



# ITS Advancement in Road Systems: Smartway

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1. Concept of Smartway
2. Directions for Smartway policy
3. Advances in car navigation systems
4. Advances in ETC
5. Support for safe driving
6. Realization of services

# 1. Concept of Smartway



## 1) Overall image of ITS

### Guidelines for the promotion of ITS:

- In October 2004, the ITS Strategy Committee issued a proposal on the areas in which ITS should actively contribute in the future.

(1) Safety and security

(2) Efficiency and the environment

(3) Convenience and comfort

### Overall framework for the promotion of ITS:

- In July 1996, an overall framework for the promotion of ITS was formulated by four government agencies related to ITS.
- Since then, the promotion of research, development, and practical implementation has focused primarily on the following nine development areas of ITS in Japan.

1. Advances in navigation systems

2. Electronic toll collection systems

3. Assistance for safe driving

4. Optimization of traffic management

5. Increasing efficiency in road management

6. Support for public transport

7. Increasing efficiency in commercial vehicle operations

8. Support for pedestrians

9. Support for emergency vehicle operations

# 1. Concept of Smartway



## 2) Framework of Smartway

### (1) Smartway

#### Definition of Smartway

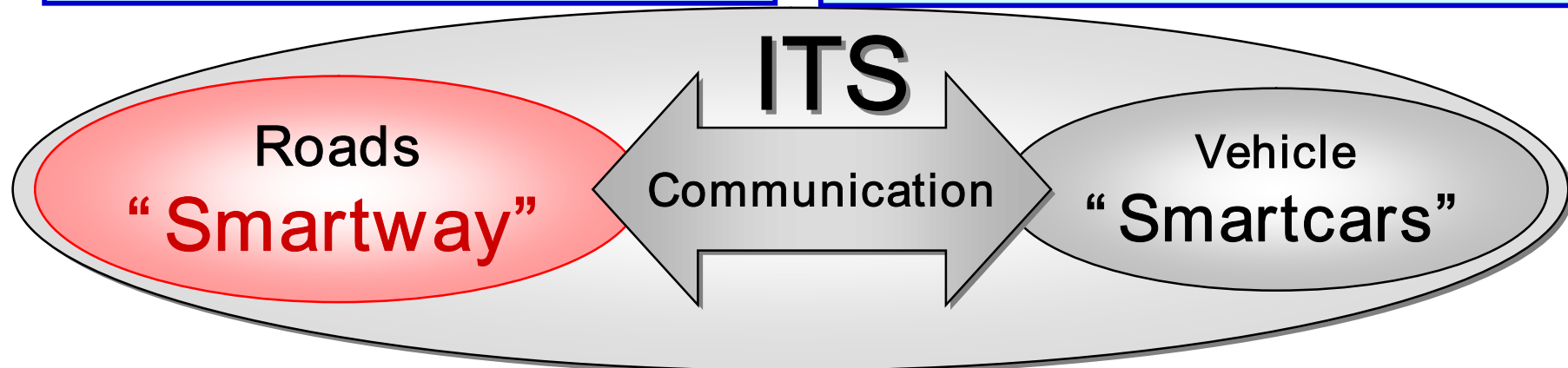
- Smartway refers to a road system that allows the exchange of various types of information among cars, drivers, pedestrians, and other users.

#### Foundation for the deployment of various ITS services

- Integrated realization of ITS to provide safe, smooth road transportation and a positive environment.

#### Foundation for affluence and comfort in life and society

- More efficient movement of people, goods, and information
- Realization of comfortable living spaces
- Building a national infrastructure that provides safety and peace of mind





