

Automated Vehicles Symposium 2018

# SIP-adus: Field Operational Tests and Regulatory Issues

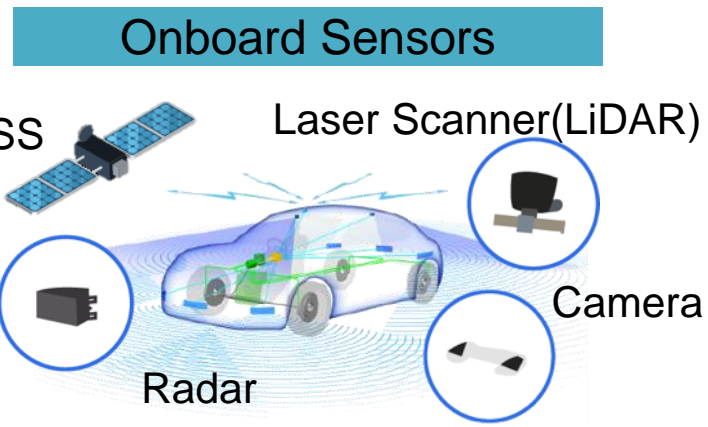
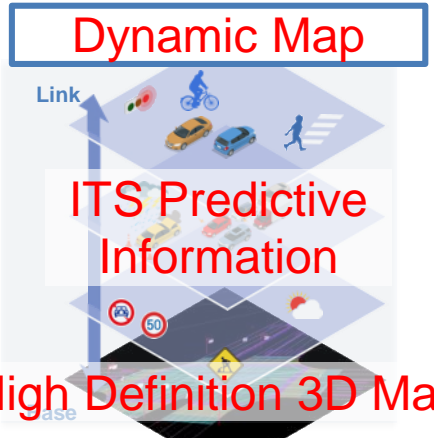
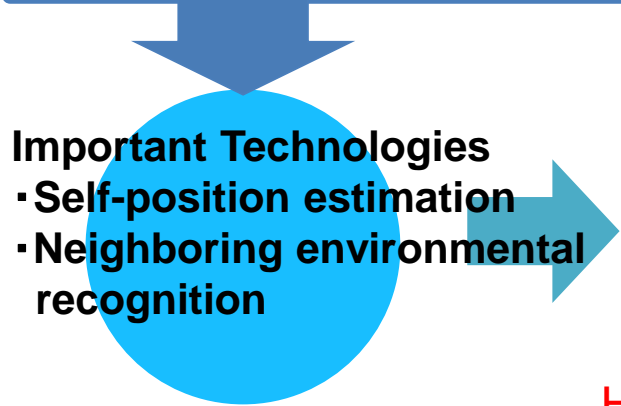
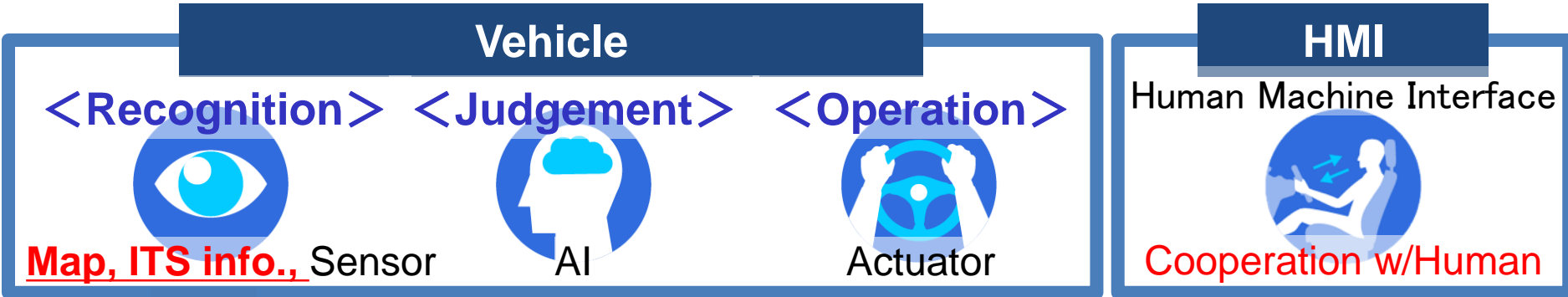
**SIP-adus:** Cross-Ministerial **S**trategic **I**nnovation **P**romotion Program  
Innovation of **A**utomated **D**riving for **U**niversal **S**ervices

July 12, 2018

**Hajime Amano**

President and CEO, ITS Japan  
Chair, International Corporation WG, SIP-adus





Basic Tech. **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

## Verification of research results in 5 integrated themes

- Dynamic Map
- Human Machine Interface (HMI)
- Cyber Security
- Pedestrian Accident Reduction
- Next Generation Transport

## International cooperation sharing the test fields and the data sets

- International participants signed up (OEMs, suppliers and research institutes)
- Concrete evidence acquired through the tests on the common grounds
- In-depth discussions on the specific research topics
- Identification of shared challenges and direction to overcome them

## Business model investigation

## Expressway

300 km stretch in Tokyo Area

- Joban expressway
- Tokyo Metropolitan expressway
- Tomei expressway
- Shin-Tomei expressway

## Test facility

Japan Automobile  
Research Institute

## Arterial roads

Tokyo waterfront city area





mazda



Alphabetical order



GNSS



Laser Scanner(LiDAR)



