# ITS in Japan

28th June 2017

Shinichi Sasaki, Chairman, ITS Japan

# What is ITS ?

ITS : Intelligent Transport Systems

Solving Transport Challenges, raising Quality of Life, and promoting Economic Growth through IT and Electronic Control technology.
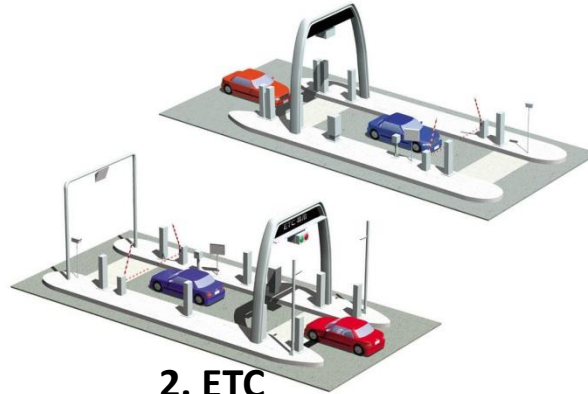
1) Development and deployment of Transport systems applying advanced technologies

2) Uniting each system with purpose oriented to solve transport issues
   - Safety/Security          : Zero traffic accident society
   - Environment/Efficiency: Zero traffic jam society
   - Comfort/Convenience  : The most comfortable, convenient society

3) Creating next generation transport systems to be integrated into revolution of social systems for resolution of global challenges like a global warming
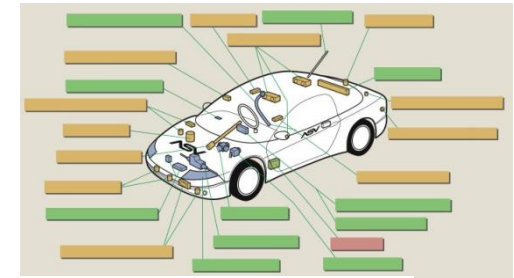
# ITS action plan in Japan (1996)

**ITS Japan**


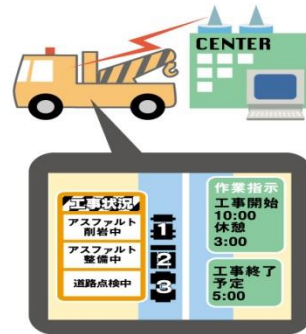**1. Car Navigation**


**2. ETC**


**3. Driving Safety**


**4. Traffic Management**

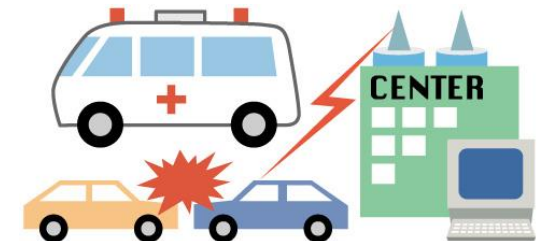
**5. Road Management**


**6. Public Transportation**


**7. Commercial Vehicle Operation**


**8. Pedestrian Support**
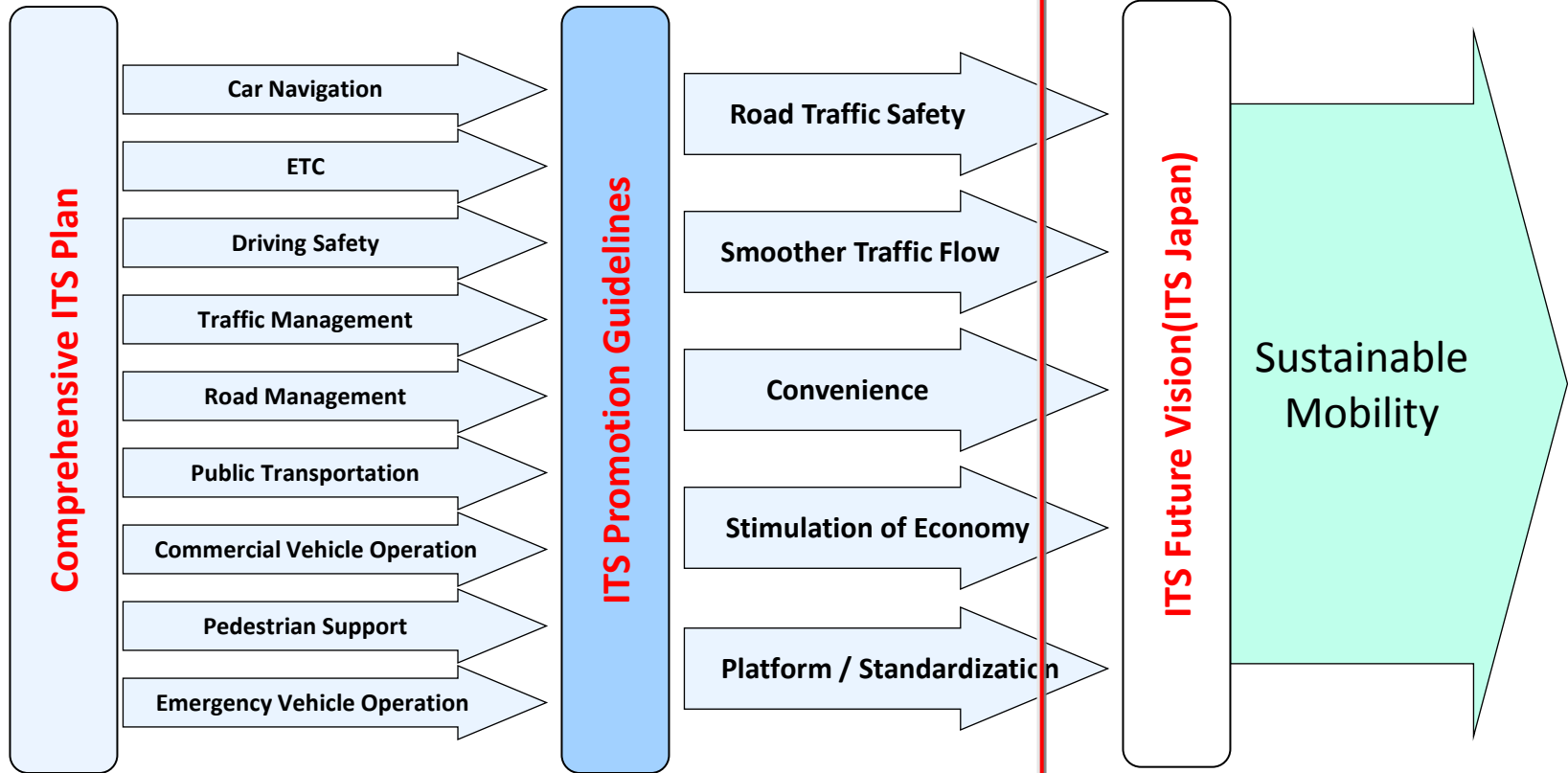

**9. Emergency Vehicle Operation**

# R&D, Deployment, and New Challenges

**ITS Japan**

| First Stage (Development and Field Evaluation) | Second Stage (Accelerated Deployment) | New Challenges (ITS for Sustainability) |
|---|---|---|

