ITS Policy in Japan and Smartway

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Government of Japan
New cooperative vehicle-infrastructure system

ITS on-board units

Speech-only unit

Unit linked to car navigation system

5.8 GHz short-range communications

DSRC roadside unit

Unit linked to car navigation system
## Building a common infrastructure

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### Comprehensive effects

- **Common software**
  - More advanced digital maps
  - Building a data infrastructure

### Open platform

- **Common hardware**
  - More advanced digital maps
  - Building a data infrastructure
Diversification of services with a common infrastructure

Car navigation systems

VICS
2.4 GHz beacon

ETC
5.8 GHz DSRC

ITS on-board units
5.8 GHz DSRC

Multiple media

Supplying information

Fee collection
Two-way communications communication capacity

Next-generation road services

1995 2001 2007

VICS (wide-area, detailed road traffic information)

Fee payment at parking facilities, et cetera

Tourist information and route selection

In-car Internet access

Toyota Municipal Museum of Art
Toyota Stadium
Shinjuku-Dori Ave. near Yotsuya-Mitsuke: Congested for 0.5 km

Multiple media: Services
On-board units: Services
Scope of Smartway services: Services

Diversification of services with a common infrastructure
Providing information on obstacles in the road ahead

Providing merging assistance information

Caution. Vehicle merging from the left.

Advanced Cruise Assist Highway Systems (AHS)
New IT Reform Strategy (adopted by IT Strategic Headquarters in January 2006): Excerpt

**Goal:**

The world’s safest road traffic environment
—Reducing traffic fatalities to 5,000 or below—

**Policies toward realization:**

- Formation of a public-private joint committee (April 2006)
- Large-scale proving tests, verification, and evaluation (2008)
- Nationwide deployment, primarily at locations of frequent traffic accidents (2010)

Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society (IT Strategic Headquarters; founded in January 2001 under the IT Basic Law)

IT Strategic Headquarters, the government's decision-making institution regarding IT policy, is directed by the Prime Minister and consists of related ministers and experts.
Providing location information (electronic signs)

Route 5 (Ikebukuro Line)

Central Loop Shinjuku Line

Service to provide information on conditions ahead

Service to provide information on obstacles ahead

Merging assistance service

Map-linked service

Caution. Many accidents occur at a sharp curve ahead.

Caution. Many rear-end collisions occur 200 meters ahead.

Current conditions before Gaien Entrance, about 1 kilometer ahead.

This is an announcement of conditions on Metropolitan Expressway Route 4 in the Tokyo direction. The required travel time is...

Traffic congestion is...

IP data link services

EMV payment processing services (at Kajibashi Parking Area)

IP information link services (at Daikoku Parking Area)

Route 4 (Shinjuku Line)

Caution.

Congestion ahead.

Vehicle merging from the left.

Caution.

Vehicle merging from the left.

Caution.

Many accidents occur at a sharp curve ahead.

Caution. Many rear-end collisions occur 200 meters ahead.

Caution.

Many accidents occur at a sharp curve ahead.

Caution.

Vehicle merging from the left.
**Scale of testing**

- Participating companies:
  - 11 carmakers
  - 18 manufacturers of on-board units and appliances
  - 6 experts
- 40 vehicles used in testing
- Testing began: May 14, 2007
- Total number of trips: 2,522 as of December 10, 2007

**Matters verified**

1. System functions
2. System efficacy based on vehicle behavior
3. System efficacy based on driver responses to questionnaires

**Equipment and devices used in testing**

- ITS on-board units linked to car navigation systems
- Stand-alone ITS on-board unit
- Roadside antenna
- Camera

**Results of testing**

- With safety-related services (providing information on obstacles ahead, merging assistance, and map-linked service), we confirmed through the analysis of vehicle operation data that vehicle behavior became safer.

- In a questionnaire survey by general monitors, most respondents found the services to be effective; and there were no negative reactions, confirming the safety of the services.
Countermeasures for snowy and icy roads using Smartway (FY 2008-)

Using cooperative vehicle-infrastructure ITS technologies to collect and supply vehicle behavior data

Kanto and Joshin-Etsu regions

Kan-Etsu Expressway (from Minakami Interchange to Yuzawa Interchange)
Support for effective route selection using Smartway (FY 2008–)

Supporting appropriate route selection on the Meishin Expressway and the New Meishin Expressway

- Existing 2.4 GHz beacons
- New 5.8 GHz beacons

Using highway radio to provide supplemental traffic information in audio form.

Supplying wide-area route selection information with highway radio (audio).

2.4 GHz (existing) 5.8 GHz (new)

(simple diagrams) (simple wide-area diagrams) plus audio information
Beginning in fiscal year 2008, testing is being expanded to various other areas besides the main focus of Tokyo. Services based on the characteristics of each region will be tested.

- **Kyoto, Osaka, and Kobe (Meishin Expressway and New Meishin Expressway)**
  - Providing information on obstacles ahead (highway radio reports)
- **Kyoto, Osaka, and Kobe (Hanshin Expressway)**
  - Preventing hazards on entering curves, providing information on obstacles ahead, merging assistance, and providing information on conditions ahead (providing road information by still images)
- **Niigata (Kan-Etsu Expressway)**
  - Collecting vehicle behavior information (snow-covered road surface information)
- **Tokyo (Metropolitan Expressway)**
  - Providing information on obstacles ahead (coordinated service for expressways and ordinary roads)
  - Providing road traffic information (support for route selection)
  - Providing information on conditions ahead (providing road information by still images)
- **Hiroshima (Sanyo Expressway)**
  - Calling attention when exceeding the speed limit
- **Aichi (Nagoya Expressway, National Highway 153, and Tokai-Kanjo Expressway)**
  - Providing information on obstacles ahead, preventing hazards on entering curves, providing information on conditions ahead, and Internet information access
1. Development of speech-only on-board units

On-board units for the realization of Smartway services

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

Both its functionality and price are only incrementally higher than existing ETC on-board units, making it easier for users to buy as a replacement.
2. Unification of on-board unit formats

Conventional services

- Car navigation system
  - 31.83 million vehicles (as of June 30, 2008)
- VICS receiver unit (2.4 GHz)
  - 2.74 million vehicles (as of June 30, 2008)

New services using Smartway

- Car navigation system
- ITS on-board unit (5.8 GHz) (New ETC on-board unit)

The unification of on-board unit formats makes it easier for users.
3. Advancement of VICS

Promoting the spread of Smartway services:

- **Roadside equipment (traffic counters, et cetera)**
- **Central facilities**
- **Roadside equipment (radio beacons)**

Collecting and supplying road traffic information (road administrators and VICS Center)

- Processing and compiling road traffic information (JARTIC)
- Transition to the new VICS based on 5.8 GHz DSRC
- Using probe data to collect road traffic information
- Central facilities compatible with the new VICS
- Providing the new VICS by DSRC

VICS-capable on-board unit

Promoting a transition in roadside equipment by promoting a transition to the new VICS
Thank you