Radar



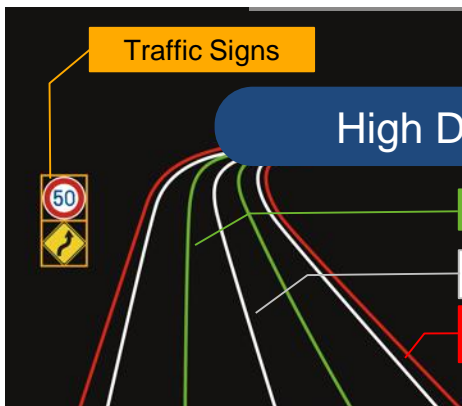
Camera



Sensed Data

Compare to estimate the position

High Definition 3D Map

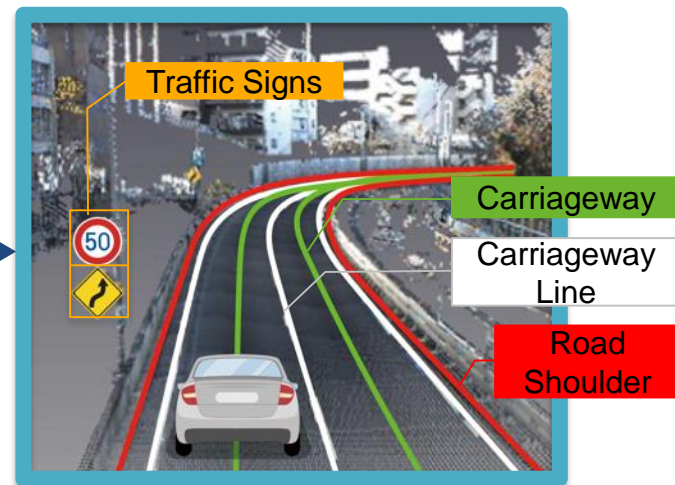


Traffic Signs

Carriageway

Carriageway Line

Road Shoulder



Traffic Signs

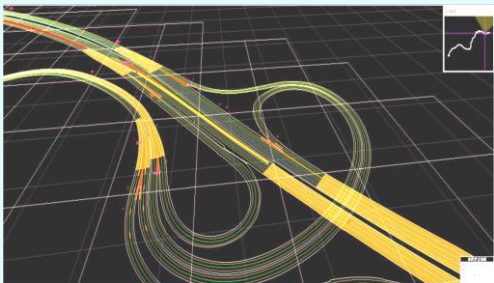
Carriageway

Carriageway Line

Road Shoulder

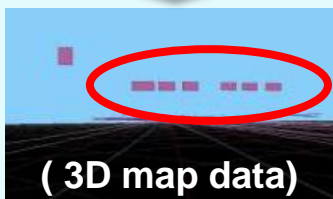
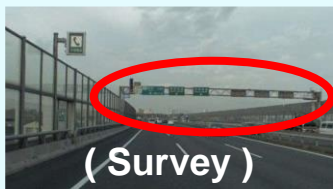
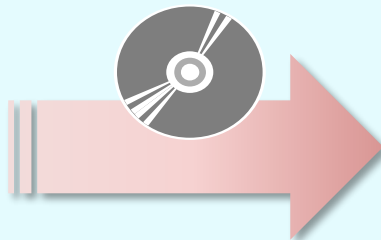
Estimate the position of the vehicle

## Prototype 3D Map

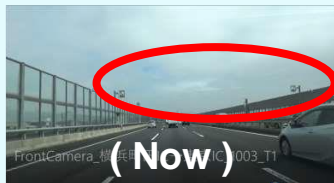


## Delivered to 19 participants

October 2017



## Evaluation



...living driving environment...



