

Japanese Coordinated Approach for R&D of Automated Driving System

-Cross-ministerial Strategic Innovation promotion Program(SIP)-

Cabinet Office, Japan



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- 1. Overview of SIP-adus
(cooperative R&D for ADS in Japan)**
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SIP Automated Driving System

SIP-adus

(Innovation of **A**utomated **D**riving for **U**niversal **S**ervices)

- ✓ Intensive R&D program supporting development of future advanced ADS
- ✓ Industry-academia-government collaboration
- ✓ Working with the Japan Automobile Manufacturers Association (JAMA) and going along with its vision for ADS
- ✓ Especially focusing on what we should cooperate with, including digital map, wireless communication, HMI, security

Budget for SIP-adus : JPY 2.7 Billion (FY2016)

Program Director



Seigo Kuzumaki

Chief Safety Technology
Officer Secretary,
Toyota Motor Corporation

Goal & Exit Strategy of SIP-adus

1. Ensuring safety and traffic jam reduction on the road
2. Development and deployment of Automated Driving System
3. Realization of advanced next generation public bus service good for elderly and handicapped people.



Structure of SIP-adus

SIP-adus R&D activities are reviewed in the Promoting Committee. Currently, 3 Working Groups and 2 Task Forces have been established to cover wide variety of the topics.

SIP-adus Promoting Committee

FOT planning TF

System Implementation WG

Map structuring TF

- ◆ Dynamic map (precise 3D digital map with information changing over time)
- ◆ Micro and macro data analysis and simulation technology
- ◆ Prediction based on information from ITS
- ◆ Sensing capability enhancement
- ◆ Human Factors
- ◆ System security

International cooperation WG

- ◆ Open research facility
- ◆ Social acceptance

Next Generation Urban Transportation WG

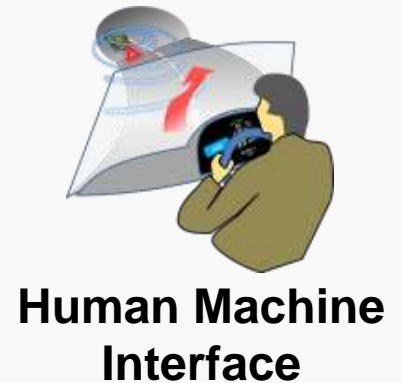
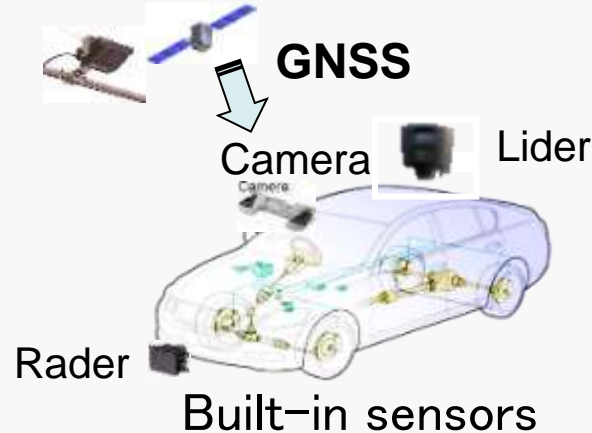
- ◆ Local traffic management enhancement
- ◆ Next-generation public road transport system

Technologies for Automated Driving

On-board Technologies



HMI



Platform

Security, Simulation, Shared database, etc.