# 1. Concept of Smartway



## 2) Framework of Smartway

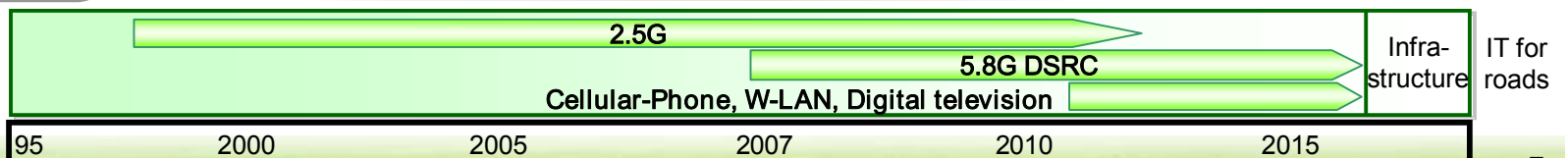
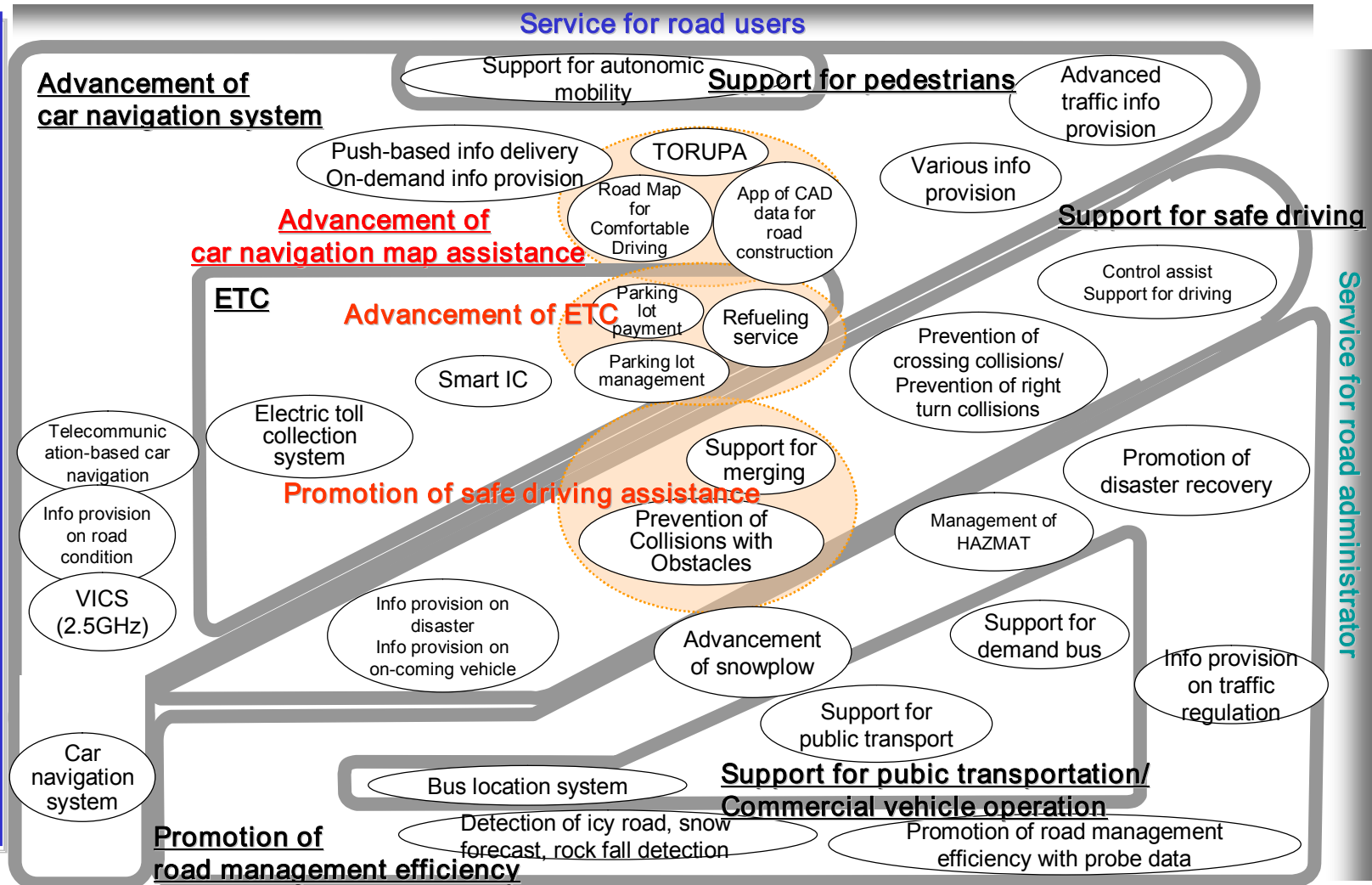
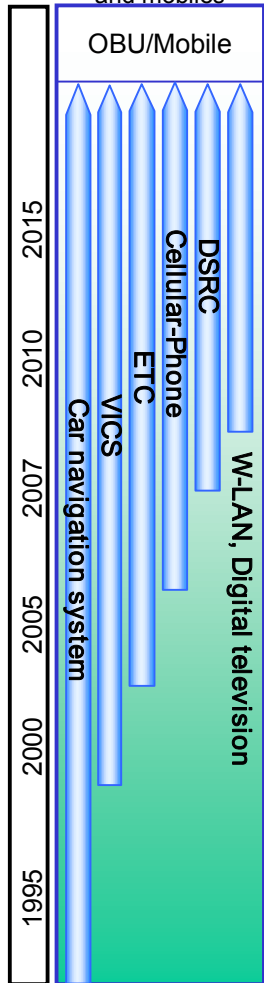
### (2) Smartway Project Advisory Committee



# 2. Directions for Smartway policy



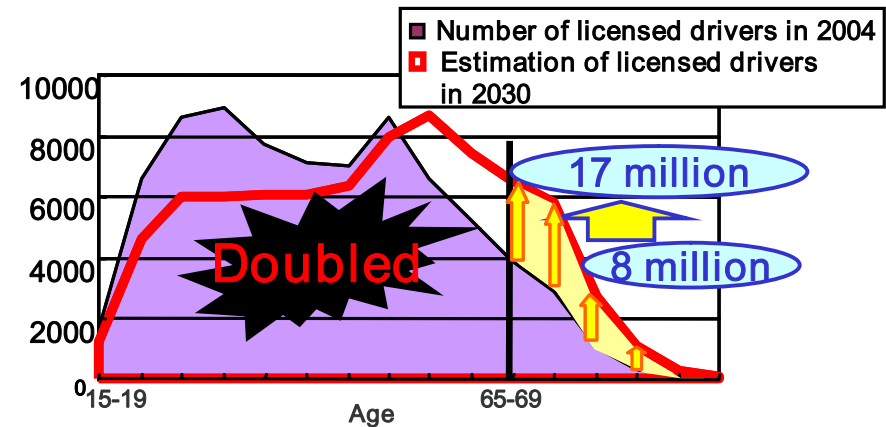
IT for vehicles and mobiles



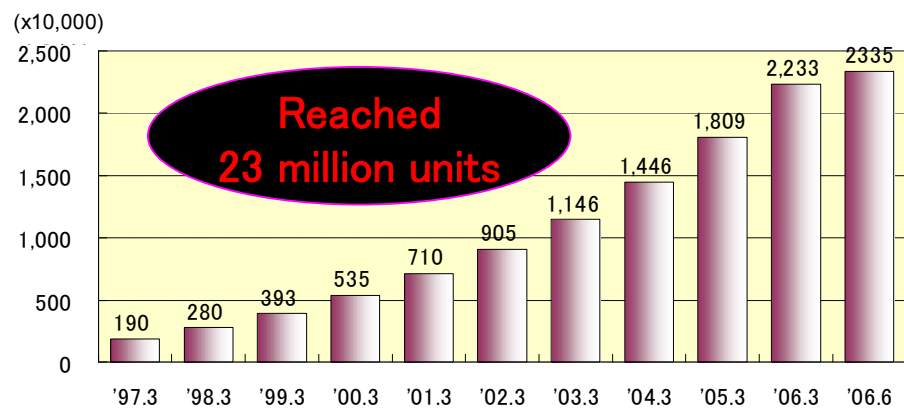
# 3. Advancement of car navigation systems



