



**XXIVth World
Road Congress
Mexico 2011**
Mexico City 2011.

Deployment of Next-Generation ITS in Japan

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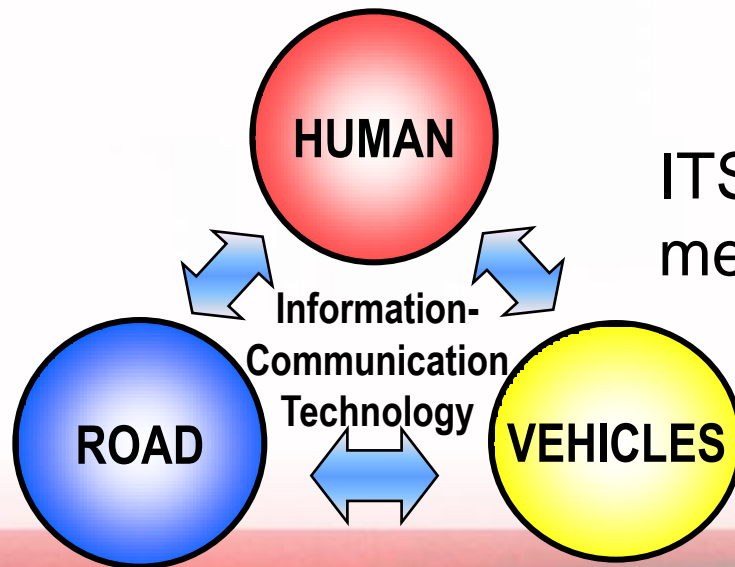
Contents

- 1. ITS Organizational Structure and Achievements**
- 2. Outline of the ITS Spot Service**
- 3. Under Development Services**



1. Challenges in Japan

- Congestion economic loss : 10 Trillion Yen/year
- Traffic accidents : around 736,000 accidents and around 4,900 fatalities per year
- CO2 emission : Around 18% is emitted by vehicles



ITS deals with these issues by means of advanced IT.



2. Organizational structure for promoting ITS

- IT Strategic Headquarters headed by Prime Minister
- Four ministries (MLIT, NPA, MIC, METI)
- ITS Japan, ITS Standardization Committee

The Strategic headquarters for the
Advanced Information and
Telecommunications Network Society
(IT Strategic Headquarters)

(Started in January 2001)
(Headed by the Prime Minister)

ITS Standardization Committee

Four-ministry
Liaison Conference

ITS Japan

(universities, companies and
other relevant organizations)

Ministry of land, Infrastructure,
Transport and Tourism

National Police Agency

Ministry of Internal Affairs
and Communications

Ministry of Economy, Trade
and Industry

Promotion of international standardization

ISO : International Organization for Standardization

- An industry-academia ITS promotion organization
- Organizing the ITS World Congress, etc.