## Consensus building

- Basic data elements
- Optional data elements
- Update frequency



## Equipment



Roadside



3,600 as of Oct. 2016

On-board



DSRC Unit

Navigation

2.42 million as of Jan. 2018

## Basic Services

### Toll Collection



### Safety Assistance



### Traffic Information

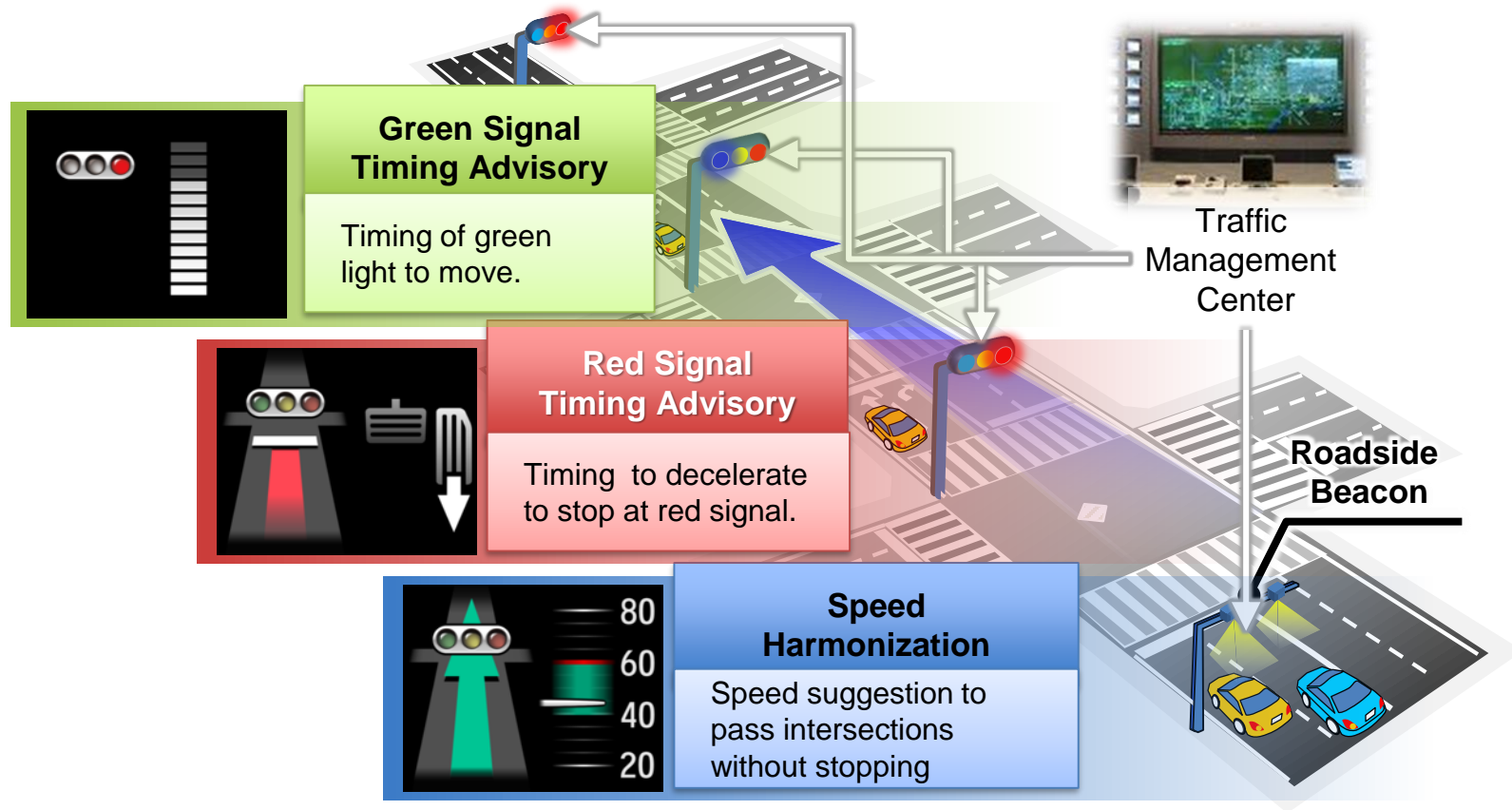


### Dynamic Route Guidance






Nationwide operation since 2011.