Dynamic Map

Hierarchical structure of digital 'Map' layered by time frame

Time frame

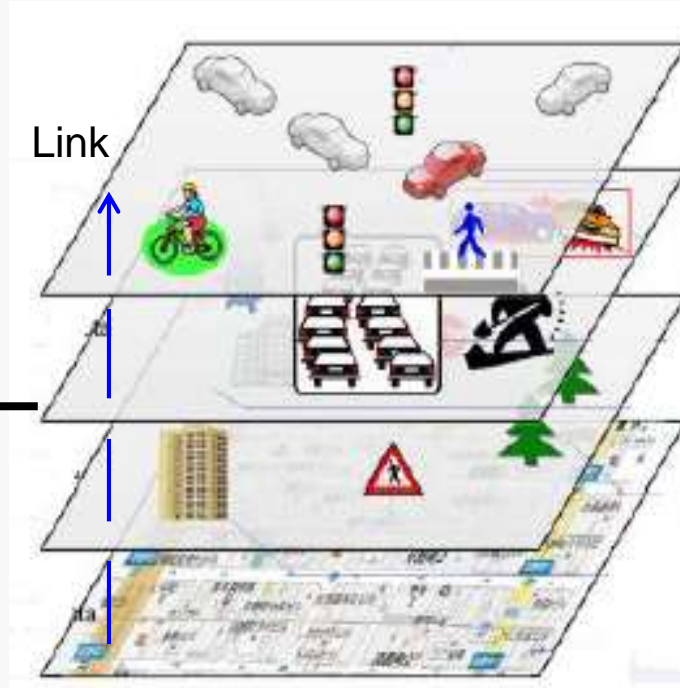
Dynamic (< 1 sec)

Semi-dynamic (< 1 min)

Semi-static (< 1 hour)

Static (< 1 day)

Linked layers



Information through V to X

Traffic Information

Planned and forecast information

Basic Map Database

Development of Operational Framework

Dynamic Map Planning Co., Ltd.

Founded in June 2016 to establish technologies and business scheme to build and maintain the Dynamic Map for automated driving and other applications. The company will be transformed to a business entity by 2017.

Survey and digital map providers

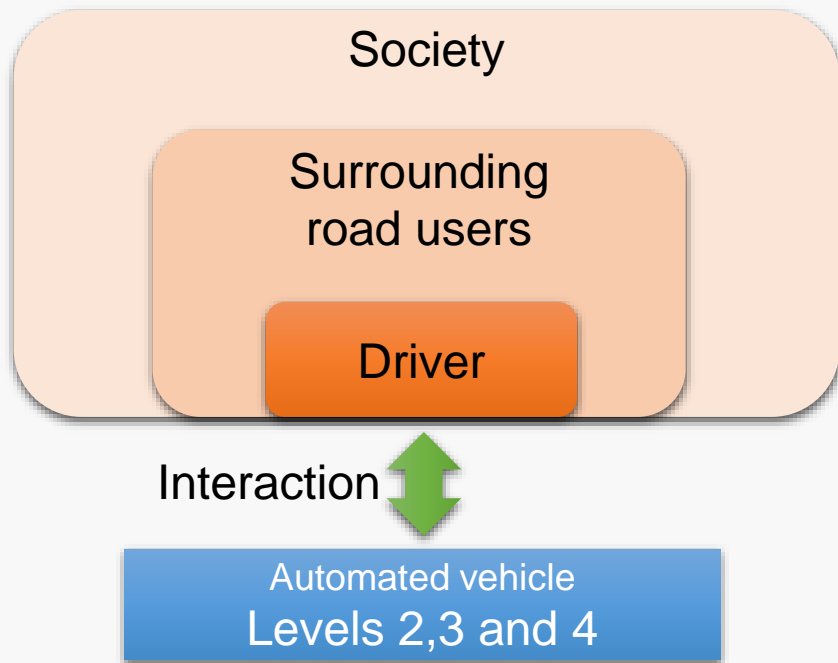
Mitsubishi Electric Corporation
ZENRIN CO., LTD.
PASCO CORPORATION
AISAN TECHNOLOGY Co., Ltd.
INCREMENT P CORPORATION
TOYOTA MAPMASTER INCORPORATED

Auto manufacturers

Isuzu Motors Limited
SUZUKI MOTOR CORPORATION
Toyota Motor Corporation
NISSAN MOTOR CO., LTD.
Hino Motors, Ltd.
Fuji Heavy Industries Ltd.
Honda Motor Co., Ltd.
Mazda Motor Corporation
Mitsubishi Motors Corporation

HMI (Human Machine Interface)

- Framework for extraction of human factor problems



- 3 phase for challenges and approaches toward Level 3, 4

- Vehicle - Driver
 - ✓ Understanding of system
 - ✓ Driver's state
- Vehicle & Surrounding road users
 - ✓ Communication between the Automated vehicle and its surrounding vehicle's drivers or pedestrians, etc..
- Vehicle & Society
 - ✓ Social acceptance
 - ✓ Liability, Licensing, etc..



