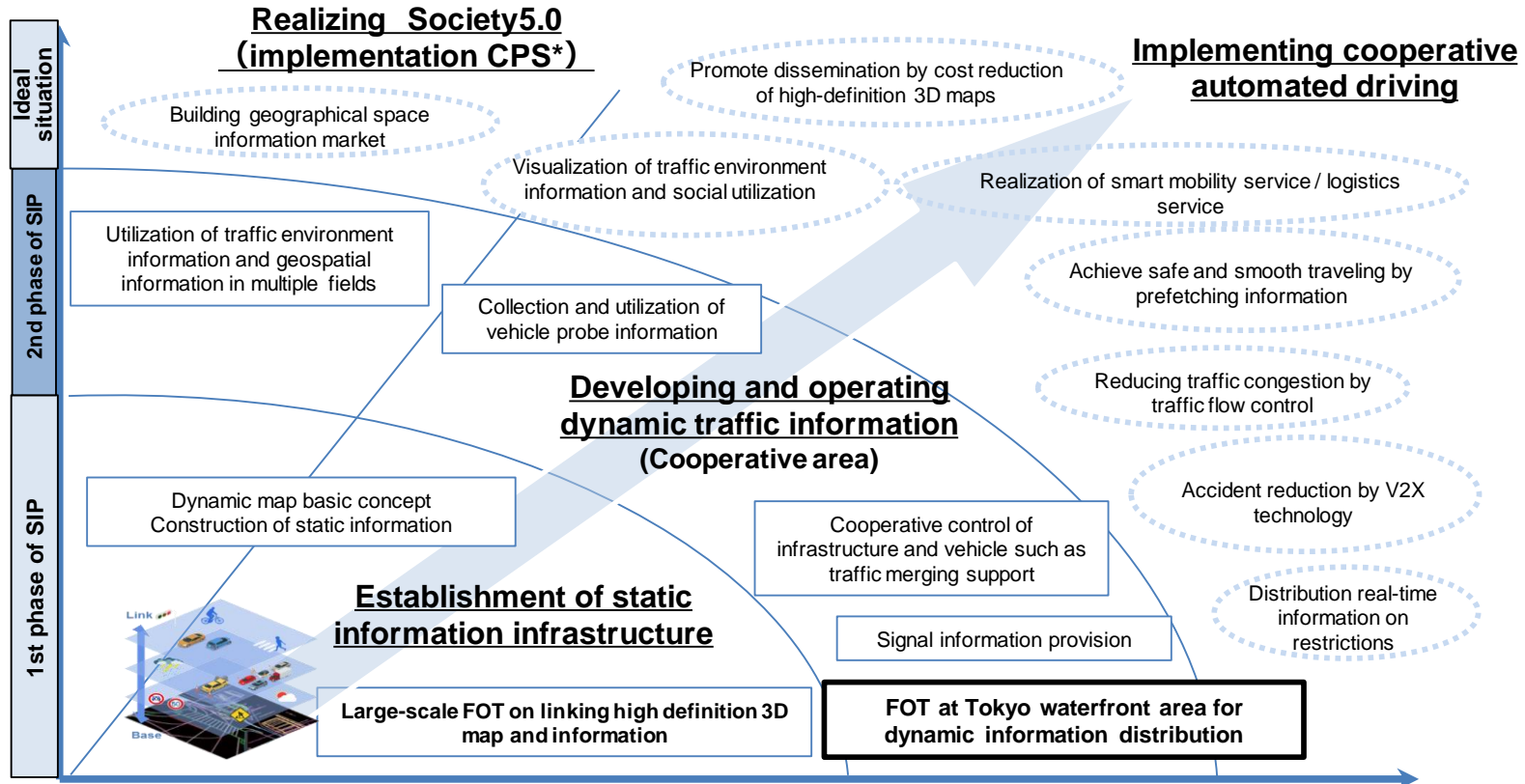
Local FOTs involve **businesses and local government.**

Open discussion for promoting international standardization and R&D

4 Pillars of 2nd SIP-adus

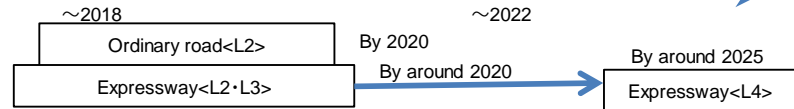


Building the Traffic Environmental Info. Framework



*CPS : Cyber Physical System

[Scenario for private car]



FOTs (Tokyo Waterfront City–Haneda Area)

- FOTs will start in autumn 2019 in the Tokyo waterfront city area (general roads and Metropolitan Expressway in the Tokyo Waterfront City area/Haneda area) in cooperation with Japan Automobile Manufacturers Association.