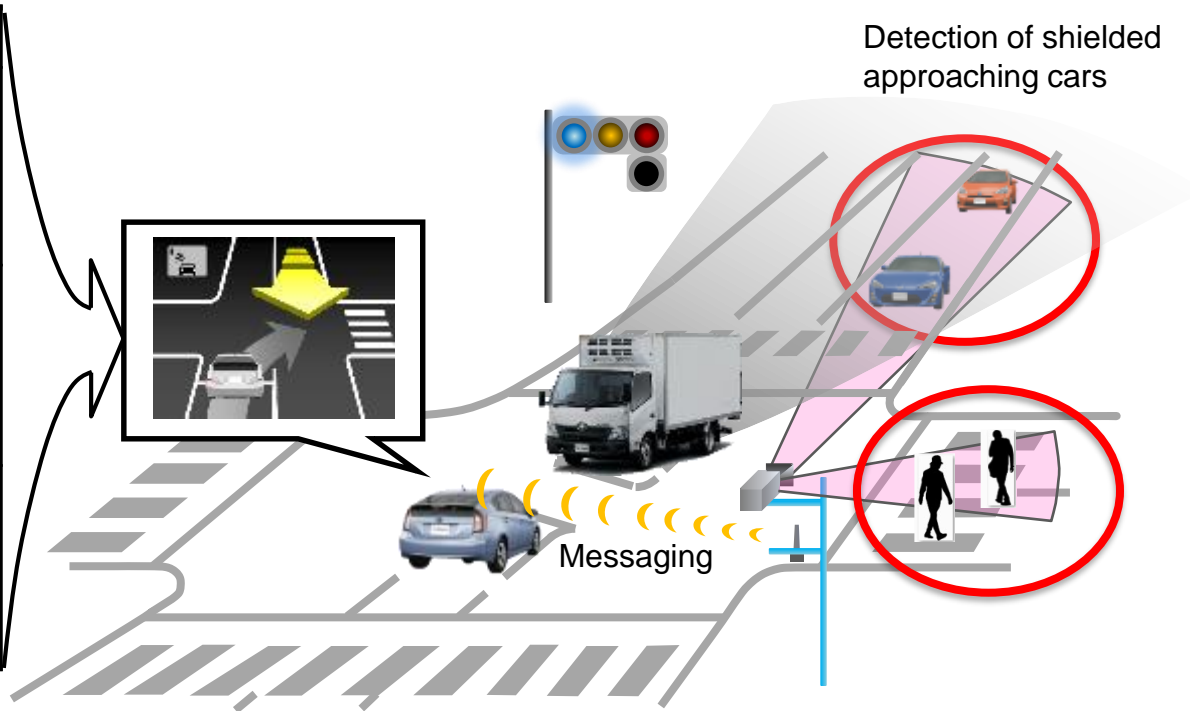




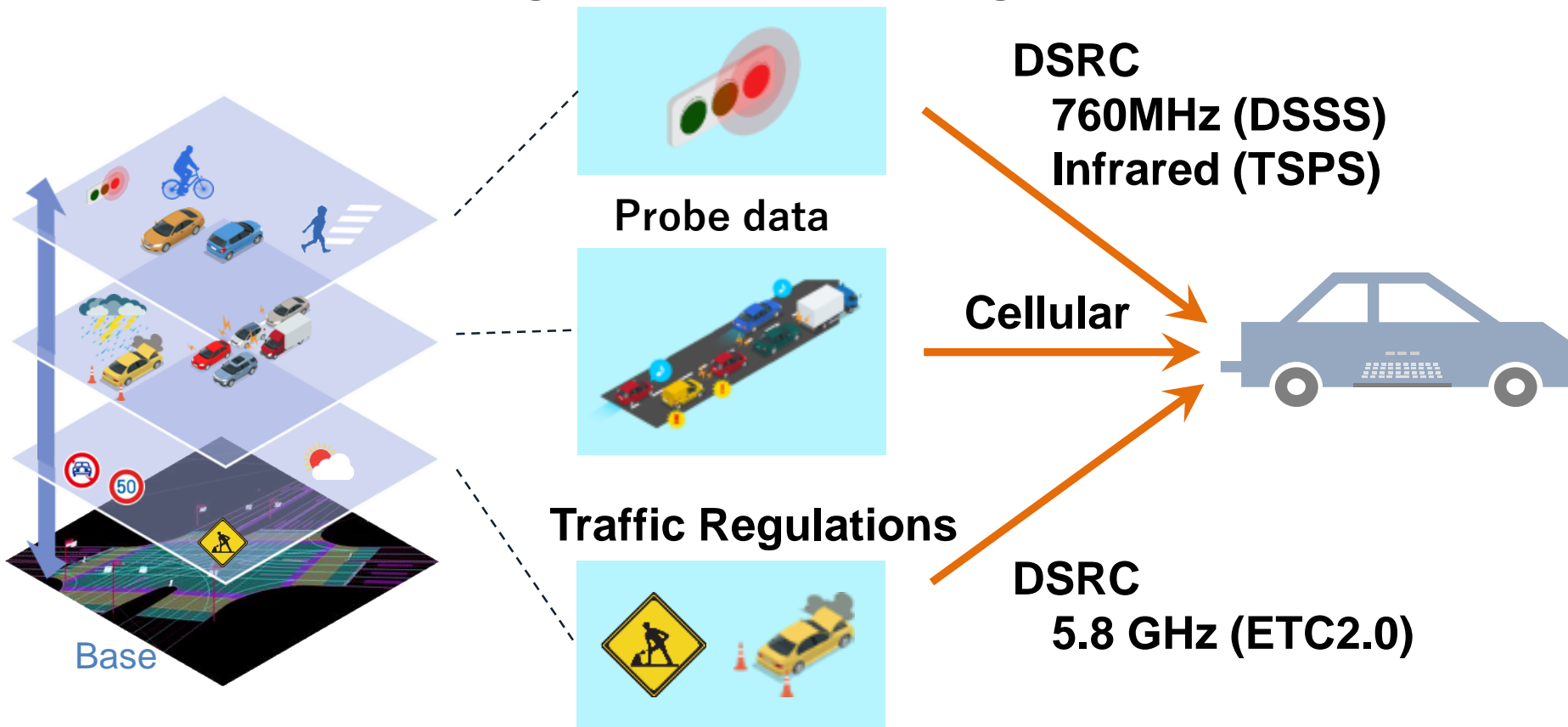
Source: National Police Agency

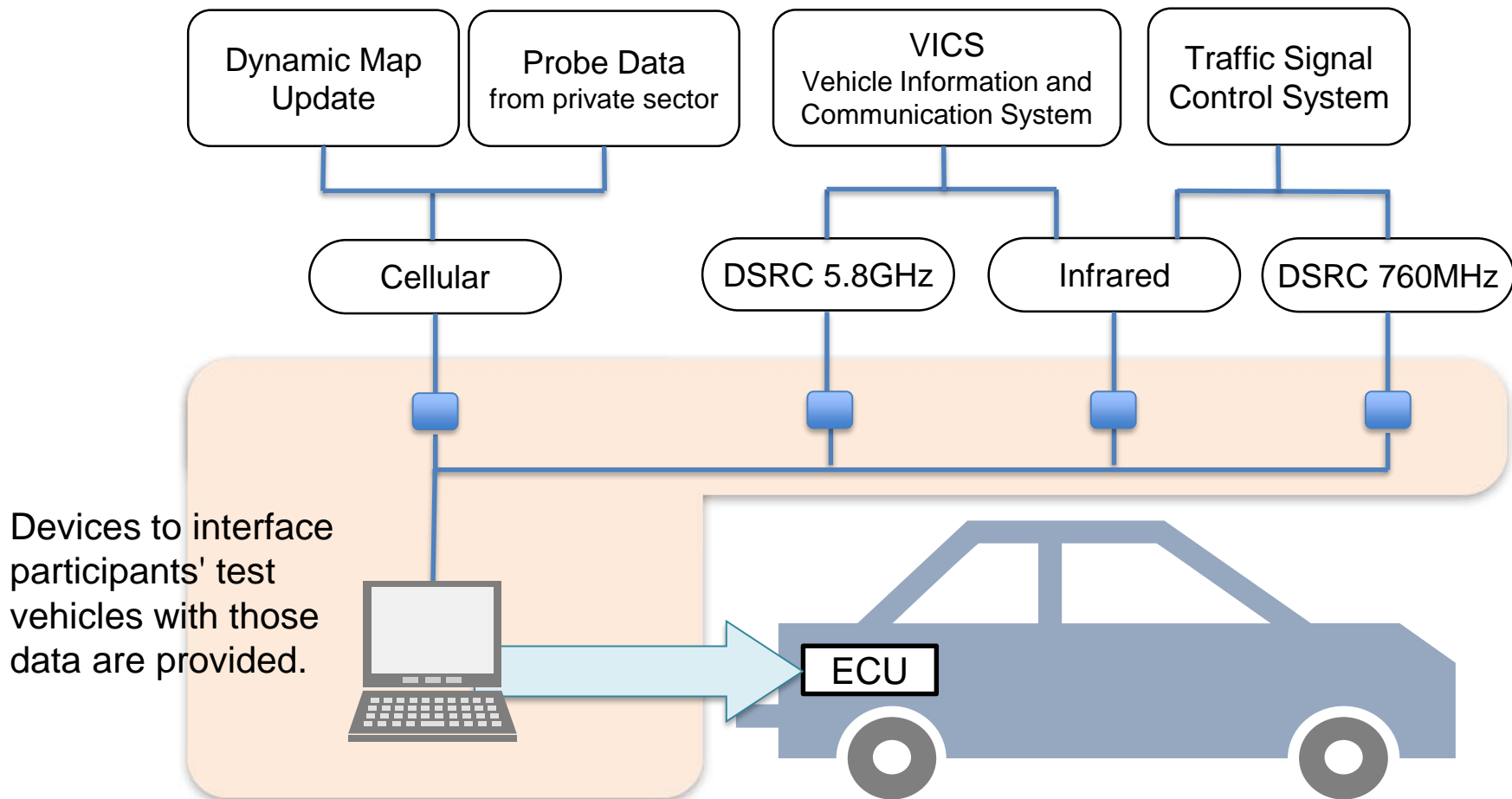
## Right Turn Collision Warning

	Display	Sound	Situation
A		-	Clear
B		-	In coming vehicle/s detected
C		beep	Turning against in coming vehicle/s