3. ITS concept in Japan

Nine topics of development fields

1. Advances in navigation system

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



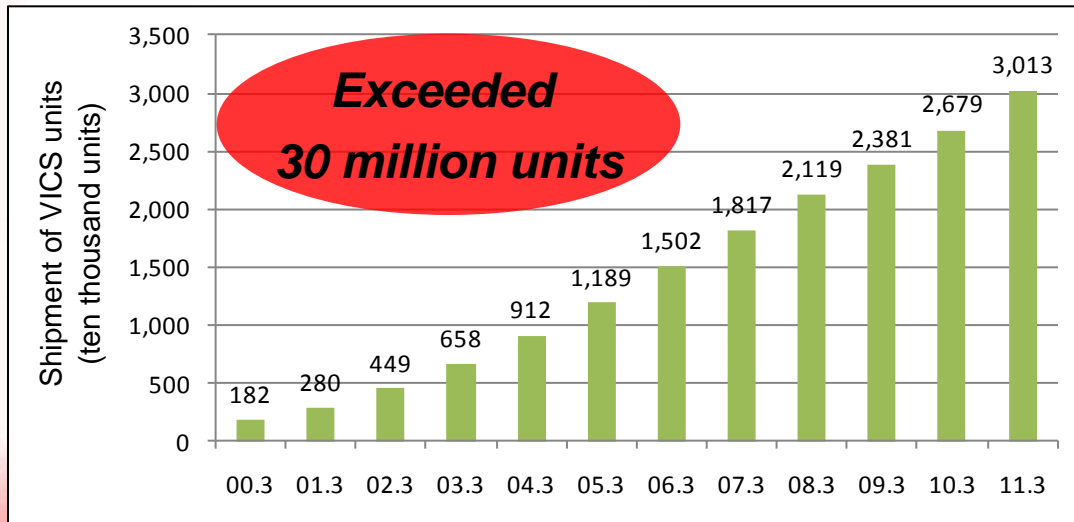
4. VICS

- VICS service has been available since 1996
- Providing real-time information

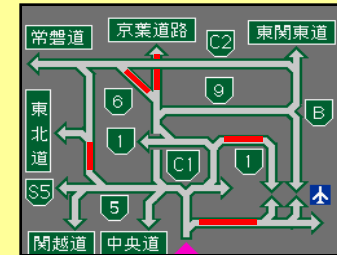
【Provided information】

- Traffic condition
- Traffic restrictions
- Travel time
- Parking lots
- Other

Volume of shipment of VICS units (cumulative total)



VICS display examples



Level 2: Simple Graphic



Level 3: Map

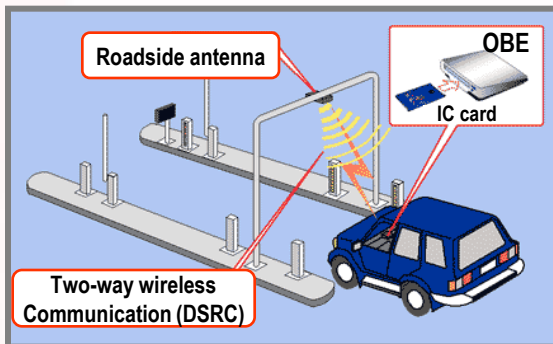
5. ETC

- 34 million vehicles installed ETC(March, 2011)
- About 87% of drivers use ETC (June, 2011)

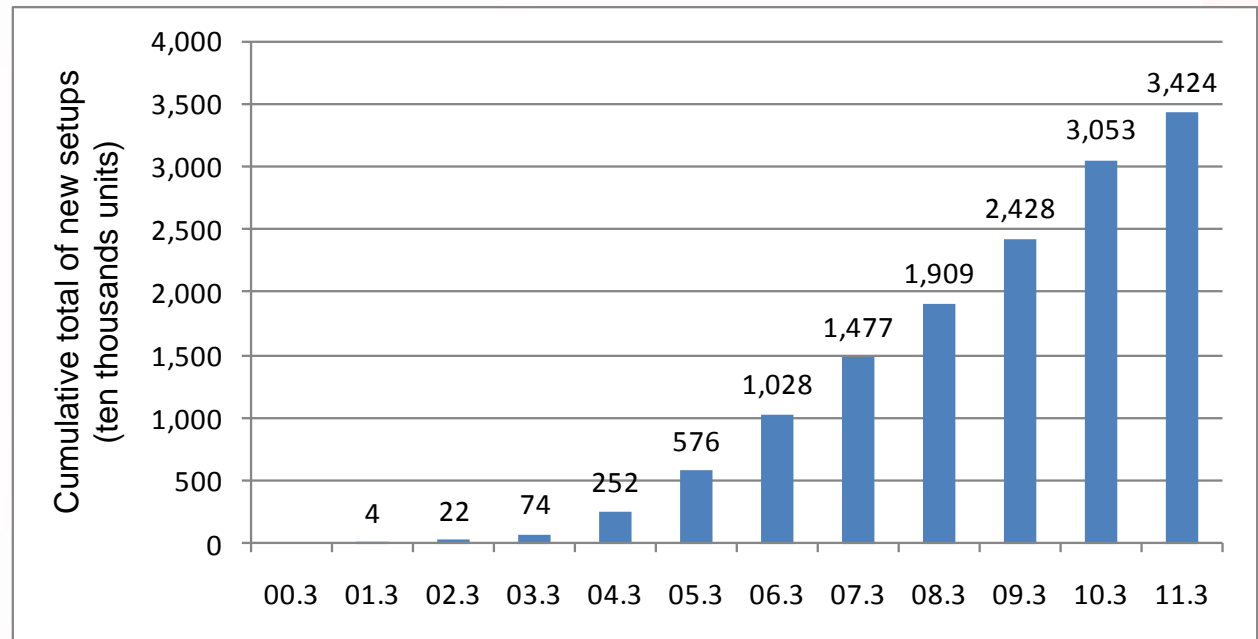
ETC on-board unit



Reference : Mitsubishi Electric



Cumulative total of ETC on-board equipment new setups



※ Cumulative total of new setups = [Total setups] - [Re-setups]