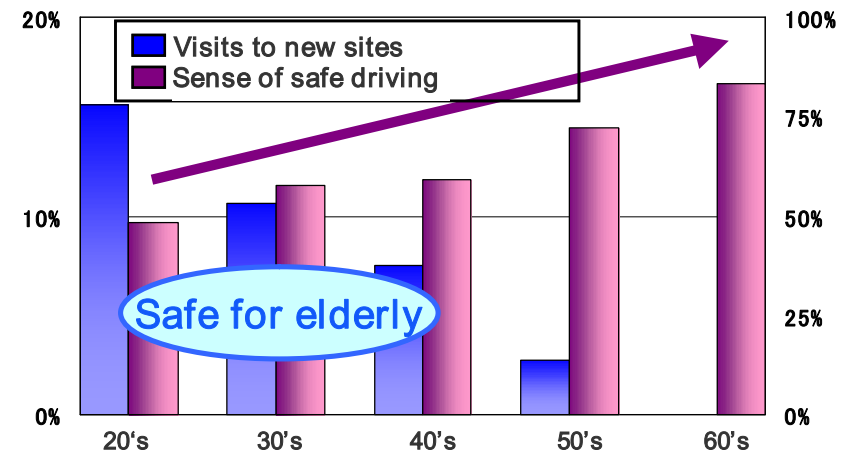
## 1) Spread of car navigation systems



Increasing senior drivers  
- estimation of population and licensed drivers in 2030



Cumulative shipments of car navigation systems



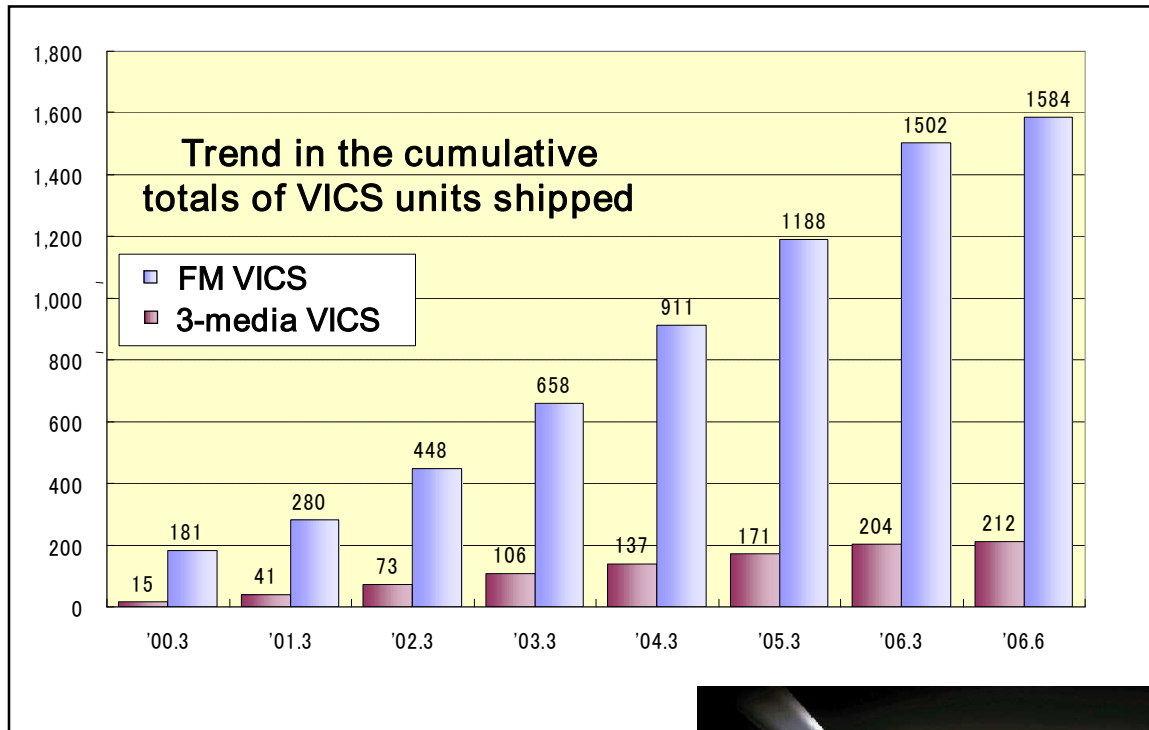
Change in the driver's sense of safety  
- Result of questionnaire survey on the effect of car navigation



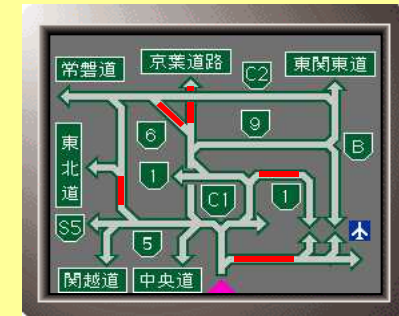
# 3. Advancement of car navigation systems