**Comprehensive ITS Plan**

- Car Navigation
- ETC
- Driving Safety
- Traffic Management
- Road Management
- Public Transportation
- Commercial Vehicle Operation
- Pedestrian Support
- Emergency Vehicle Operation

**ITS Promotion Guidelines**

- Road Traffic Safety
- Smoother Traffic Flow
- Convenience
- Stimulation of Economy
- Platform / Standardization

**ITS Future Vision(ITS Japan)**

Sustainable Mobility

1995 Yokohama WC

2004 Nagoya WC

2013 Tokyo WC

# ITS for safe driving

## Type of fatal Accident in Japan



Other
Head-on
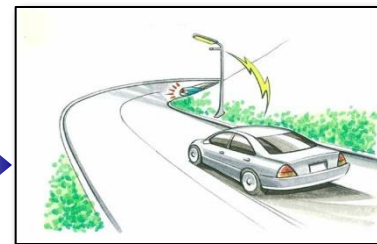Pedestrian
Sudden encounter
Rear end
Right Turn against Straight
Left Turn against Straight
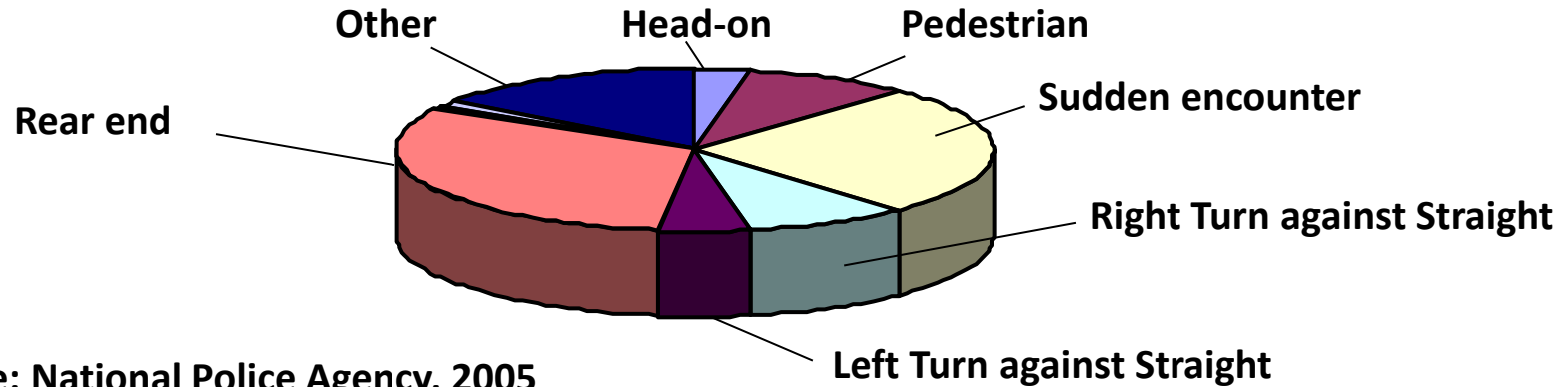
**Source: National Police Agency, 2005**

## Active Safety Systems (built-in)



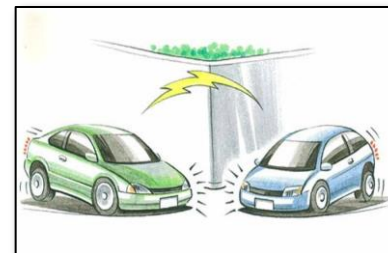Following Driving Mode is based on the preceding vehicle.

- Anti-lock Braking System
- Electronic Stability Control
- Adaptive Crouse Control
- Lane-keeping Assist
- Pre-crash Safety
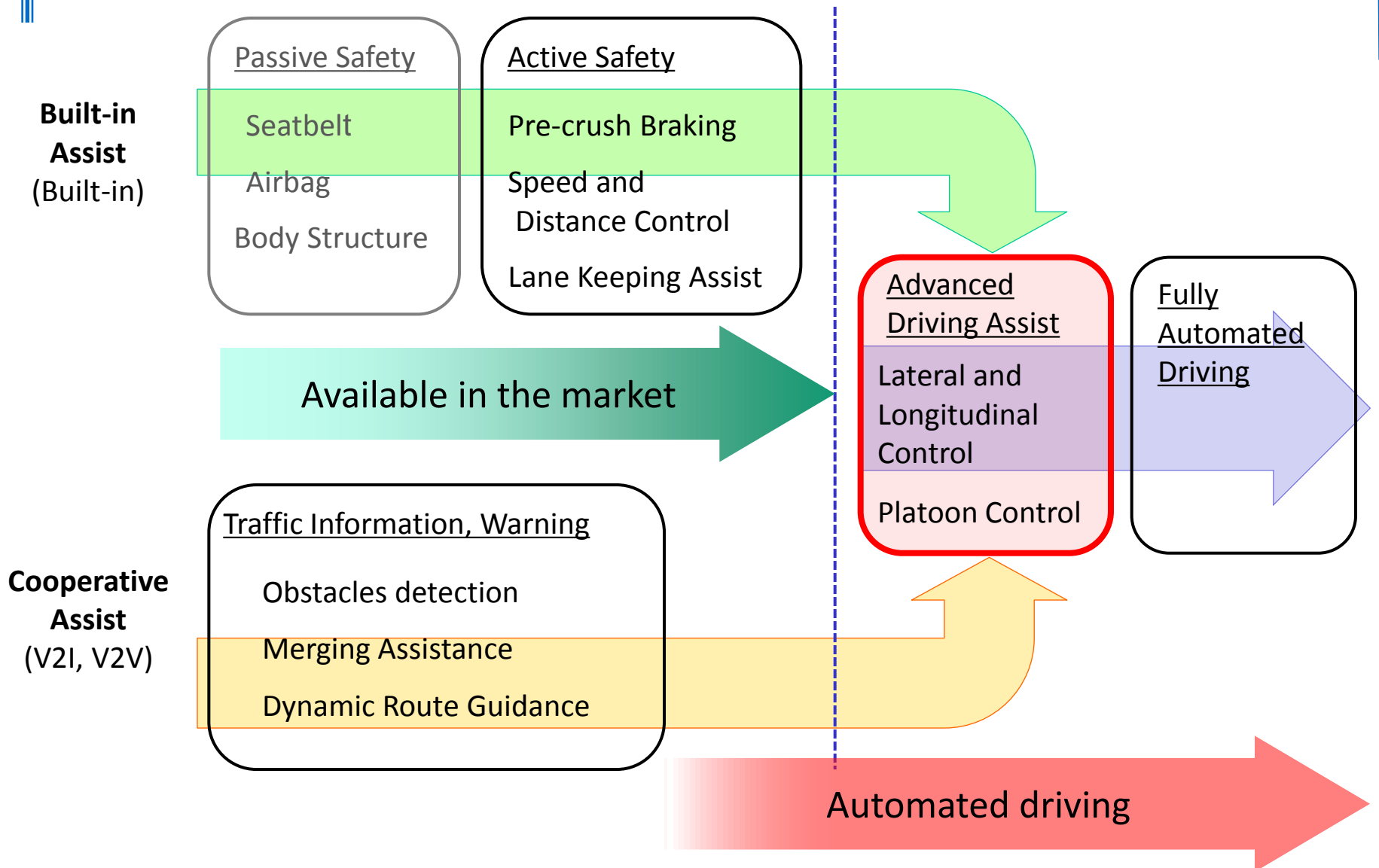
## Cooperative Active Safety Systems