## Signal Phase and Timing





**Objectives:** transition from the 1<sup>st</sup> phase to the 2<sup>nd</sup> phase

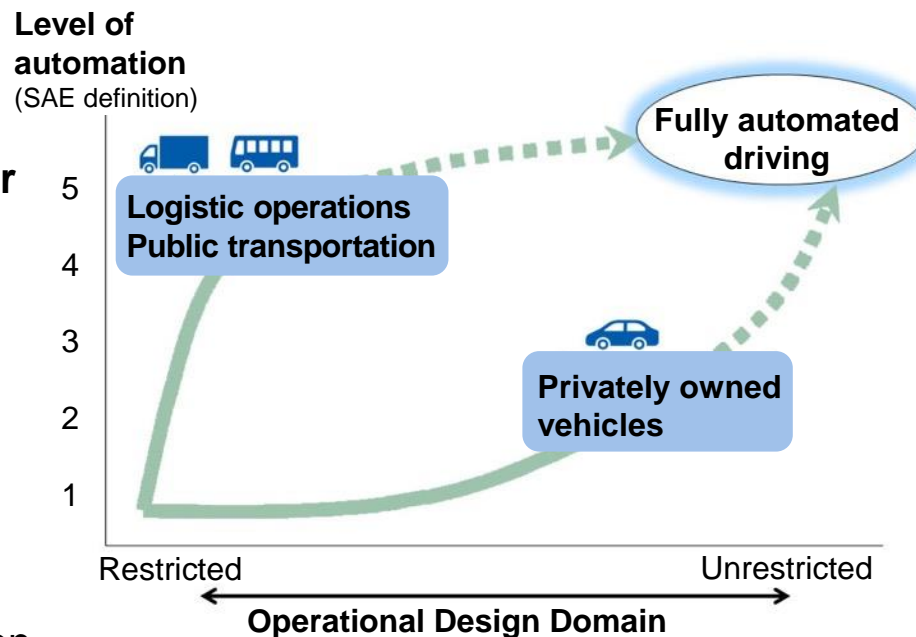
- 1) Extension of **operational domain** from the highways to the arterial and general public roads
- 2) More focus on **mobility services** including public transportation and logistic operations
- 3) Pursuit of **societal benefits** for safety, efficiency, inclusive society and enhanced economy

**Deployment Goals:**

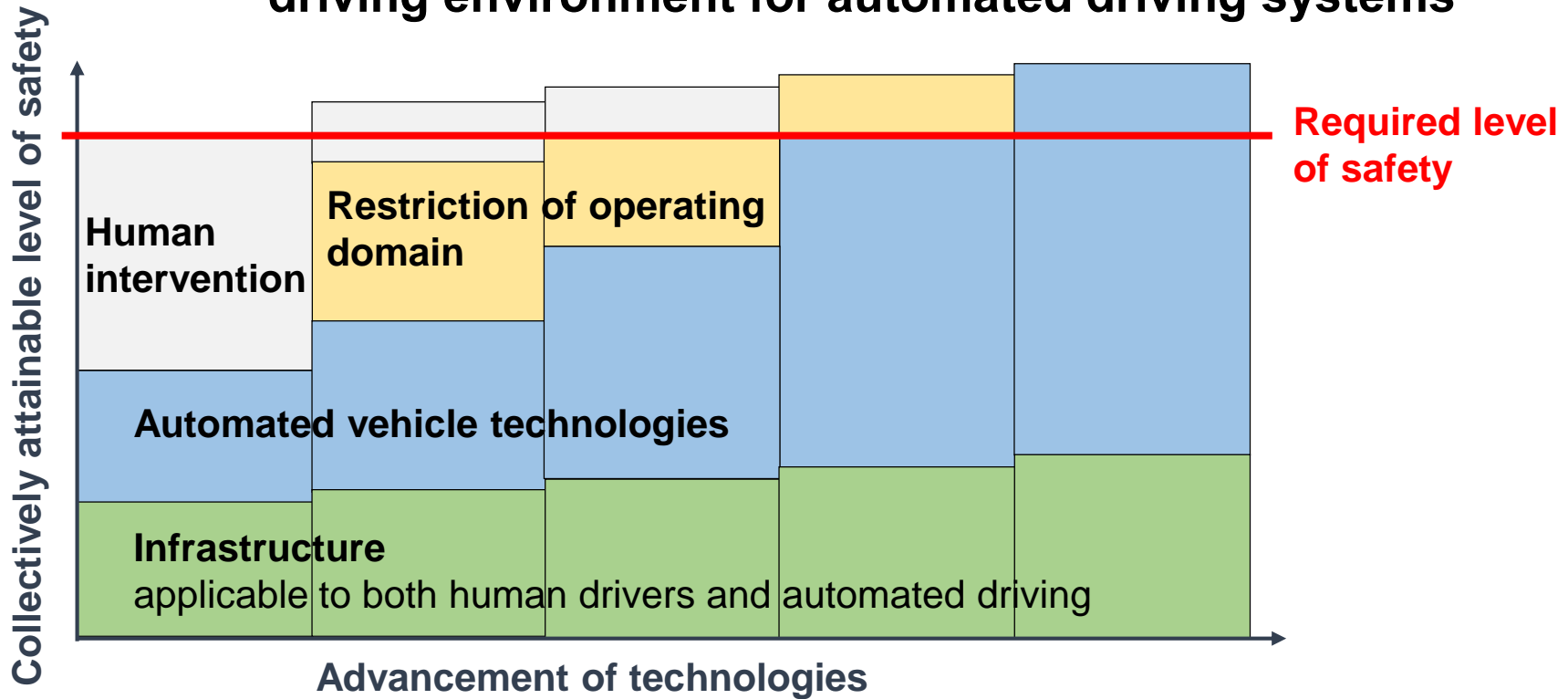
- 1) **Tokyo Olympic and Paralympic Games**
- 2) Public transportation by **local government**
- 3) Mobility service businesses by **private sector**