## 2) Spread of VICS



### Example of Display



Level 2 : Simple Diagrams



Level 3 : Map Display







# 4. Advancement of ETC



## 2) Effects of the spread of ETC

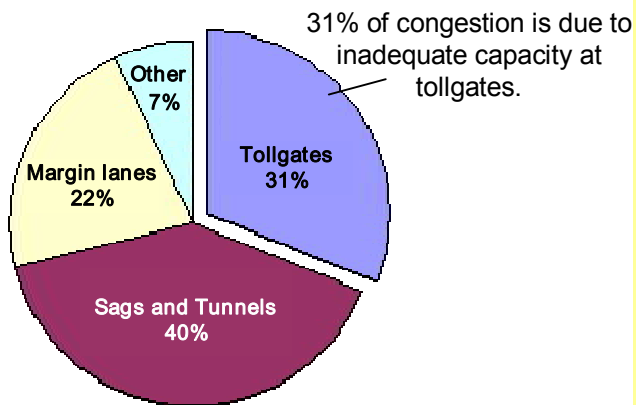


Fig.: Causes of congestion on expressways

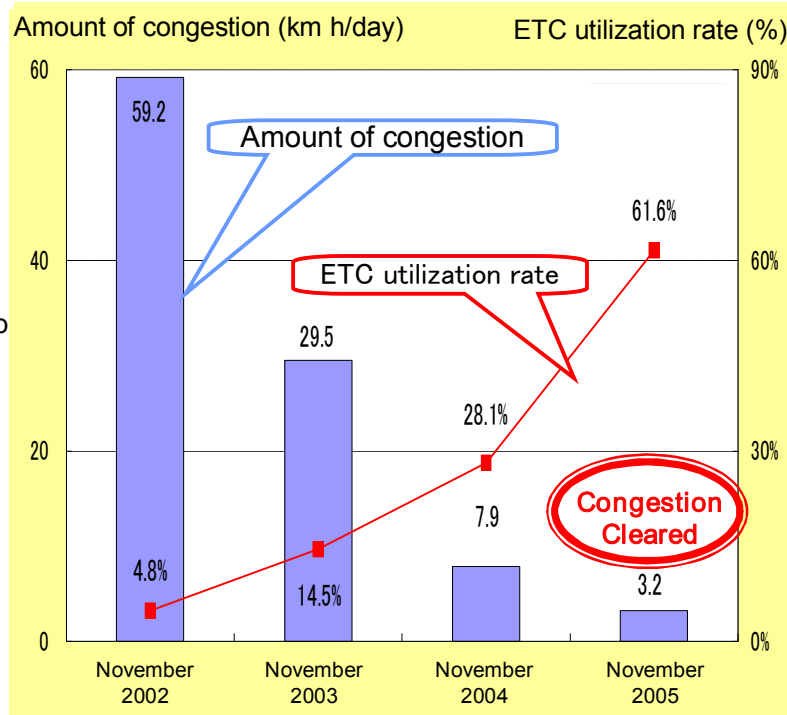


Fig.: Trends in ETC utilization rates and congestion at tollgates on the main lines of Metropolitan Expressways

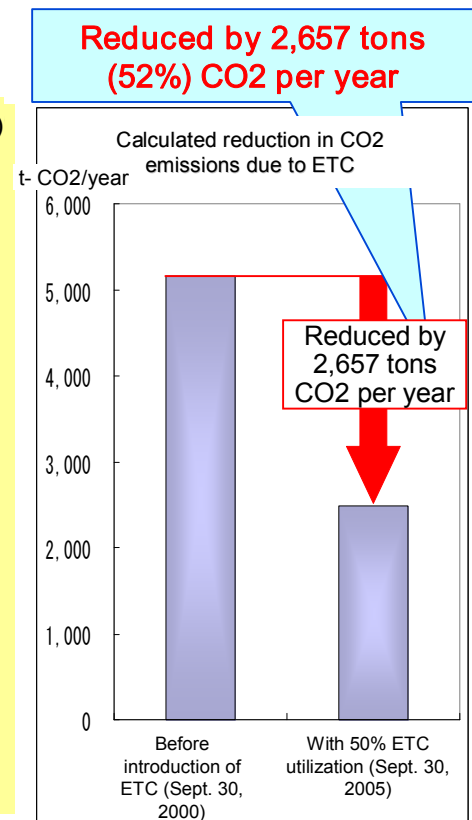


Fig.: Change in carbon dioxide emissions at Yokohama-Machida Toll Plaza

# 4. Advancement of ETC



## 3) Field trials of smart interchanges

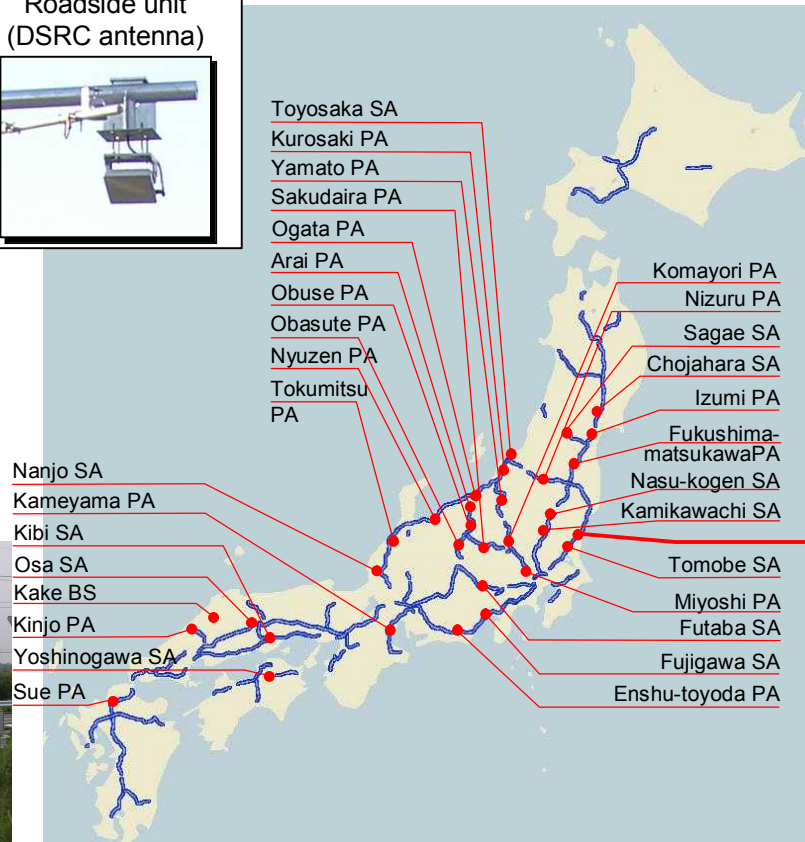


Smart interchange at Kamisato Service Area

Roadside unit (DSRC antenna)



Smart interchange at Komazaki Parking Area



**Smart IC field trial on National Highway 123**

**-Location**  
Junction of the Joban Expressway with National Highway 123

**-Time**  
September 2006 - March 2007



# 4. Advancement of ETC



## 4) Payment of public parking fees and private sector services

**OSAKA**

**Sakurabashi parking facility**

- From December 1, 2005
- Payment of parking fees and guidance to handicapped spaces







**NAGOYA**

**Ozone highway parking facility**

- From November 21, 2005
- Payment of parking fees

**TOKYO**

**Nishi-Shinjuku No. 4 parking facility**


- From December 16, 2005
- Payment of parking fees







**Other anticipated future uses**

ETC will be used to simplify the procedures for vehicles boarding car ferries.




ETC will be used for payments at gas stations and drive-through establishments in order to improve convenience.

Drive-through      Gas station



# 5. Support for safe driving



## 1) Concept of safe driving support

### Lane Keeping System

-Assists wheel control at a straight section of the road by keeping the vehicle inside the lane that is recognized by a camera.