**V2I**



**V2V**

# Advanced Driving Assistance

**Built-in Assist** (Built-in)

Passive Safety
- Seatbelt
- Airbag
- Body Structure

Active Safety
- Pre-crush Braking
- Speed and Distance Control
- Lane Keeping Assist

Available in the market

Advanced Driving Assist
- Lateral and Longitudinal Control
- Platoon Control

Fully Automated Driving

**Cooperative Assist** (V2I, V2V)

Traffic Information, Warning
- Obstacles detection
- Merging Assistance
- Dynamic Route Guidance

Automated driving

**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.

Source: SIP-adus

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# Technologies for Automated Driving



**On-board Technologies**

Sensing 認知 / Decision 判断 / Operation 操作

**HMI**

人との協調 — Coordination

GNSS

Precise digital map

V to X

Camera — Lider

Camera
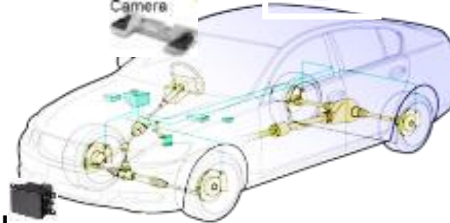
Rader

Built-in sensors
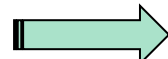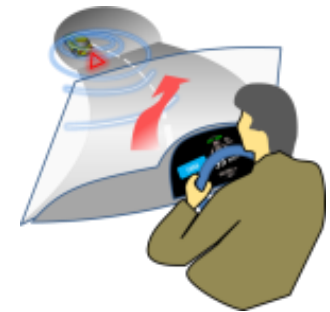
Human Machine Interface

**Platform** — **Security, Simulation, Shared database, etc.**

Source: SIP-adus

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# Traffic Signal Prediction System (TSPS)

**Green Signal Timing Advisory**

Timing of green light to move.

**Red Signal Timing Advisory**

Timing to decelerate to stop at red signal.

