Progress of the Smartway

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Background (Penetration of ITS Technology for Car Users in Japan)

- Electronic Toll Collection System (ETC)

- About 26 million ETC on-board units have been marked in.
- The nationwide utilization rate is 80.5%. (85.3% are on the Tokyo Metropolitan Expressway.)
- Enables non-stop, cashless toll collection at expressway tollbooths, whose capacity shortage causes about a third of traffic jams on expressways:

![Graph showing Total numbers of ETC on-board units over time]

![Graph showing Trends in ETC utilization rates and congestion at tollgates]

![Pie chart showing Causes of congestion on expressways]

**Causes of congestion on expressways**
- Toll gates: 31%
- Sags and tunnels: 40%
- Merging lanes: 22%
- Others: 7%

**Ratio of ETC Users**

- **Volume of Congestion** (Blue bar; km-h/day)
  - 0.0
  - 0.5
  - 1.0
  - 1.5
  - 2.0
  - 2.5
  - 3.0
  - 3.5
  - 4.0

- **ETC utilization rates** (Red line; %)
  - 0%
  - 20%
  - 40%
  - 60%
  - 80%

**Total numbers of ETC on-board units**

- 01.3: 22
- 02.3: 74
- 03.3: 252
- 04.3: 576
- 05.3: 1028
- 06.3: 1477
- 07.3: 1909
- 08.3: 2428
- 09.3: 2624

**Volume of Congestion**

- 01.3: 0
- 02.3: 500
- 03.3: 1000
- 04.3: 1500
- 05.3: 2000
- 06.3: 2500
- 07.3: 3000
- 08.3: 3500
- 09.3: 4000

**ETC utilization rates**

- 01.3: 35
- 02.3: 27
- 03.3: 21
- 04.3: 44
- 05.3: 67
- 06.3: 75
- 07.3: 80

**Background (Penetration of ITS Technology for Car Users in Japan)**

- Electronic Toll Collection System (ETC)

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In 1989, the standard national digital road map development was completed, and the distribution was started.

In 1990, car navigation units have started to load with the digital road map.

In 2009, more than 35 million car navigation units are shipped.
Background (Penetration of ITS Technology for Car Users in Japan)

- Vehicle Information Communication System (VICS)

- In 1996, VICS service started.
- In 2009, accumulative total of nearly 24 million VICS units have been shipped.
- In 2012, VICS will be expected to contribute to achieve the objective of Kyoto Protocol by reducing 2.5 million tons of CO₂ emission per year.

Trend in the cumulative totals of VICS units shipped

Information provided on simbolized map

Image of the information provided by VICS

Information provided on digital road map
Promotion of the Smartway by Public-Private Partnership

2004
Smartway promotion conference, proposed “For the second stage of ITS development”
To further accelerate and promote the smartway that is a common foundation for ITS development, in the scope of national strategy.

2005
Started public-private collaborative research
The National Institute for Land and Infrastructure Management and 23 private enterprises jointly made research for the next generation road service system.

2007
Establishment of standards and specifications of on-board devices and roadside devices
Smartway 2007 experiments and demonstration tests on public roads
Using demonstration cars running on the Metropolitan Expressway, trial riding for experiencing various new ITS services, and a symposium and an exhibition were also held.

2008
ITS-Safety 2010: Large-scale demonstration test of FY2008
Expanded services to the three major metropolitan areas.

2009～
Nationwide deployment of the smartway

- It is expected that the following ITS services will be available by means of an ITS on-board device from 2007:
  1) Providing timely information for supporting driving
  2) District guide responding to on-the-spot needs
  3) Easy passage through any gates

- Based on the proposal, public-private collaborative research with 23 private enterprises was made on the next-generation road service system.