**Research Topics:**

- 1) **Validation** of integrated automated driving systems through field operations
- 2) Foundation for **roadworthiness testing**: data collection, modeling and simulation
- 3) Quantitative impact assessment to foster **social acceptance**
- 4) **International collaboration** for harmonization



## “The Charter for improvement of legal system and driving environment for automated driving systems”



## **Vehicle safety regulations and conformance testing for type approval**

- Safety guidelines for automated driving (by summer 2018)
- Vehicle safety regulations for automated driving vehicles

## **Road traffic rules**

- Revision of road traffic rules in line with technology development and international discussion
- Necessary measures for automated driving systems to comply with the traffic rules
- Unmanned operation of automated vehicles with remote monitoring
- Rules for platoon operation of automated vehicles

## **Liability**

- Application of Japanese mandatory automobile liability insurance for immediate relief of victims and their families
- Criminal responsibility based on clearly defined responsibilities of divers entities involved
- Installation of event data recorder on-board the vehicle and requirements of recorded data specifications and their submission

## **Regulations for public transportation and freight operators**

Source: National Strategy Office of Information and Communications Technology



# What is automated driving for ?

Societal benefits of deployment for mobility to sustain daily life and vitalization of economic activities.

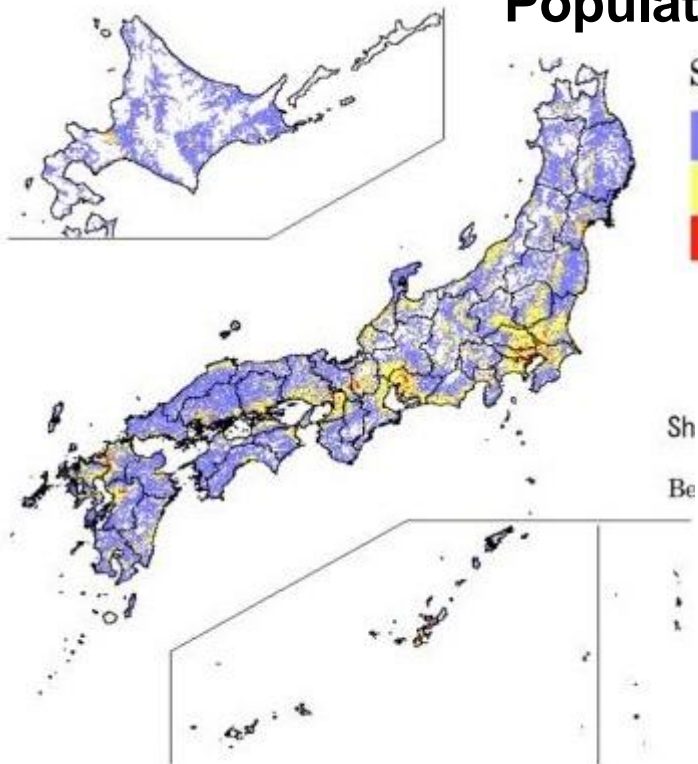
Achieved only if integrated with social innovations.



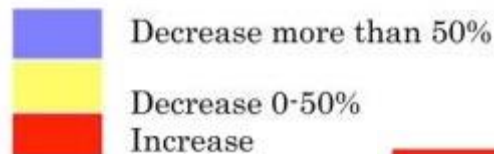


# Ageing and Declining Population in Japan

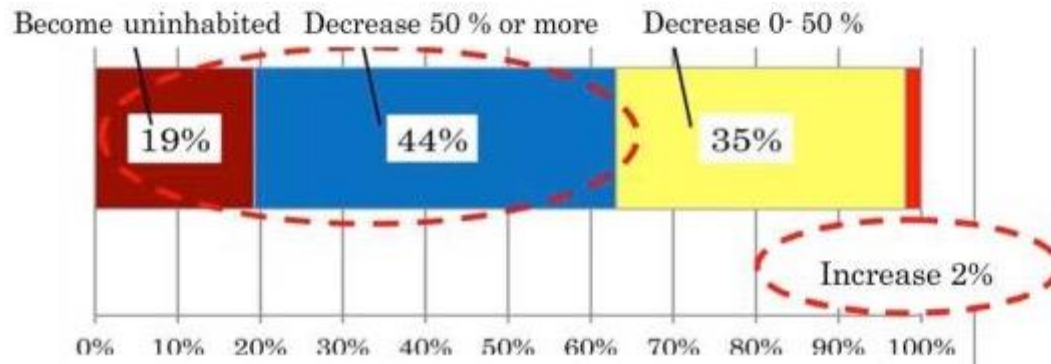
## Population in 2050 compared with that of 2010