**Speed Harmonization**

Speed suggestion to pass intersections without stopping

Traffic Management Center

**Roadside Beacon**
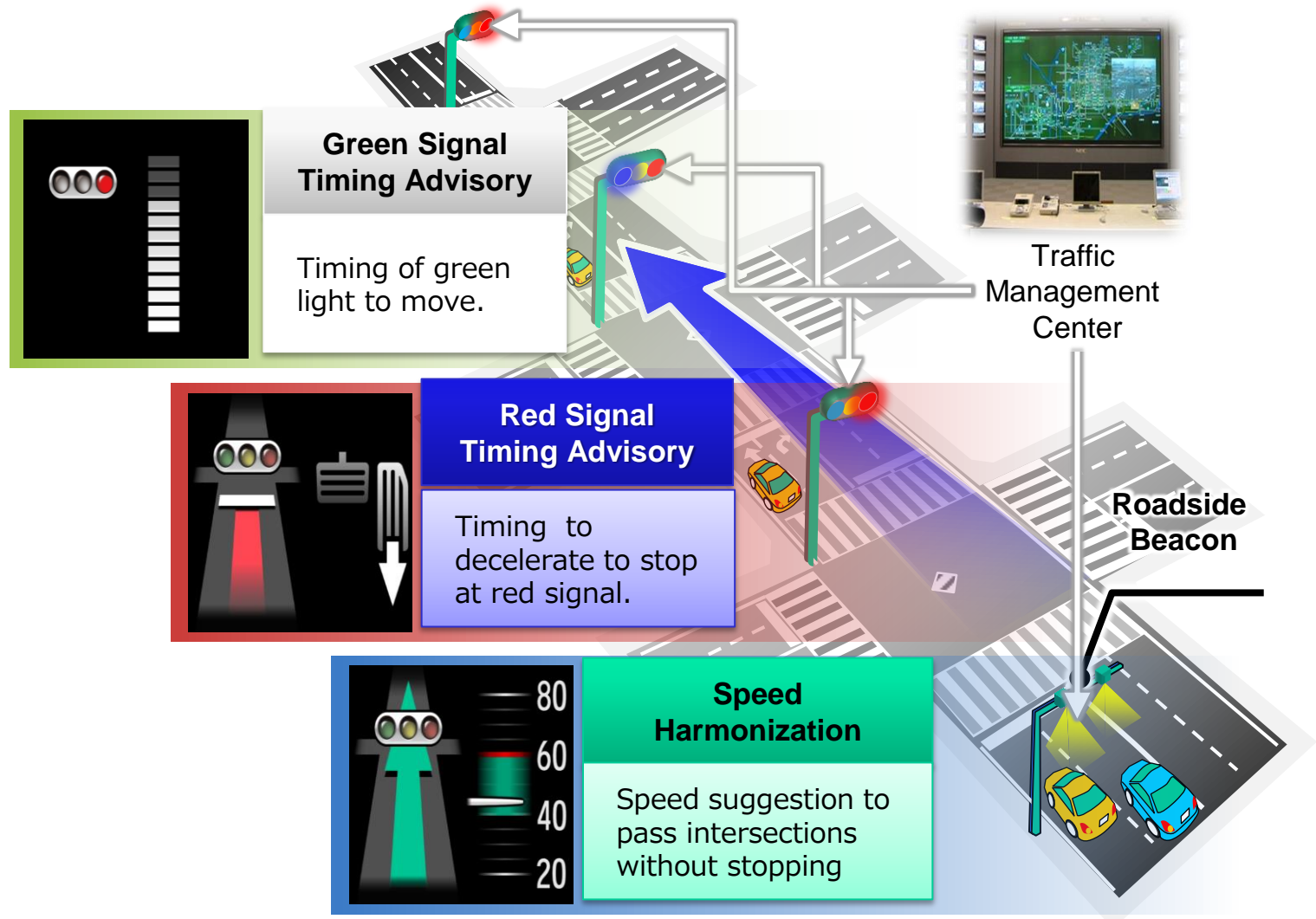
Source: National Police Agency, Japan

# Right Turn Collision Warning



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

Detection of shielded approaching cars

Messaging

Detection of pedestrians on the crosswalk

Source: National Police Agency, Japan

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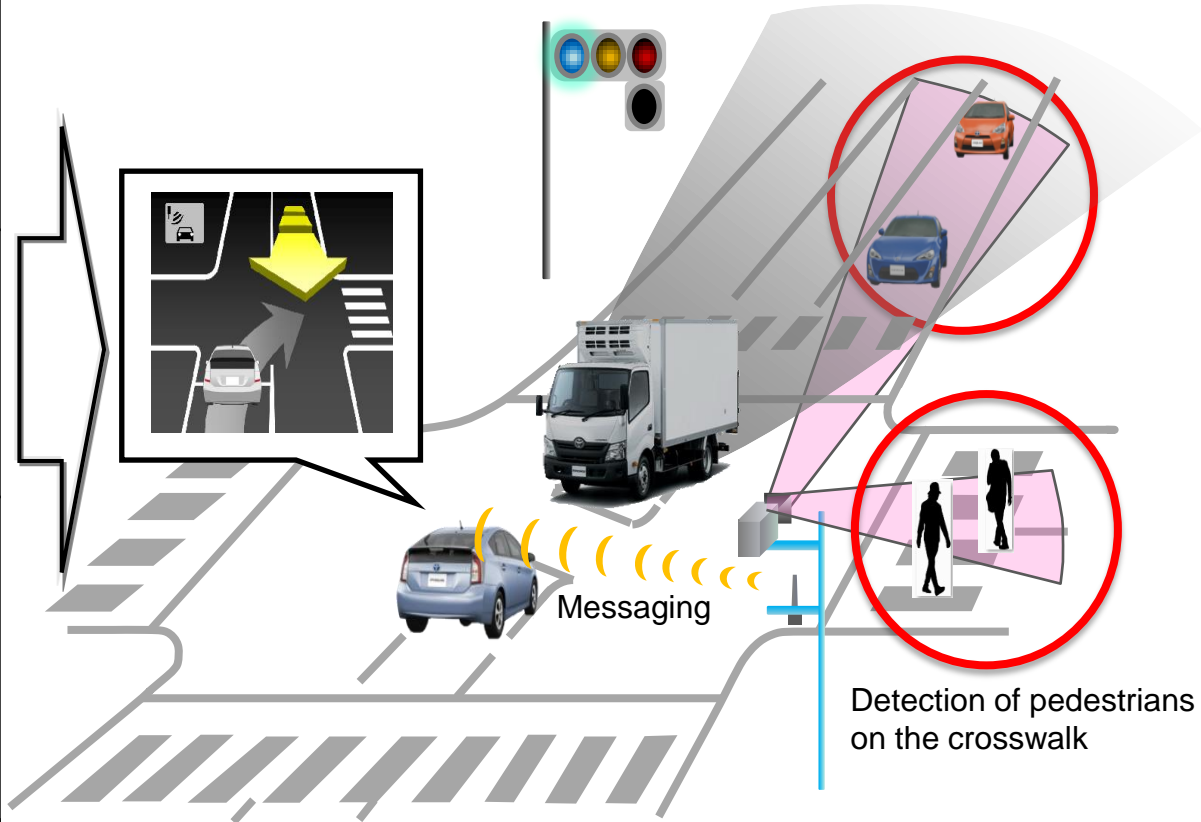
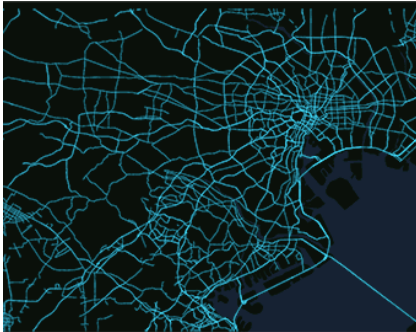# ART (Advanced Rapid Transit)



Cyber Agent

Source: SIP-adus
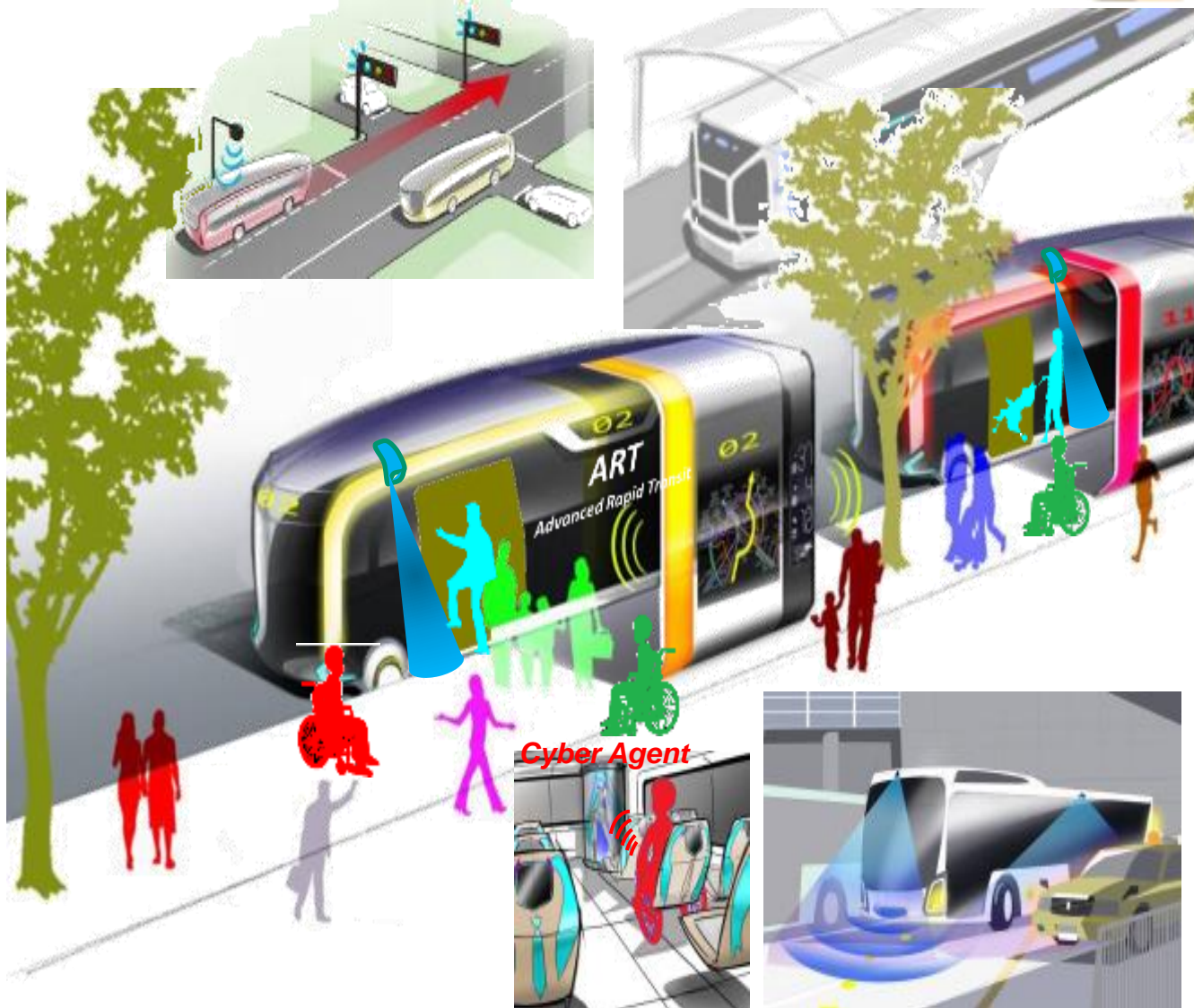
# Intelligent Traffic Management System

