





Up-date of Intelligent Transport Systems in Japan

Ministry of Land, Infrastructure, Transport and Tourism Japan 14 October 2013



Ministry of Land, Infrastructure, Transport and Tourism

Challenges in Japan



ITS is designed to integrate people, roads and vehicles in order to resolve road traffic problems such as traffic congestion, traffic accidents and environmental degradation.



Organizational structure to promote ITS



Comprehensive Plan



- MLIT : Ministry of Land, Infrastructure, Transport and Tourism
- NPA : National Police Agency MIC : Ministry of Internal Affairs and Communications METI : Ministry of Economy, Trade and Industry

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"Declaration on the Creation of the World's Most Advanced IT Nation"

(Approved by the Cabinet Meeting on June 14, 2013)

• Short term:

- Studying a system to achieve automated driving on expressways
- Expanding the use of ETC and other ITS technologies

• Middle/Long term:

Research to advance driving support technologies by using road structure data etc.

• Target goals:

- Fewer than 2,500 traffic accident fatalities (2018)
- World's safest road traffic society (2021)

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Public-Private Collaboration



OVICS, ETC, and other ITS services were achieved by providing digital road maps(DRM), promoting development and introduction of road side devices, and forming a promotion organization linking concerned ministries and agencies and linking the government and the private sector.

Digital road maps (available since 1990)







:Government G

:Private sector

VICS (available since 1996)



provides techniques and G standards for collecting and



- develops instruments for collection systems and center systems
- develops VICS-capable car Ρ navigation systems

ETC (available since 1997)





provides techniques for cashless transactions services



supports incentives to promote the wide use of discount measures, etc.



develops OBU and conduct campaigns to promote their use

Promotion through government – private sector collaboration

Penetration of...

Car navigation

VICS on-board units

ETC on-board units

Widely deployed ITS Service in Japan - VICS - ^Q国土交通省

VICS: Vehicle Information and Communication System



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Source: http://www.vics.or.jp/english/vics/pdf/vics_pamph.pdf

国土交通省 Widely deployed ITS Service in Japan - VICS -

- O VICS services begin in April 1996
- O provides road traffic information (congestion, accident, etc.) on car navigation screens.
- O Cumulative shipments of VICS OBU exceed 37 million units (March 2013)

(10,000 unit) 4,500

4,000 3,500

3,000

2,500

2,000

1,500

1,000

500



(Red lines indicate congestion)





Vehicle breakdown













: Construction

658

03.3

023



06.3

07.3

1,502

1,189

05.3

912

043

: Limited access

3,013

2,678

10.3

11.3

12.3

133

13.6

2.381

09.3

2,119

083

Cumulative shipments of VICS



: Road narrows

🔀 : No entry



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: Accident

3,849

Widely deployed ITS Service in Japan - ETC - ^Q国土交通省

ETC: Electronic Toll Collection system

- O equipped on more than 41 million vehicles (March, 2013)
- O usage rate is about 89% (Aug, 2013)
- O more than 7.3 million vehicles per day use ETC (Aug. 2013)



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Cumulative total of ETC on-board equipment new setups



Cumulative total of new setups = [Total setups] - [Re-setups]
Calculated by the data on website of Organization for Road System Enhancement

Widely deployed ITS Service in Japan - ETC -国土交通省

OETC introduction has eliminated almost all toll-gate congestion on expressways (30% of all expressway congestion).



Brand-new ITS service - ITS Spot Services -



- 2004 Smartway Project Advisory Committee "ITS Enter the Second Stage"
- 2005 Start of joint researches
- 2006 Final report of joint research
 - ITS on-board unit standard (JEITA standard)
- 2007 On-road tests on Tokyo Metropolitan Expressway
 - Smartway 2007 Demo on Tokyo Metropolitan Expressway
- 2009 ITS-Safety2010 Large scale demonstration
- 2009 Releasing ITS Spot-compatible car navigation units
- 2010 Technical Specification for roadside equipment
- Installation of about 1,600 ITS Spots
 Launching of nationwide ITS Spot Services

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Deployment of ITS Spot Service





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 High-speed, high-volume communications between roads and vehicles provides road traffic information and others, and allows collection of data from vehicles.

Day-one services for users

Dynamic route guidance

Receipt of wide-area congestion data allows car navigation system to select routes intelligently.

Safe driving support

Reduction of close-call experiences by alerting drivers to possible dangers such as fallen obstacles on roads.

ETC

Realization of ETC services.

Collection of probe data

Collection of traveling data from individual vehicles

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Ex. Safe Driving Support





Information on road-work, traffic restriction & obstacles



On the Metropolitan expressway, one obstacle every 10 minutes

Congestion tail information

60% of collisions have been reduced at Sangubashi Curve.



Still image information On-board display shows still image on weather conditions such as snow and fog and traffic.







V2I Services at Expressway Sag Sections

- V2I services at expressway sag sections consist of a roadside sensor which observes traffic conditions and a roadside ITS Spot which provides ACC setting information.
- If the traffic volume exceeds a certain threshold value, ACC setting information will be provided by roadside ITS Spot.



 It is estimated that if 20% of vehicles practice "trafficsmooth driving" in a sag section, congestion can be reduced by nearly 25%.



Simulation calculation conditions :

- Calculation results based on data on the small-scale congestion (0-15 km•h) that occured in the Yamato sag section of the Tomei Expressway in 2011. Lost time is calculated by ∑ Max [Travel time - Base travel time (assumed to be 70km/h), 0]
- The average following gap of vehicles practicing traffic-smooth driving at the downstream and the upstream of the sag section are about 1.75s and about 1.5s, respectively. And they follow the leader vehicle quckly than other vehicles so as to keep constant following gap.

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Towards next step...

• Efforts to collect information on travel routes of vehicles



Outline of probe data application

Regularly collecting info. on the travel routes & frequency of vehicles and working out measures to make effective use of ring roads and assist in vehicle operation.

Future plans

Developing systems for collecting vehicle travel data from ITS Spots and regularly collecting info. on travel routes & frequency of vehicles.





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Towards next step...

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- Fully utilization of the three ring roads is essential to realize expected benefit.
- Traffic easing
 - 600 points of traffic congestion will be almost disappeared
 Average value for travel speeds to traffic congestion 18.8km/h(2005) ⇒ 25km/h(2015)
- Reduction of travel time (Shinjyuku~Haneda)
 40min ⇒ 20min
- Environmental improvement
 CO₂ discharge reduction :
 - 2~3 million t/year





Thank you for your attention. Merci de votre attention. ご清聴ありがとうございました。