(lane departing warning/lane keeping assist camera)



Source : Honda Motor Co., Ltd. Official website

### Adaptive Cruise Control

-Laser radar monitors ahead and maintains a certain speed. Also keeps a following distance when recognizing a preceding vehicle.

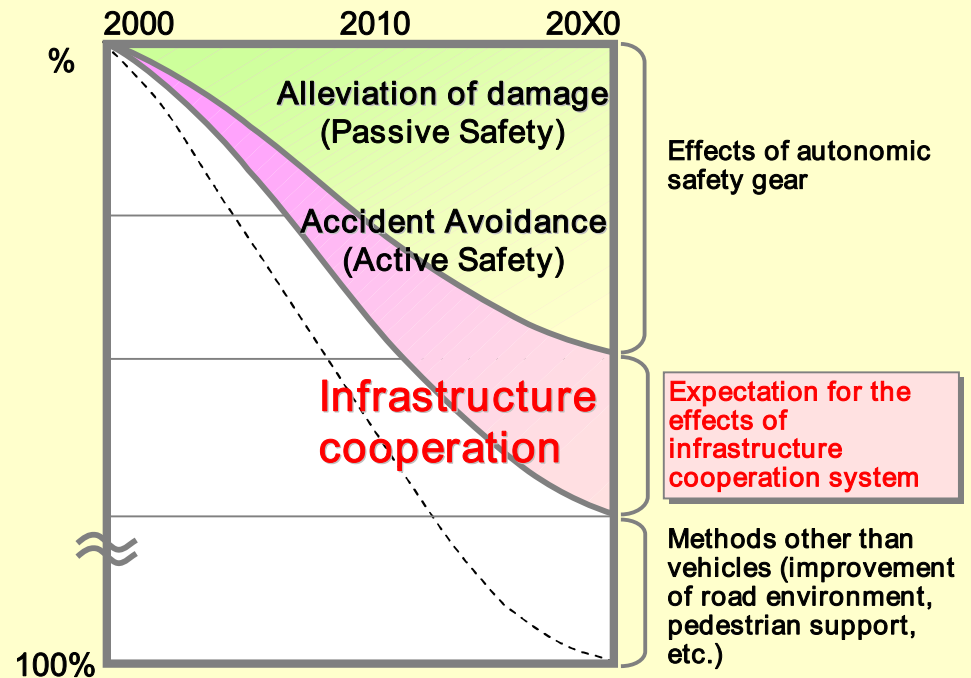


Source : Nissan Motor Co., Ltd. Official website

### Concept of Safety System

-Shifting the focus from passive safety to active safety  
 -When the detection from the onboard sensors is difficult or insufficient, information from the road infrastructure becomes necessary

**→ Cooperative safety system**



Expectation for the effects of infrastructure cooperation system

Methods other than vehicles (improvement of road environment, pedestrian support, etc.)

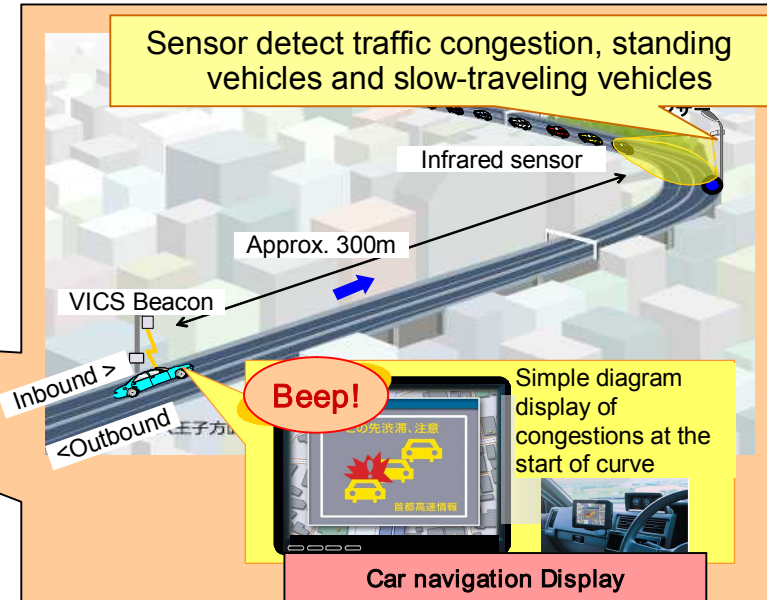
(Source : ITS Japan)

# 5. Support for safe driving

## 2) Information Provision on forward obstacles



Fig. Field test site ( No.4 of Metropolitan Expressway)  
Source : AHSRA



### Accidents covered by the service

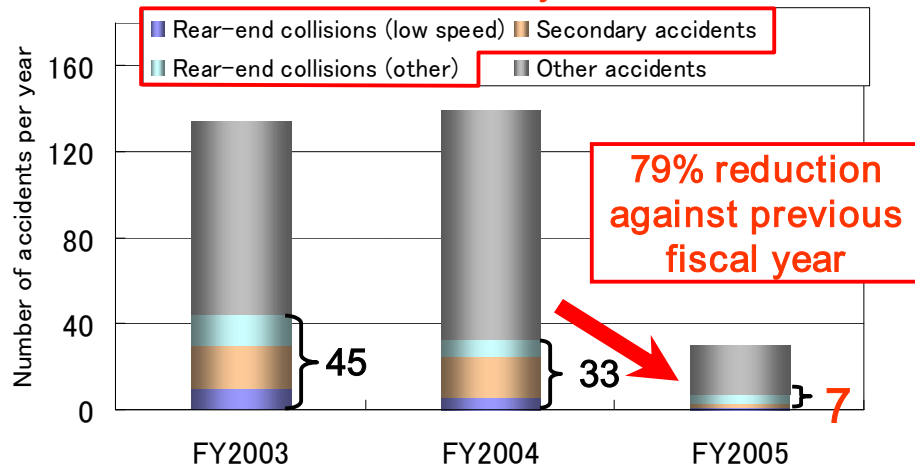


Fig. Number of accidents during the field test  
Source : AHSRA

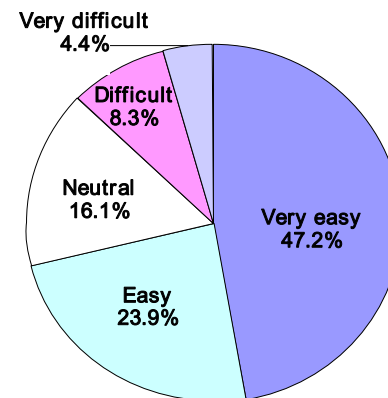


Fig. Was the information easy to understand?