## Conventional Traffic Information System

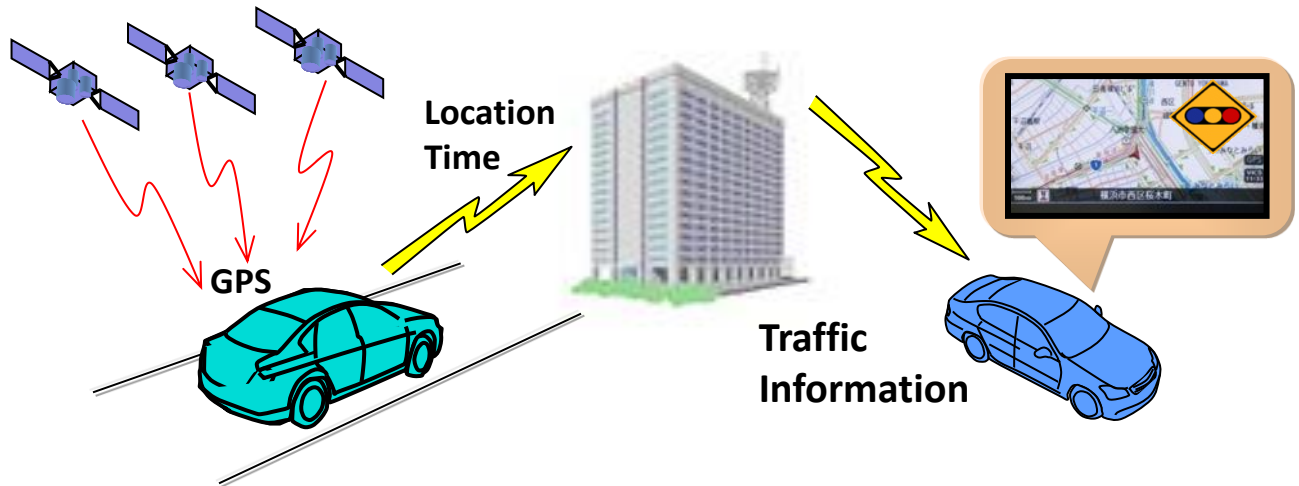**Fixed sensor data**



**Central Tokyo**

**Traffic Control Center**

## Mobile Device based System

**Probe Data**



**Central Tokyo**

**GPS**

**Location Time**

**Traffic Information**

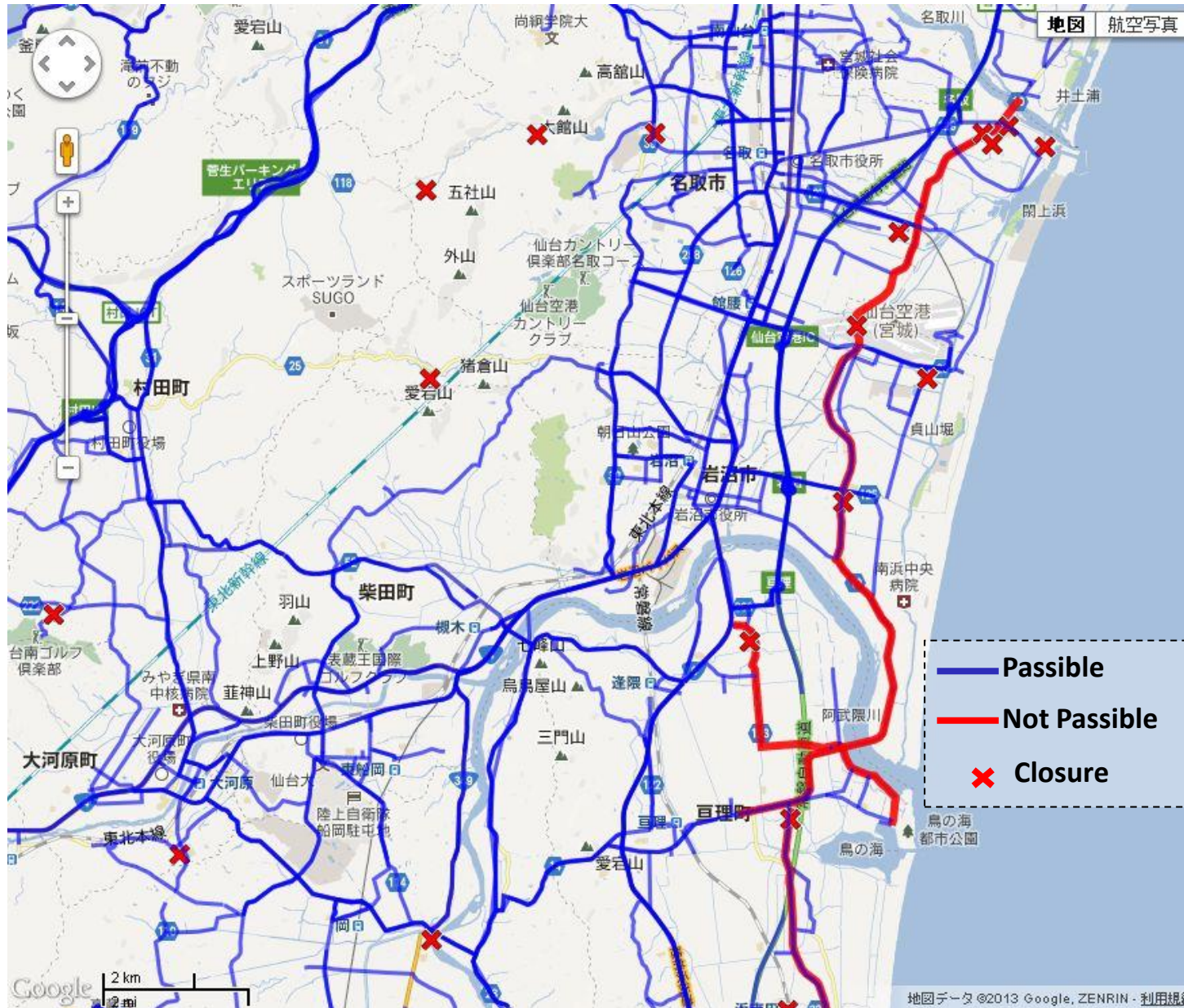# Lessons learned from the disaster

Source: Haruo HAYASHI, SS65, ITS World Congress 2011, Orlando

# Probe data with road closure information



Data Source

Probe:
Honda
Pioneer
Toyota
Nissan

Road closure:
Geospatial
Information
Authority of
Japan

**Passible**
**Not Passible**
✖ **Closure**

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# From R&D to Product Development

## Recognition by the National Leader



Prime Minister Abe
showed strong interest

**TOYOTA**



**NISSAN**



**HONDA**



## Showcase in Detroit

**HONDA**



**TOYOTA**



**DENSO**

# Automated Driving

What does it mean for our society ?