New IT innovation strategy (2005)
Building the road traffic society the safest in the world.
Reducing road fatalities to less than 5,000

- Innovative strategy for the new digital age
  - Three-year emergency plan - (2009)
  - i-Japan strategy 2015 (2009)

In the ITS area, reduction of environmental impact and traffic accidents, and streamlining of physical distribution are expected. In the circumstances, efforts shall be made for widespread use of the next-generation on-board devices and development of roadside devices.
New cooperative vehicle-highway system

Smartway: New cooperative vehicle-highway system

ITS on-board units

Speech-only unit

Unit linked to car navigation system

5.8 GHz DSRC (Dedicated Short Range Communications)

2007 Field OperationTest
2009 Nation-wide Deployment

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Multiplatform: Diverse services (e.g., provision of traffic information, ETC, various private sector services) with a common infrastructure

Spot-type Communication with International Standard DSRC of ETC

* DSRC: 5.8GHz Dedicated Short Range Communication

Outline of ITS Onboard Unit

1995  2001  2009 and beyond

Car navigation

VICS

Information supply

ETC 5.8GHz DSRC

Fee collection

New services

Diverse media

5.8GHz DSRC

ITS onboard units

Diverse applications

- Providing wide-area traffic information
- Providing traffic information in easily understandable audio forms
- Providing information to support safe driving
- Providing information at service areas, parking areas, and rest areas
- ETC

Private sector services

- Providing information based on requests
- Cashless payments

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Service examples (1)

**Nationwide deployment starting in 2009**

- Wide-area traffic information
- Traffic information by audio forms
- Information on assisting safe driving

**Demonstration starting in 2009**

- Information access at service, parking, and rest areas

Example: Providing information on obstacles ahead

Beep. Congestion ahead. Take care to avoid a rear-end collision.
## Service examples (2)

Preparations will be considered in the future for these services:

<table>
<thead>
<tr>
<th>Fee collection at parking facilities, etc.</th>
<th>Uploading</th>
<th>Supporting for more efficient logistics</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image" alt="Image of fee collection" /></td>
<td><img src="image" alt="Image of uploading" /></td>
<td><img src="image" alt="Image of logistics support" /></td>
</tr>
</tbody>
</table>

- **Uploading**
  - Travel time can be obtained from probe information.
  - Uploading time and vehicle location history

- **Supporting for more efficient logistics**
  - The easiest-to-drive route selection.
  - Easy-to-drive road
  - Shortest time
  - Shortest distance
  - Avoid toll roads

- **Distance Examples**
  - To Takaido: 21 minutes
  - To Yoyogi: 15 minutes
  - To Gaien: 7 minutes

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ITS on-board units linked to car navigation systems

Beep. Congestion ahead. Take care to avoid a rear-end collision.

Speech-only ITS on-board units

Beep. Congestion ahead. Take care to avoid a rear-end collision.

New type of ETC on-board unit with speech capability
Development & Sale of ITS OBUs by the Private Sector

Release of new ITS OBUs last October by private companies, which can provide various services including metro-wide road traffic information.

* Press Release of ITS OBU
  - Mitsubishi Electric (2009, Sep)

* Estimated Number of ITS OBUs: 10 million OBUs in 5 years (estimate of Non-profit Organization, ITS-Japan)

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We are installing roadside equipment, primarily on expressways, and are taking the lead by introducing public services such as providing wide area traffic information.

We are developing means of verification and response, such as monitor surveys, for the effects of services as well as issues of facility establishment, management, and operation.

○ Anticipated Benefits
  - To reduce congestion and promote low-carbon innovation through the sophisticated provision of information, including appropriate route guidance
  - To provide economic benefits including the sale of ITS onboard units and ripple effects in content-related markets
Future Plan

2009
○ Providing information on road traffic and assisting safe driving on the Tokyo Metropolitan Expressway, Hanshin Expressway, and Nagoya Expressway
○ Starting installing around 1,000 roadside equipment (RSE) throughout Japan
○ Expanding providing traffic information by voice message on the Tokyo, and Osaka area

2010
○ Starting full-scale services primarily on expressways nationwide and conducting proving tests at highway rest area by 1,000 RSE

2013
○ ITS World Congress to be held in Tokyo
Deployment of Smartway Services

Extensive services by the private sector are provided through ITS OBUs (with a high-performance, open platform including multi-application capability).

- Regional Road Traffic Information
- Provision of information on tourism and leisure facilities.
- Simple Diagram Display
- Map Display
- Text Display
- ETC (26 million ETCs) (Utilization rate: 80%)

- Existing VICS services (24 million VICS)
- Management of Logistics
- Improved security at entrances
- Providing traffic information in audio form (highway radio)
- Assistance System for Safety Driving
- The current travel time to _____ is about ____ minutes.
- Distributing electronic ads, etc. for outlet stores
- Client management

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