Share of 2050/2010



## Projected population decrease 2010 to 2050



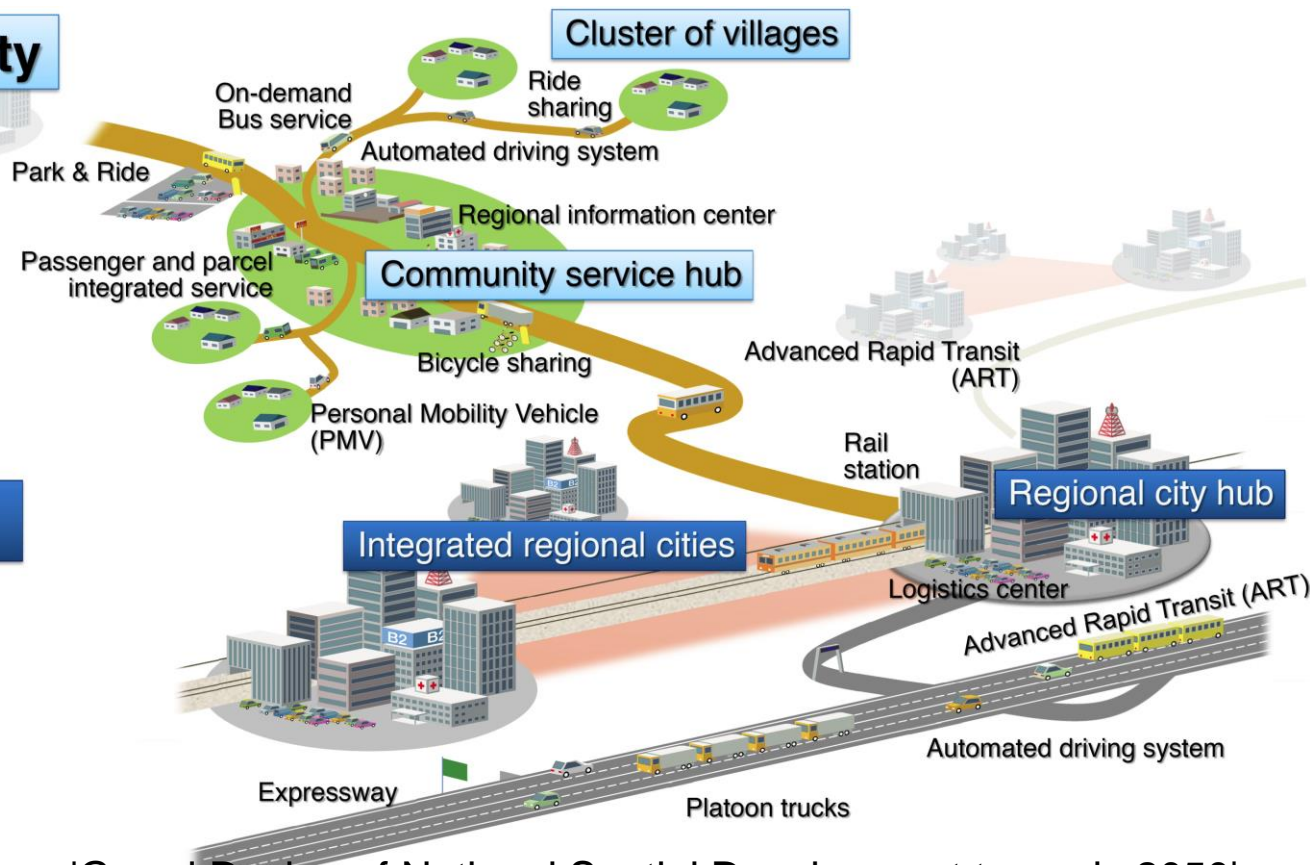


# "Grand Design of National Spatial Development"



## Local Community

## Cluster of villages



## Urban Area

## Integrated regional cities



# FOT: Automated Vehicles in Rural Area

## People Mobility



## Local community



## Service Hub



## Goods Delivery



# Vision: Integrated Mobility for Inclusive Society



**Opportunities**  
for small scale farmers or  
traditional craftsmen/women



**Consumers**  
keen on  
specialized  
products

**Mobility services**  
for ageing population  
and their products



Hub

Products

Hub



**Better living  
environment**



**Diversity in workstyle**  
satellite office and  
migration of young generation

**Residents and visitors**



**Businesses**  
without  
location  
restriction



# Sustainable Economic Development



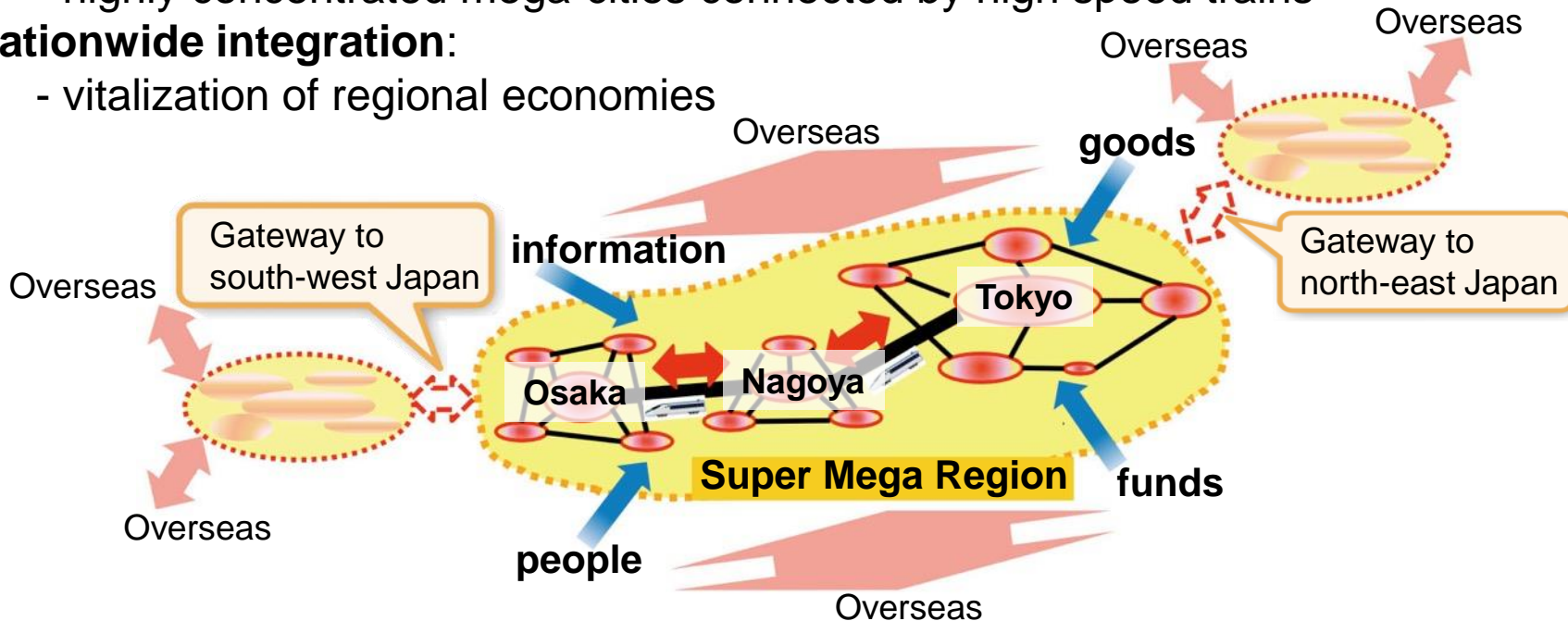
Strategic integration of economic activities with networked transportation