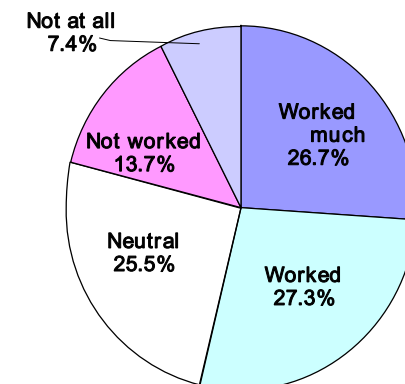


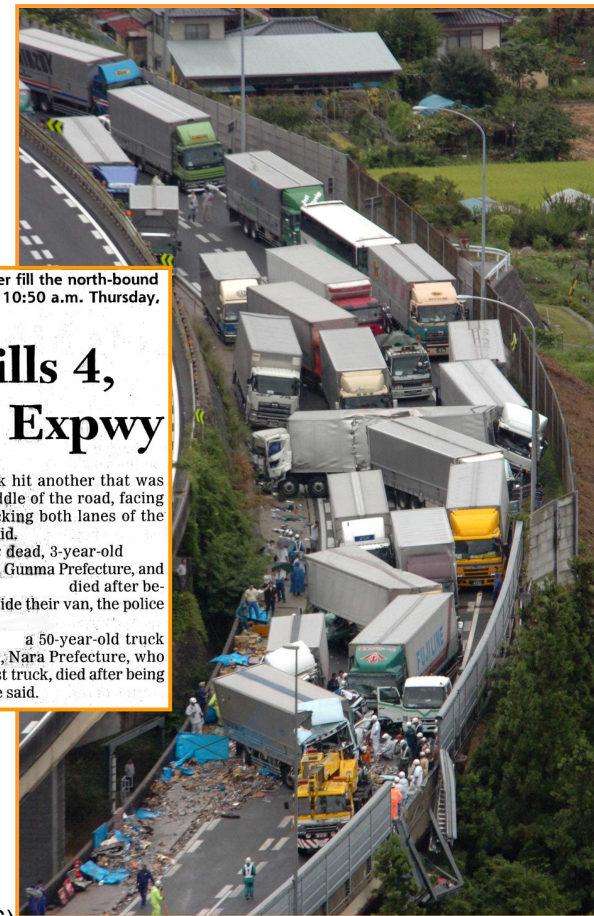
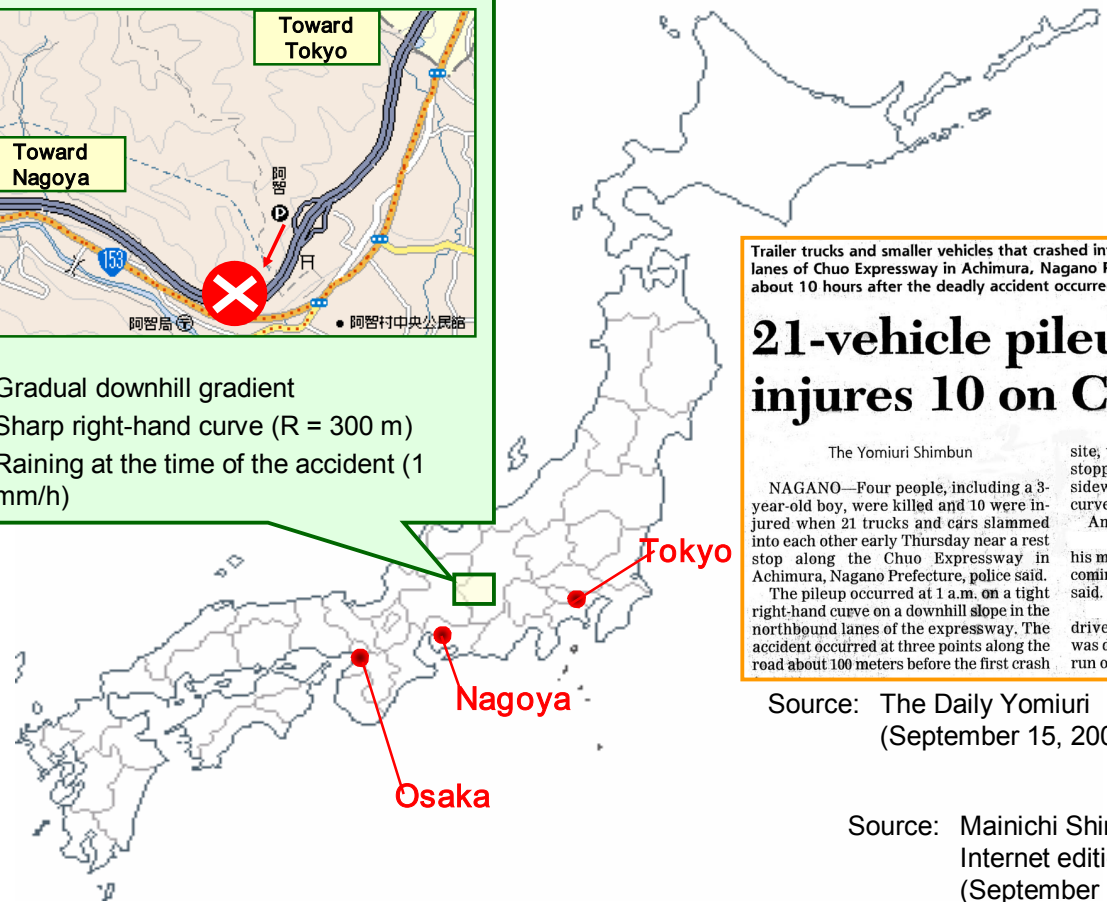
Fig. Did the information work for safe driving?