Critical transport challenges
- Reduction of traffic accidents
- Mitigation of traffic jam
- Energy and Environmental problems

More urgent and fundamental challenges
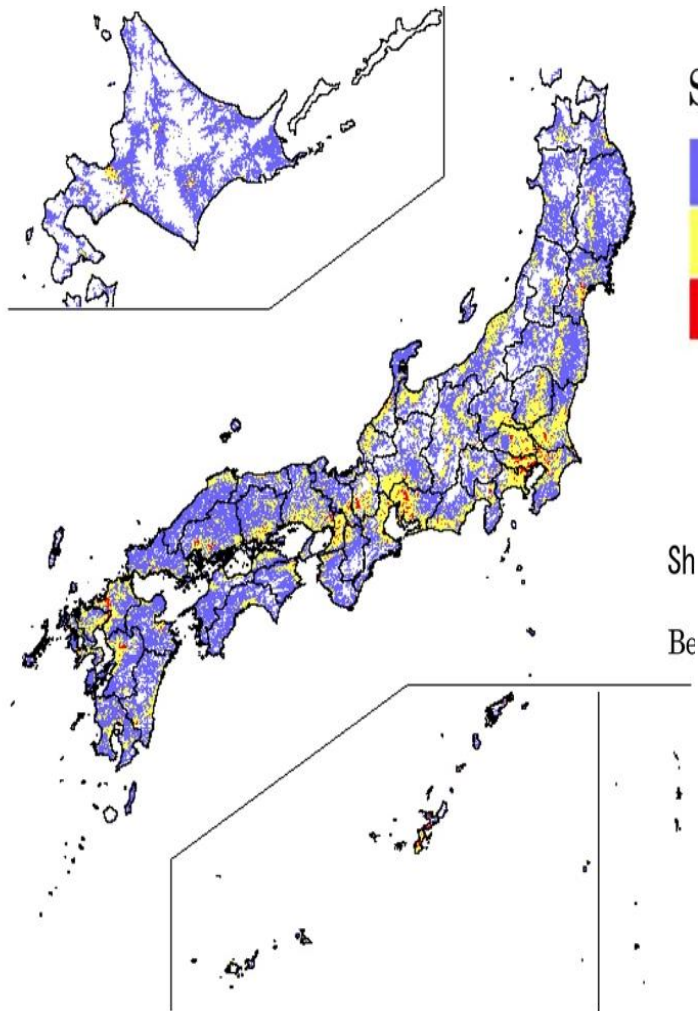- Declining Birthrates and Aging Societies

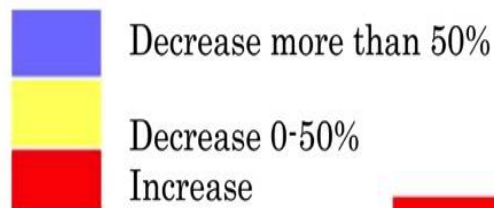Expected to contribute to overcome above challenges

# Aging and Declining Population in Japan

**ITS Japan**

**Population in 2050 compared with that of 2010**

Share of 2050/2010

- Decrease more than 50%
- Decrease 0-50%
- Increase

**Projected population decrease 2010 to 2050**

Become uninhabited    Decrease 50 % or more    Decrease 0- 50 %

| 19% | 44% | 35% |

Increase 2%

0%  10%  20%  30%  40%  50%  60%  70%  80%  90%  100%
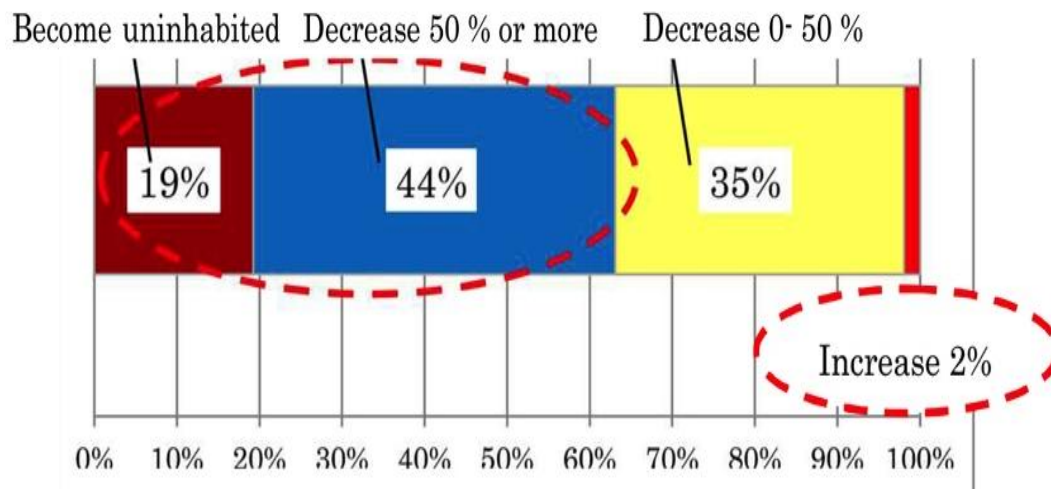
Source: Ministry of Land Infrastructure, Transport and Tourism, Japan