## Super Mega Region:

- highly concentrated mega-cities connected by high speed trains

## Nationwide integration:

- vitalization of regional economies





# FOT: Truck Platooning

## Fully automated platoon (Unopened section of highway, 2012)



Photo: Japan Automobile Research Institute

## CACC platoon (Mixed traffic on highway, January 2018)

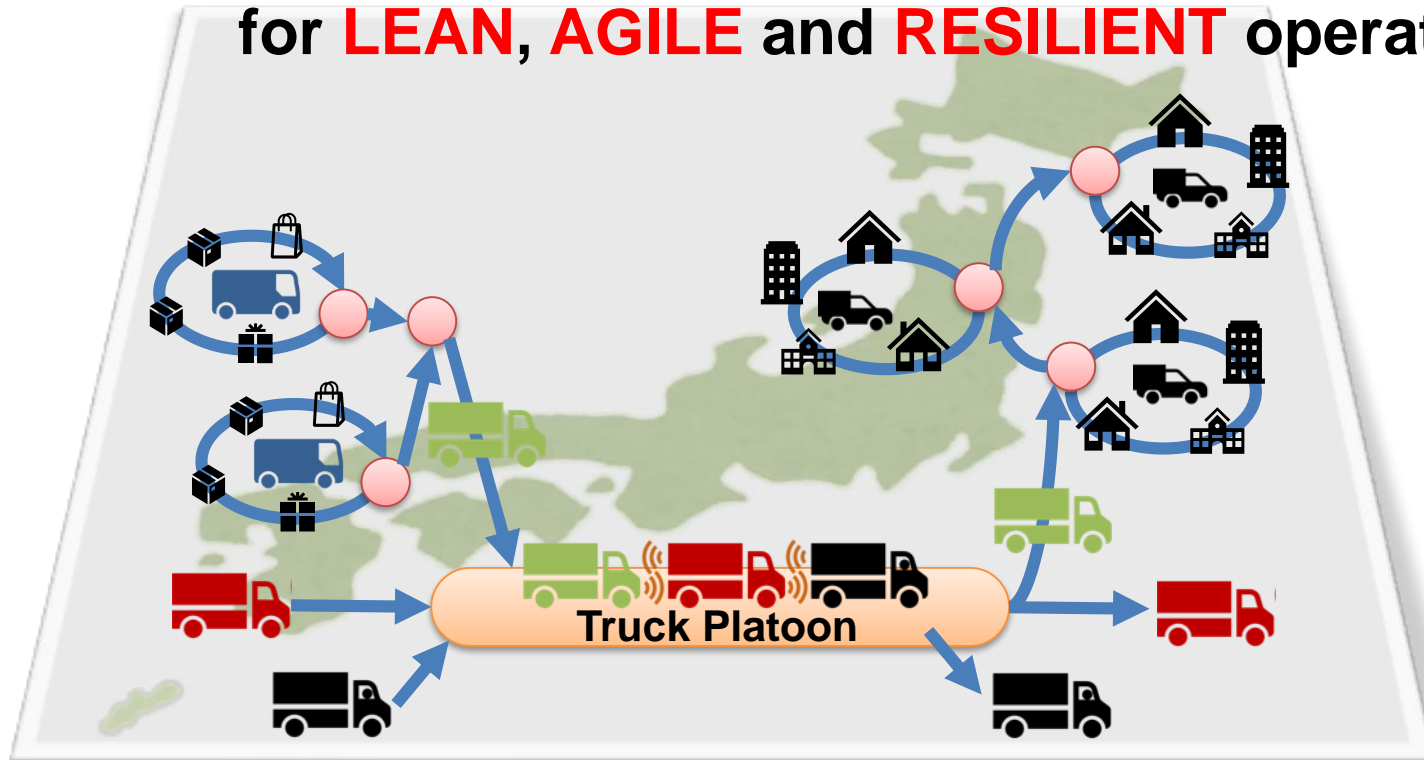


Photo: Toyota Tsusho Corporation



# Vision: Integrated Freight Operations

## Connected and Automated Driving for **LEAN**, **AGILE** and **RESILIENT** operation



**Cross-Ministerial Strategic Innovation Promotion program  
Innovation of Automated Driving for Universal Services**

**“SIP- adus”**

**- Mobility Bringing Everyone a Smile -**

Inclusive society, where diverse people in diverse communities actively participate in generating values, will enhance both wellness of individuals and economic development. Automated driving technologies integrated with social innovations should provide everyone with mobility to fully exercise his or her capacity, enabling sustainable development of the society.



# 5<sup>th</sup> SIP-adus Workshop

**Date:** November 13 – 15, 2018

**Venue:** Tokyo International Exchange Center

## **Topics:**

1. Regional Activities and Field Operational Tests
2. Report Session from SIP-adus Activities
3. Dynamic Map
4. Connected Vehicles
5. Human Factors
6. Impact Assessment
7. Security
8. Next Generation Transport