# 5. Support for safe driving



- Multiple collisions occurred on the Chuo Expressway on September 14, 2006, causing several fatalities and injuries.
- There has been a high incidence of accidents at this location in the past as well.
- A service to provide information on obstacles in the road ahead will be deployed to reduce accidents in the future, primarily at this type of location.

- Gradual downhill gradient
- Sharp right-hand curve (R = 300 m)
- Raining at the time of the accident (1 mm/h)



Trailer trucks and smaller vehicles that crashed into one another fill the north-bound lanes of Chuo Expressway in Achimura, Nagano Prefecture, at 10:50 a.m. Thursday, about 10 hours after the deadly accident occurred.

## 21-vehicle pileup kills 4, injures 10 on Chuo Expwy

The Yomiuri Shimbun

NAGANO—Four people, including a 3-year-old boy, were killed and 10 were injured when 21 trucks and cars slammed into each other early Thursday near a rest stop along the Chuo Expressway in Achimura, Nagano Prefecture, police said.

The pileup occurred at 1 a.m. on a tight right-hand curve on a downhill slope in the northbound lanes of the expressway. The accident occurred at three points along the road about 100 meters before the first crash site, where a truck hit another that was stopped in the middle of the road, facing sideways and blocking both lanes of the curve, the police said.

Among the four dead, 3-year-old from Numata, Gunma Prefecture, and his mother, died after becoming trapped inside their van, the police said.

a 50-year-old truck driver from Ikoma, Nara Prefecture, who was driving the first truck, died after being run over, the police said.

Source: The Daily Yomiuri (September 15, 2006)

Source: Mainichi Shimbun, Internet edition (September 14, 2006)



# 5. Support for safe driving



## 3) New IT Reform Strategy

### ■ IT Strategic Headquarters

Director-General	Junichiro Koizumi, Prime Minister	
Deputy Director-Generals	Shinzo Abe, Cabinet Secretary	and 3 others
Members	Kazuo Kitagawa, Minister of Land, Infrastructure and Transport	and 12 others
Experts	Hiroyuki Itami, Professor, Hitotsubashi University	and 7 others

### ■ Cooperative Safety Systems

Systems that allow vehicles to obtain information from infrastructure devices using wireless communications to enable the driver to respond to traffic conditions beyond the range of what can be detected from a vehicle.



### ■ IT New Reform Strategy

#### 1. The Pursuit of IT Structural Reform Capabilities

- (1) Responding to Social Issues that Should Be Resolved in the Twenty-First Century
- (2) Realization of a Safe and Secure Society
  - The world's safest road traffic environment
  - Reducing traffic fatalities to 5,000 or below -
- (3) Socio-Economic Activities in Twenty-First Century

#### 2. Development of IT Infrastructure

- (1) The Realization of an IT Society without Digital Divide
- (2) Measures Designated to Create a Society in Which People Can Live Safely and Securely
- (3) Human Resource Development and Education
- (4) Research and Development

#### 3. Provision of Valued Information to the World

Reduce the number of traffic fatalities and serious injuries by deploying Cooperative Safety Systems.

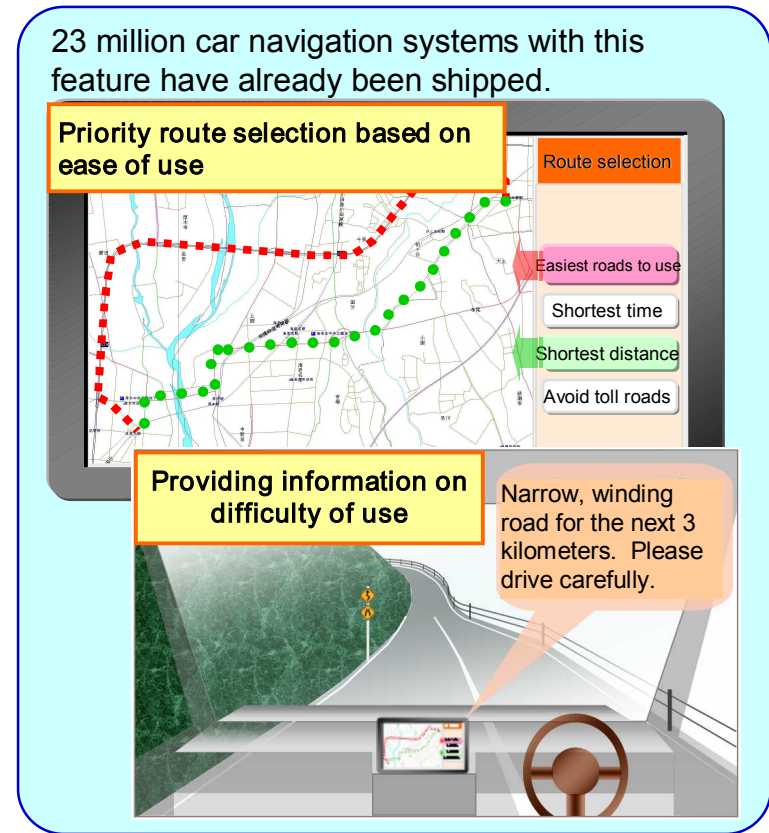
(January 19, 2006 decision by IT Strategic Headquarters)