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# Fatal Crash caused by Violation
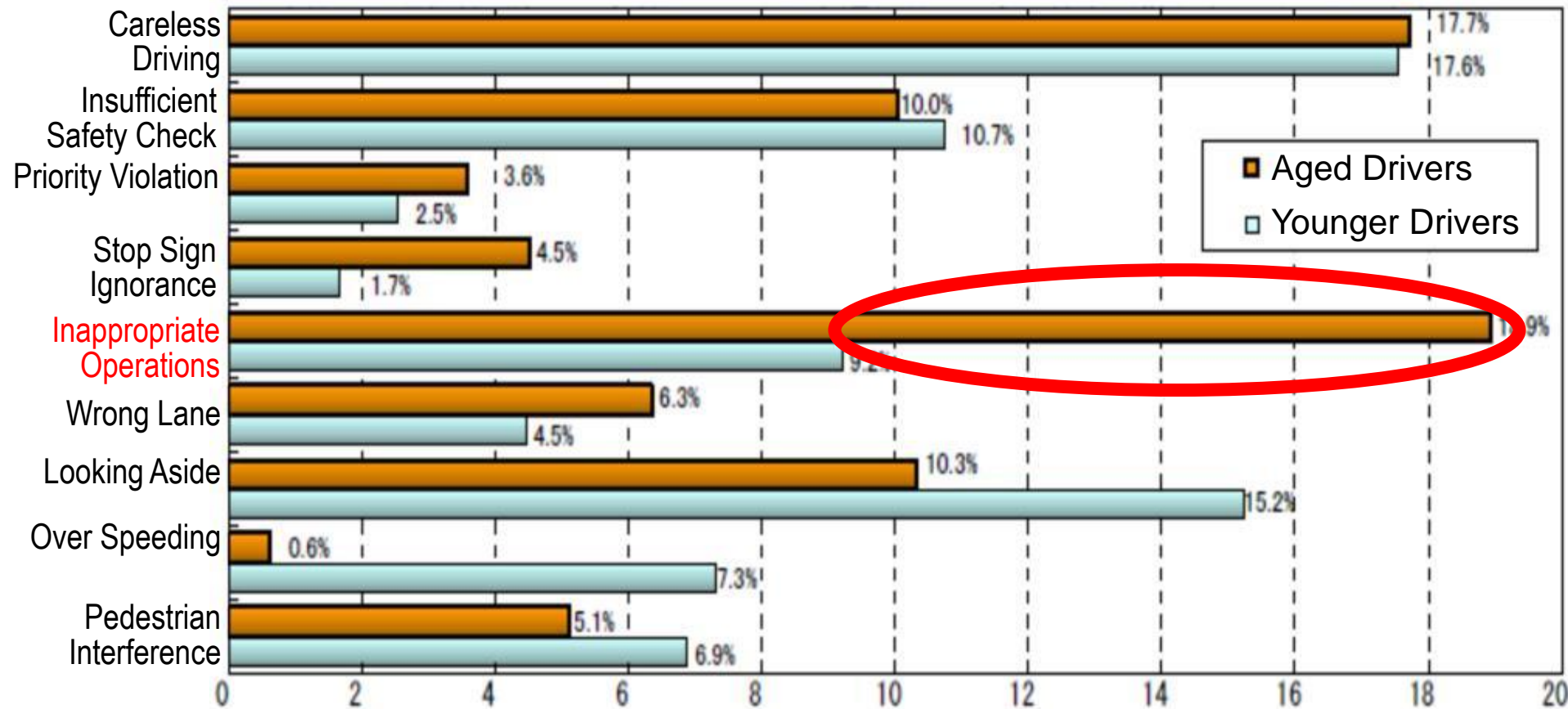


Source: National Police Agency, Japan

**5,000 clusters of small villages with 10,000 population connected to a basic service hub by transportation and information network**



to regional hub cities

On-demand bus service

Ride Sharing

Park & Ride

Regional information center

Automated driving system

Community service hub

Integration of passenger and parcel services

Bicycle Sharing

Personal Mobility vehicle (PMV)

Advanced Rapid Transit (ART)

to regional hub cities

# ITS Japan Action Plan 2016-2020: Integrated regional hubs
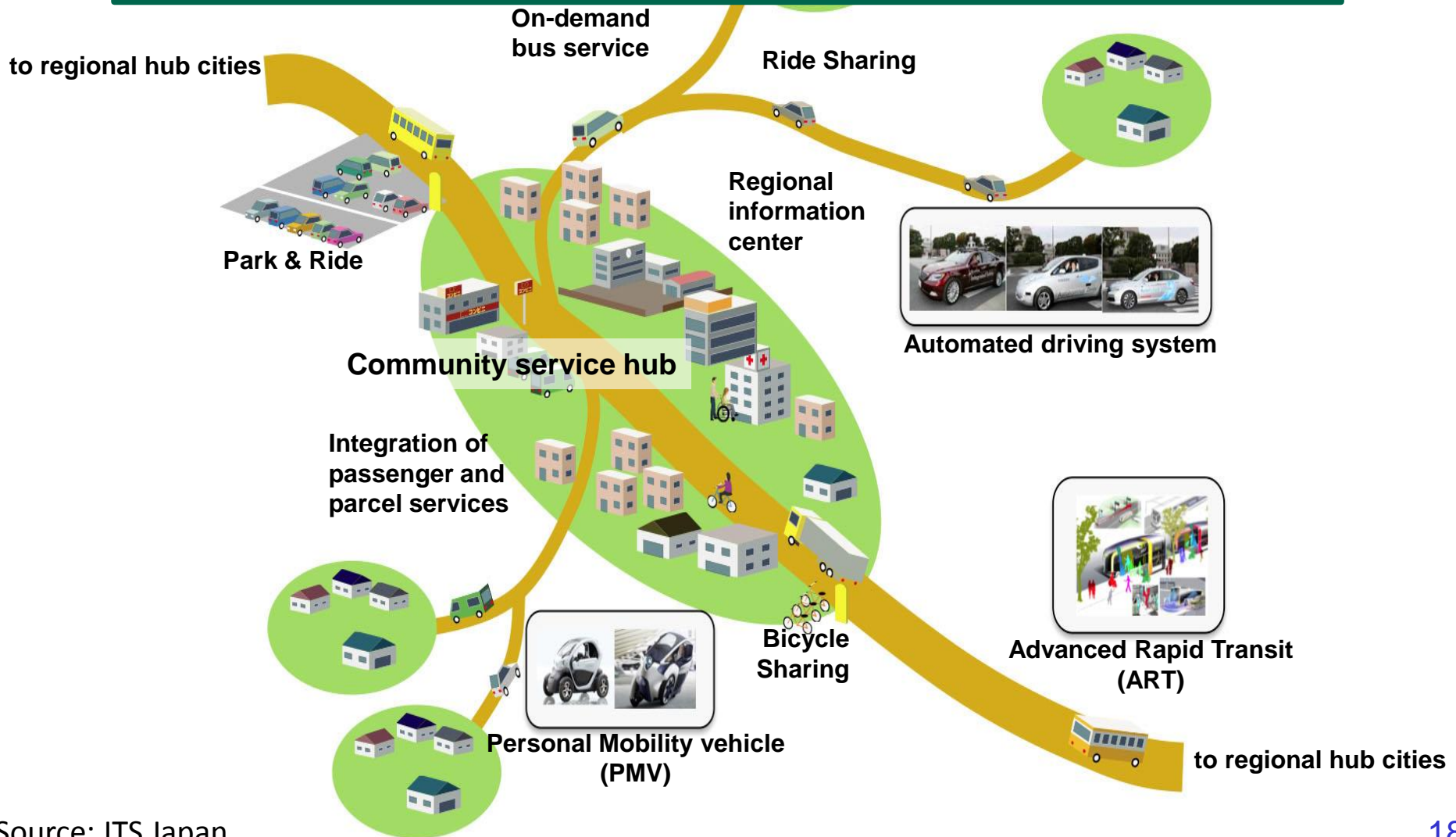
**60 to 70 integrated regional cities with 300,000 population connected to each other within one hour of travel to maintain high level education, medical care and employment opportunities**



