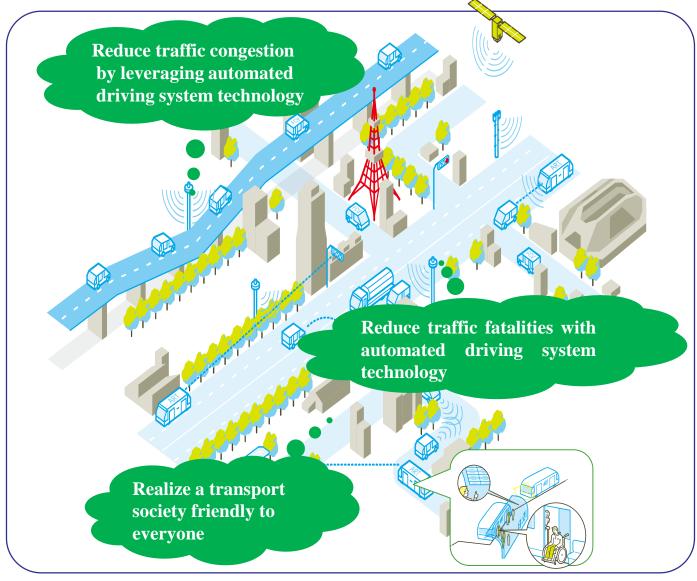
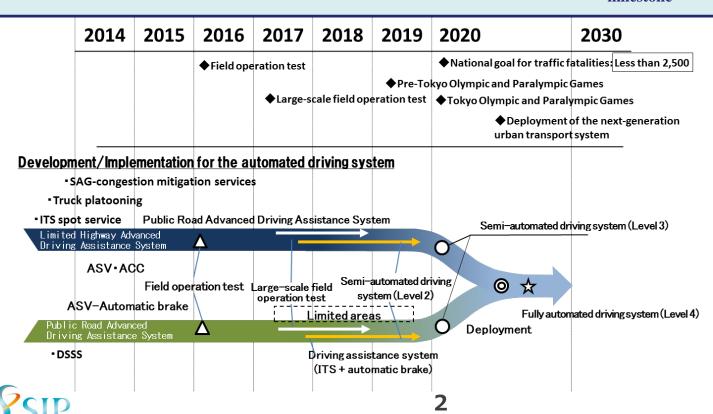
In Pursuit of a Transport Society That Brings Smiles to People - Mobility bringing everyone a smile -





Goals/Roadmap of the Automated Driving System

- 1. Achieve national goals incl. reduction in traffic accidents: Building of national infrastructure for achieving national goals
- 2. Realization/deployment of the automated driving systems: Promotion of deployment through synchronization of thoroughly streamlined research and development and international cooperation
- 3. Deployment of the next-generation public transport systems: Develop in cooperation with the Tokyo Metropolitan Government, with the Tokyo Olympic and Paralympic Games as a milestone



Definitions of Automated Driving Levels and Commercialization Targets

		Achieved Plan
Fully automated driving system	Level 4	All of the vehicle acceleration, steering and braking are done automatically by the system, with absolutely no driver involvement. Around 2025 Around 2025
Semi-automated driving system	Level 3	All of the vehicle acceleration, steering and braking are done automatically by the system. The driver is involved only if so requested by the driving system. Around 2020
	Level 2	Several operations for acceleration, steering and/or braking may be done by the system automatically and simultaneously. By 2020
Safe driving assistance system	Level 1	
No driving assistance		
		Static information

Traffic Control

At all levels, it is assumed that the driver can get involved in the control of the driving system at any time. As for the semi-automated driving system (Level 3) and the fully automated driving system (Level 4), the government has set the timing as nonbinding targets to help enable commercialization by private-sector companies.



Automated driving levels are varied according to the road conditions

A shipped

Dynamic information (Advanced)

Technologies Required for the Automated Driving System

**Telements constituting the Becognition Judgment Operation Machine Interface

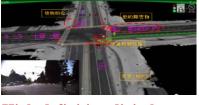
| Maps, Communications, Sensors | Control/Artificial intelligence | Hydraulic, Electric motors | Harmony with people |



- Self location estimation
- Surrounding environment recognition

are important for the automated driving system

Dynamic Map

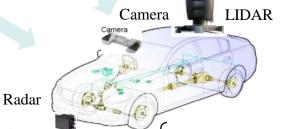


High-definition digital map



Information from communications





Points in red: Area of Cooperation (not suitable for competitive approach)

Base technology

Security, Simulation and Database, etc.

Realization of automated driving requires wide-ranging research and development, including the autonomous system and cooperative system and so on.



Scope of the Automated Driving System

[I] Development/implementation of the automated driving system [III] Building international cooperation Road transport system Development of an R&D environment open to the world and promotion of standardization Driver Recognition Judgment Operation 5 Technology to strengthen 4 HMI technology for the driver 2 Promotion of social acceptance of the automated driving system and the automated driving system system security Transport setting Recognition Judgment 3 International package Operation. export system 1 Map information enhancement technology (Dynamic map) (1)Enhancement of local 2 Technology to generate management **Area of Competition** the prediction based on ②Development of the next-generation public road ITS information transport system 3 Improvement of 3 Sensing capability accessibility and deployment enhancement technology Vehicle [IV] Application to next-① Method to estimate the fatality reduction effect and the national shared generation urban transport database 2 Microdata/microdata analysis and simulation technology [V] Large-scale field operation test 3 Local traffic CO2 emission visualization technology Area of Cooperation [II] Development of base technology for reducing traffic accident fatalities and traffic congestion (Area for SIP initiatives) SIP has been promoting development work centering on the area of cooperation,

and will discuss an expansion of the area of cooperation going forward.

Roadmap

2014 2015 2016 2017 2018

System Implementation WG

Development of the automated driving system

Reduction of traffic accident fatalities Development of base technology for reducing traffic congestion

Next-Generation Urban Transport WG

Application to the next-generation urban transport

International Cooperation WG

Building of international cooperation

- Development of the structured business model for developing dynamic maps
- Development of HMI guidelines for the takeover between the driver an
- Implementation of the vehicle-to-vehicle, vehicle-to-infrastructure and vehicle-to-pedestrian communication systems
- Building of the driving video database
- Strengthening of information security

- Field operation test on dynamic map deployment on urban roads and limited highways
- Field operation test on Levels 3 and 4 deployment
- Field operation test in areas designated for pedestrian accident reduction

- Development of the simulation of accident reduction effect calculation and testing in model cities
- Proposal of the timing of achieving the national goal of reduction in traffic accident fatalities
- Testing of the method to measure the CO2 emission reduction effect

- Development of the mechanism for the state, cities and citizens to turn the PDCA cycle for achieving the national goal
- Field operation test in areas designated for pedestrian accident reduction

- Development and testing of the ART vehicle control system
- Cooperative development of infrastructure information system (PICS and PTPS, etc.)
- Development and implementation of global standard accessibility on sites (Tokyo, etc.)
- Commencement of the test operation of ART
- Field operation test on accessibility in areas for citizens' enhanced independent awareness

- Development of the domestic structure for developing and creating the international cooperation structure
- Development of an R&D environment open to the world

- Promotion of social acceptance and system improvement
- Realization of the global standardization initiative