We are planning to recruit participants widely in order to promote international harmonization and early implementation of automated driving.

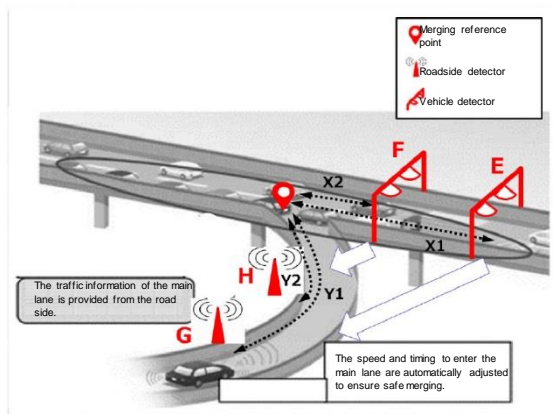
Providing traffic signal information

Vehicles are allowed to pass through intersections safely and smoothly based on **the signal display and change timing information** even in environments where recognition is difficult using in-vehicle cameras.



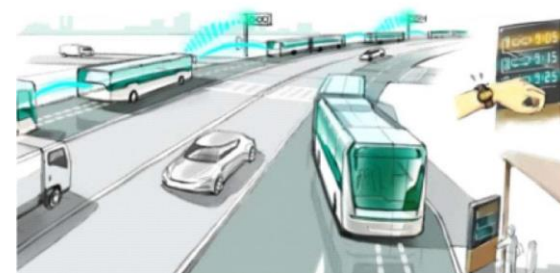
Merging assistance on the main lane of highways

Providing vehicle information on the main lane



Public transport system (self-driving buses)

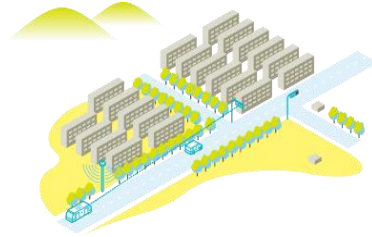
FOTs for the next-generation ART will be implemented on public roads by using automated driving technology in **mixed traffic flow**.



FOTs (Local Transportation)

■ **Long-term FOTs** will be implemented in underpopulated areas, local communities, etc. through **collaboration with businesses and local government** to validate the effectiveness and business feasibility of automated driving in terms of **logistics and mobility services**.

Mobility/logistics services in underpopulated areas, etc.



FOTs for technologies

FOTs for implementation and commercialization



Long-term FOTs on public roads toward commercialization as means of local logistics and mobility services for citizens



Virtual Environment for Safety Evaluation

- **Simulation tools for assessing the safety of automated driving in various traffic environments** — Joint research will be conducted by experts in industry and academia.

Various weather conditions



Safety validation based on driving experiments of more than 10 billion km

Various traffic environments

Virtual safety assessment



Simulation tools that can reproduce and combine various environments will be developed for performing safety assessments based on automatic assessment by repeating critical situations.

Network of Academia

- Establish academia network to promote collaboration and information sharing
- UTMobl facilitate SIP-adus' collaborative research with overseas entities

“Mobility Innovation Promoting Council”

UTMobl (Mobility Innovation Collaborative Research Organization, The University of Tokyo)



+ Individual researchers from:



SIP-adus Workshop 2019

SIP-adus: Innovation of Automated Driving for Universal Services

Outline

SIP-adus Workshop is a global cooperative activity to resolve the challenges to implement Automated Driving Systems, through debate among international experts. The event will consist of focused sessions open to the public and breakout workshops for experts.

Date

November 12 - 14, 2019

Venue

Tokyo International Exchange Center

Tokyo Academic Park, 2-2-1 Aomi, Koto-ku, Tokyo 135-8630 Japan

3 minutes from "Tokyo International Cruise Terminal" station on New Transit "Yurikamome" line (Shimbashi Station <-> Toyosu Station)

15 minutes from "Tokyo Teleport" station on "Rinkai" line (Shinkiba station <-> Osaki station)

SIP-adus Workshop 2019

Program (tentative)	Tuesday, November 12	Wednesday, November 13	Thursday, November 14
AM	Opening Session	Cybersecurity	Breakout Workshop
	Regional Activities	Safety Assurance	
	Poster Session		
PM	FOTs and Next Generation Transport	Dynamic Map	
	Human Factors	Connected Vehicle	Closing Session

Organizer

Cross-Ministerial Strategic Innovation Promotion Program, Council for Science, Technology and Innovation, Cabinet Office, Government of Japan

New Energy and Industrial Technology Development Organization

Supported by ITS Japan



For the latest information

<http://www.sip-adus.go.jp/evt/workshop2019/>

Thank you