Rail station

Logistics center

Advanced Rapid Transit (ART)

Expressway

Platoon trucks

Automated driving system
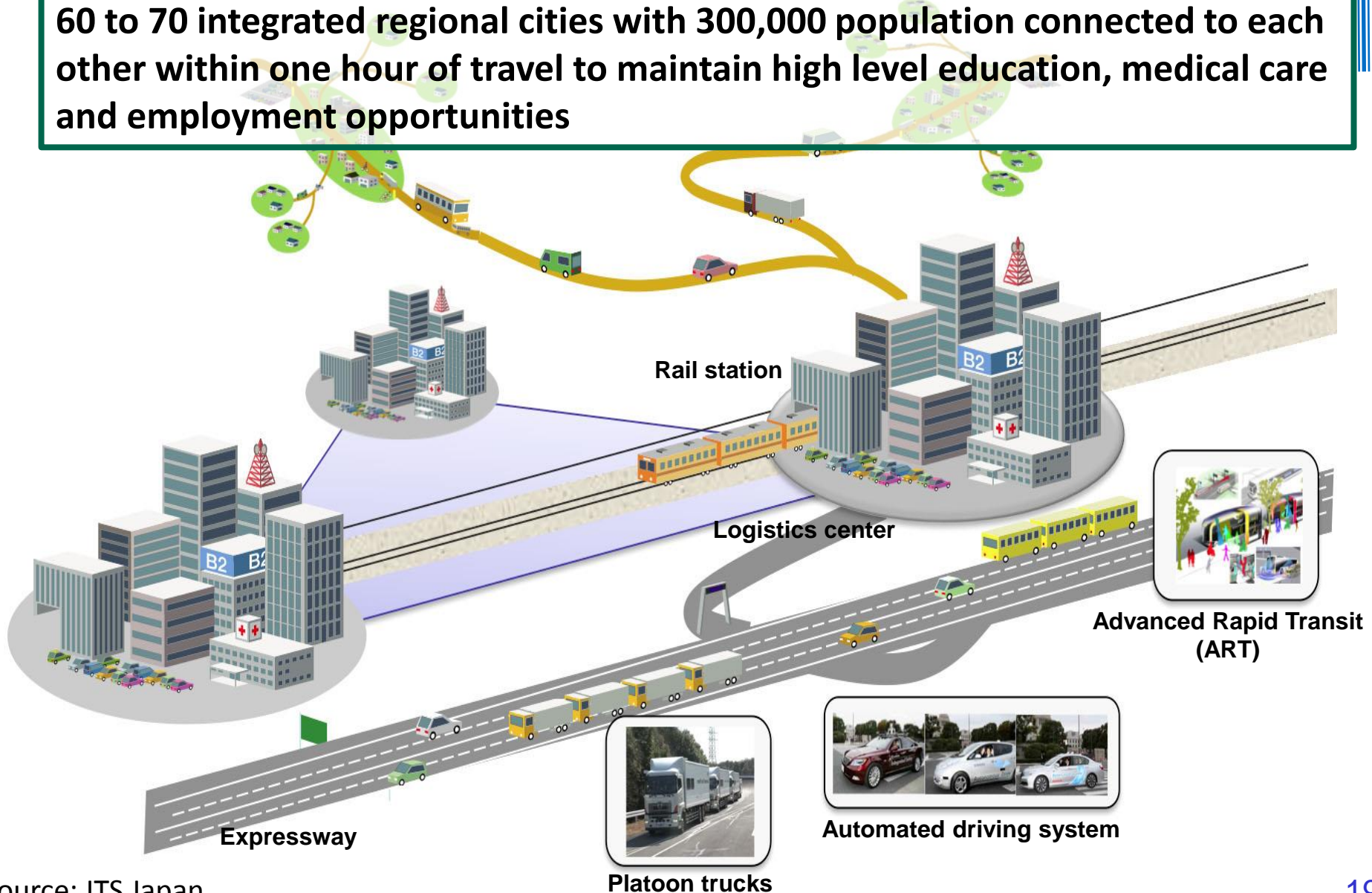
Center for competitive edge in global economy integrating industries with high capacity and efficient transportation for both domestic and global operations

Expressway

High speed rail

Expressway

Maglev

Expressway

Smart city

High speed rail

Airport

Airport

Seaport

# ITS Japan Action Plan 2016-2020

<Basic Idea>
  Synchronize progress of ITS with national land planning

<Themes>

a) To realize integrated urban transport society with new
    transportation mode corresponding to diversified environment
b) To create the open and shared big data platform from various
    sources and mashup data
c) To involve to deploy ITS systems based on the situation in
    each community
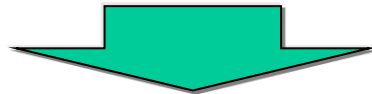
Solving social challenges by ITS

# Our commitment for the future with ITS

<Historical Path>

Rapid economic growth
→ Serious Transport problems
→ Balanced growth

**Smart Growth** = Economic Growth & Enhancement of QoL

Rapid economic growth
→ Balanced growth

Respecting diversity of people's values

**Sustainable & Smart Growth** in Asia-Pacific
through mutual collaboration of ITS colleagues

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