International Standardisation & Coordination

■ Leading Experts at SIP-adus



Ryota Shirato
Dynamic Map



Norifumi Ogawa
Connected Vehicles



Satoshi Kitazaki
Human Factors



Nobuyuki Uchida
Impact Assessment



Satoru Taniguchi
Security



Masayuki Kawamoto
Next Generation
Transport

➤ **ISO activities**

- > Dynamic Map ---- TC204 / WG3
- > HMI ---- TC22 / SC39 / WG8

➤ **Participation in the meeting of TRB, TRA, AVS, etc.**

➤ **Dialogue with relevant Organizations, Forums and Stakeholders**

➤ **Trilateral meeting**

SIP-adus Field Operation Tests

Large-scale Field Operation Tests (FOTs) on public roads will start in 2017.

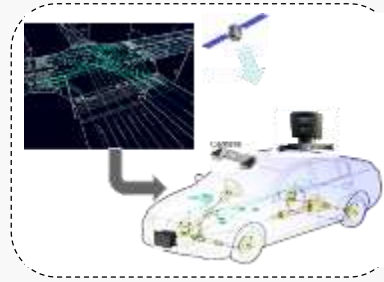
➤ Objectives of the FOTs

1. Clarify technical and institutional issues with variety of OEMs
 - Promote development of each technology such as Dynamic Map or HMI
 - Investigate social system and legislation
2. Acquire new viewpoints through participation of various players from outside of the SIP-adus
3. Enhance International cooperation and harmonization through open participation to the overseas OEMs
4. Build Social acceptability by involving ordinary citizens and maximize effect

Outline of the SIP-adus FOTs

Focus areas

- ✓ Dynamic Map
- ✓ Human Machine Interface
- ✓ Cyber Security
- ✓ Pedestrian Assistance
- ✓ Next Generation Public Transportation



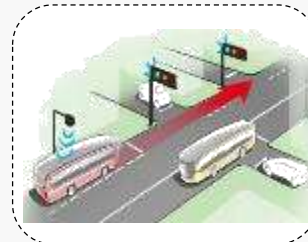
Test sites

- ✓ Expressways (relatively controlled environment)
- ✓ Arterial roads (with pedestrians and bicycles)
- ✓ Test facilities (separated from general traffic)



Expected participants (open to both domestic and international)

- ✓ Auto manufacturers and parts suppliers
- ✓ Universities, Research institutes, Government agencies, etc.



3rd SIP-adus Workshop 2016

- ◆ **Organizer** SIP-adus Promoting Committee
- ◆ **Date** November 15-17, 2016
- ◆ **Venue** Tokyo International Exchange Center
- ◆ **Program**



More information about SIP-adus FOTs will be announced !!

	Tuesday November 15	Wednesday November 16	Thursday November 17 (Breakout Workshop)
AM	Opening & Keynote Session	Special Session SIP-adus Report Session	Breakout Workshop-1
	Special Session Regional Activities and FOTs	Impact Assessment	
	SIP-adus Display		
PM	Dynamic Map Connected Vehicles	Next Generation Transport	Breakout Workshop-2
	Security		Human Factors
	Preparation meeting for Breakout Workshop		Closing Session

For More Information...

Cabinet Office:

<http://www.cao.go.jp/index-e.html>

CSTI (Science and Technology Policy):

<http://www8.cao.go.jp/cstp/english/index.html>

SIP (Cross-Ministerial Strategic Innovation Promotion Program)

http://www8.cao.go.jp/cstp/panhu/sip_english/sip_en.html

SIP-adus (Workshop on CAD):

<http://www.sip-adus.jp/> *

* All presentation documents of the workshop were uploaded with permission from the speakers.

Thank you for your kind attention!

*3rd SIP-adus Workshop
on Connected and Automated Driving Systems 2016*

Date : November 15-17, 2016

Venue : Tokyo

Please join us!!

