SIP Automated Driving System

SIP-adus; Automated Driving System for universal service

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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)
Outline of SIP2

- **Intensive R&D program**
  - Promote 5-years R&D (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.*

* ¥50 bil in total per year
  - (65% for SIP 12 themes, 35% for medical R&D)
Promotion framework of Japanese Government

Cabinet Office
(Council for Science, Technology and Innovation)

Cabinet Secretariat
(IT Strategic Headquarters)

NPA
(National Police Agency)
Road traffic safety

MIC
(Ministry of Internal Affairs & Communications)
Info-Communication Technology for ITS

METI
(Ministry of Economy, Trade and industry)
Promotion of the automobile industry

MLIT
(Ministry of Land, Infrastructure, Transport and Tourism)
Road Bureau Deployment of road infrastructure
Road Transport Bureau Safety standards for automobile

“The charter for improvement of legal system and driving environment for automated driving system”

“The Public-Private ITS Initiative/Roadmaps 2018”
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.
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 business plans of entrepreneurs and local government

Open discussion for promoting international standardization and R&D

Course

- FOTs in the Tokyo Waterfront City area
- FOTs in the Haneda area
- FOTs with matching fund

Local FOTs involve entrepreneurs and local government.
Main domain of SIP-adus’ R&D

Vehicle

<Recognition>
Map, ITS info., Sensor

Judgement>
AI

Operation>
Actuator

HMI

<Cooperation w/Human>
Human Machine Interface

Social acceptance
Impact Assessment

Traffic Environmental Data

3D HD Map + Dynamic Traffic information

Connected
Dynamic map

Basic technology

Cybersecurity Simulation Database Over the air Safety assurance

In red: Main Domain of SIP-adus (Area of Cooperation)
FOTs (Tokyo Waterfront City–Haneda Area)

- FOTs will start in autumn 2019 in the Tokyo waterfront city area (general roads and Metropolitan Expressway / Haneda area) with recruiting participants widely.

**Providing traffic signal information**

Providing 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**

Merging reference point
Roadside detector
Vehicle detector

The traffic information of the main lane is provided from the roadside.

The speed and timing to enter the main lane are automatically adjusted to ensure safe merging.

**Public transport system (self-driving buses)**

FOTs for the next-generation ART by using automated driving technology in mixed traffic flow.
Building the Traffic Environmental Info. Framework

**Realizing Society5.0**
*implementation CPS*

- Building geographical space information market
- Utilization of traffic environment information and geospatial information in multiple fields
- Signal information provision

**Establishment of static information infrastructure**
- Dynamic map basic concept
- Construction of static information
- Large-scale FOT on linking high definition 3D map and information

**Developing and operating dynamic traffic information**
*Cooperative area*
- Collection and utilization of vehicle probe information
- Cooperative control of infrastructure and vehicle such as traffic merging support
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- FOT at Tokyo waterfront area for dynamic information distribution

**Implementing cooperative automated driving**
- Realization of smart mobility service / logistics service
- Achieve safe and smooth traveling by prefetching information
- Reducing traffic congestion by traffic flow control
- Accident reduction by V2X technology
- Distribution real-time information on restrictions

**Scenario for private car**

- **1st SIP**
  - By 2018
  - Ordinary road<L2>
  - By 2020
  - Expressway<L2>L3>

- **2nd SIP**
  - By around 2020
  - Expressway<L4>
  - By around 2025

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*CPS*: Cyber Physical System

[Scenario for private car]

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

Ensuring means of mobility in areas where many elderly persons live or that are not easily accessible.

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

SIP-adus Workshop 2019
November 12-14 @ Tokyo International Exchange Center

Regular annual international conference for Info. Sharing & discussion

【Themes at Breakout WS】
Dynamic map, Connected, Human Factors
Cybersecurity, , Safety Assurance, FOT

FOT in Tokyo Bay area
Start from Oct. 2019

Recruit participants widely including overseas
⇒ Discuss about standardization openly with various entities like OEMs, suppliers, academia.
More than 25 participants are expected to join.

Collaborative research with research institutes overseas is under discussion
Thank you [http://www.sip-adus.go.jp/](http://www.sip-adus.go.jp/)