# 5. Support for safe driving



## 4) "Road Maps for Comfortable driving" is being deployed to Car Navigation System



# 6. Realization of services



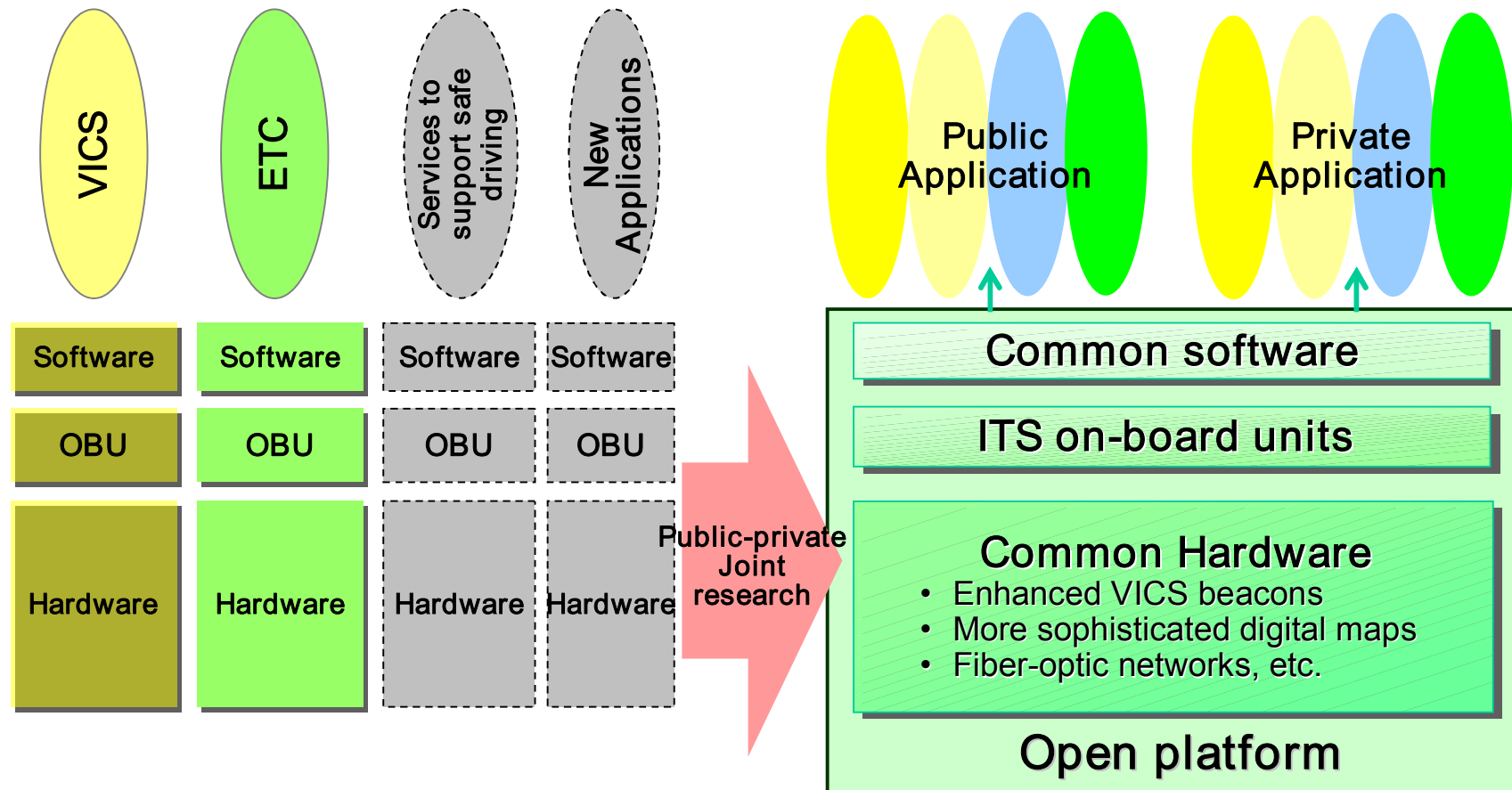
## 1) Public-private cooperation for platform development



Companies participating in government-private joint research

# 6. Realization of services

## 2) Concept of the platform





# 6. Realization of services



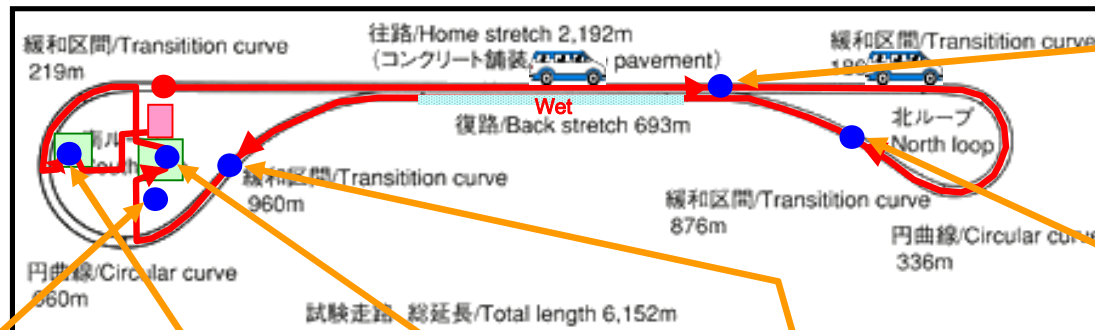
## 3) Smartway Demo 2006

Dates: February 22 to 24, 2006  
 Place: Test Course at NILIM  
 DEMO events:

- Test Ride Demo
- Tour Demo



● DSRC installation location  
 ← DEMO Course



### Refueling service



### Provision of Voice information



### Merging at intersections



### Internet connection at highway rest area



### Parking area entrance



### Provision of Warning Information



### Provision of Still picture information





# 6. Realization of services

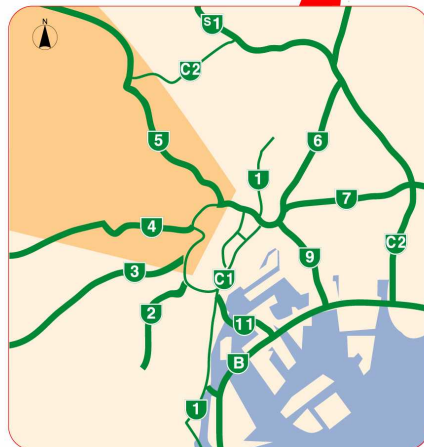


## 4) Smartway 2007

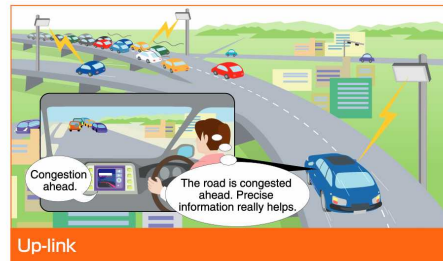
- The services planned for the Metropolitan Expressway in October 2007.
- When you travel to Beijing in 2007 for the next ITS World Congress, I hope that you will also stop in Japan and experience Smartway.



Frequent traffic accidents



Network of the Metropolitan Expressway



Up-link



Still image information



Information for assisting safety driving



Merging assistance



Internet connection



Parking lot cashless payment



END

<http://www.smartway2007.jp/>