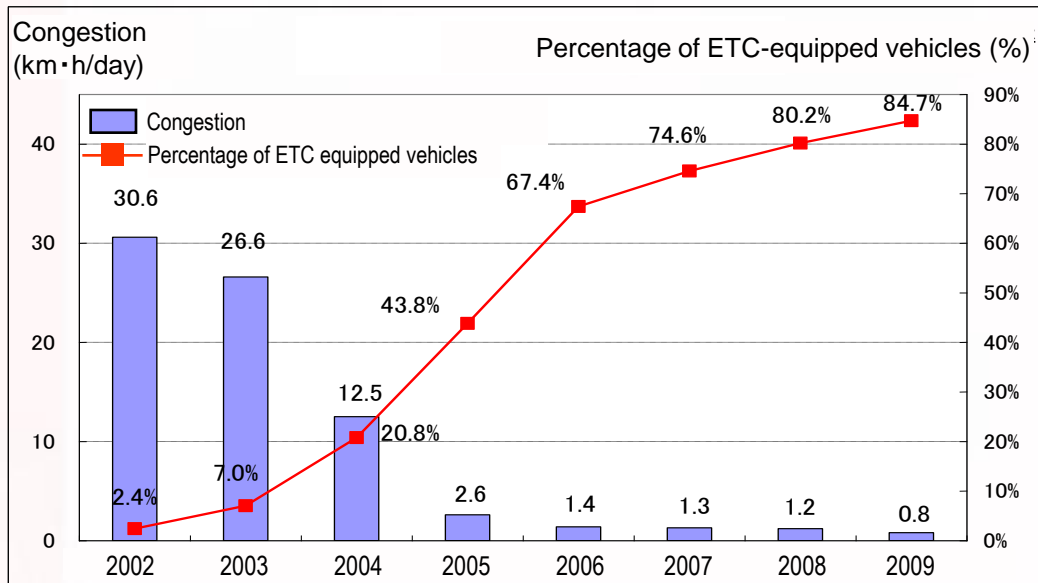
Calculated by the data of Organization for Road System Enhancement homepage



6. Effects of ETC

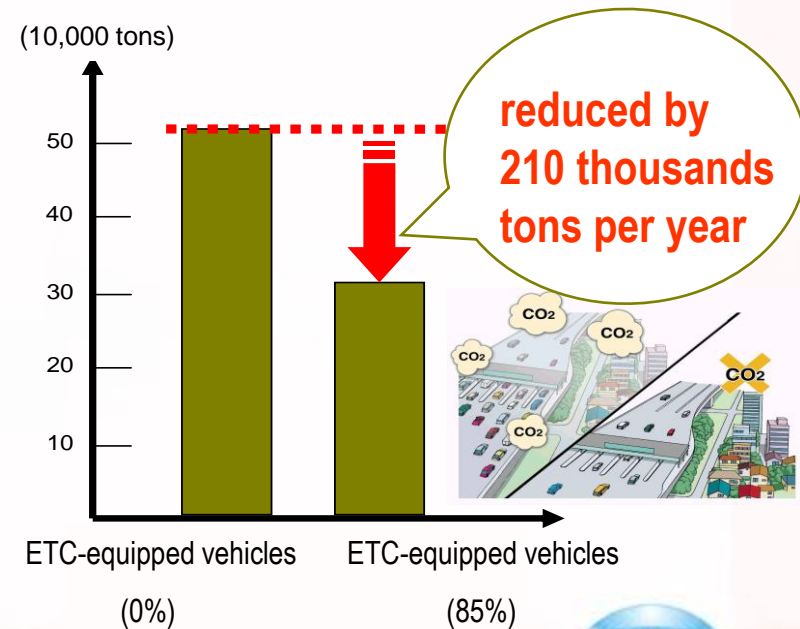
- Congestion at toll gates have been decreased dramatically

Relationship :
percentage of ETC-equipped vehicles
and congestion at toll gates

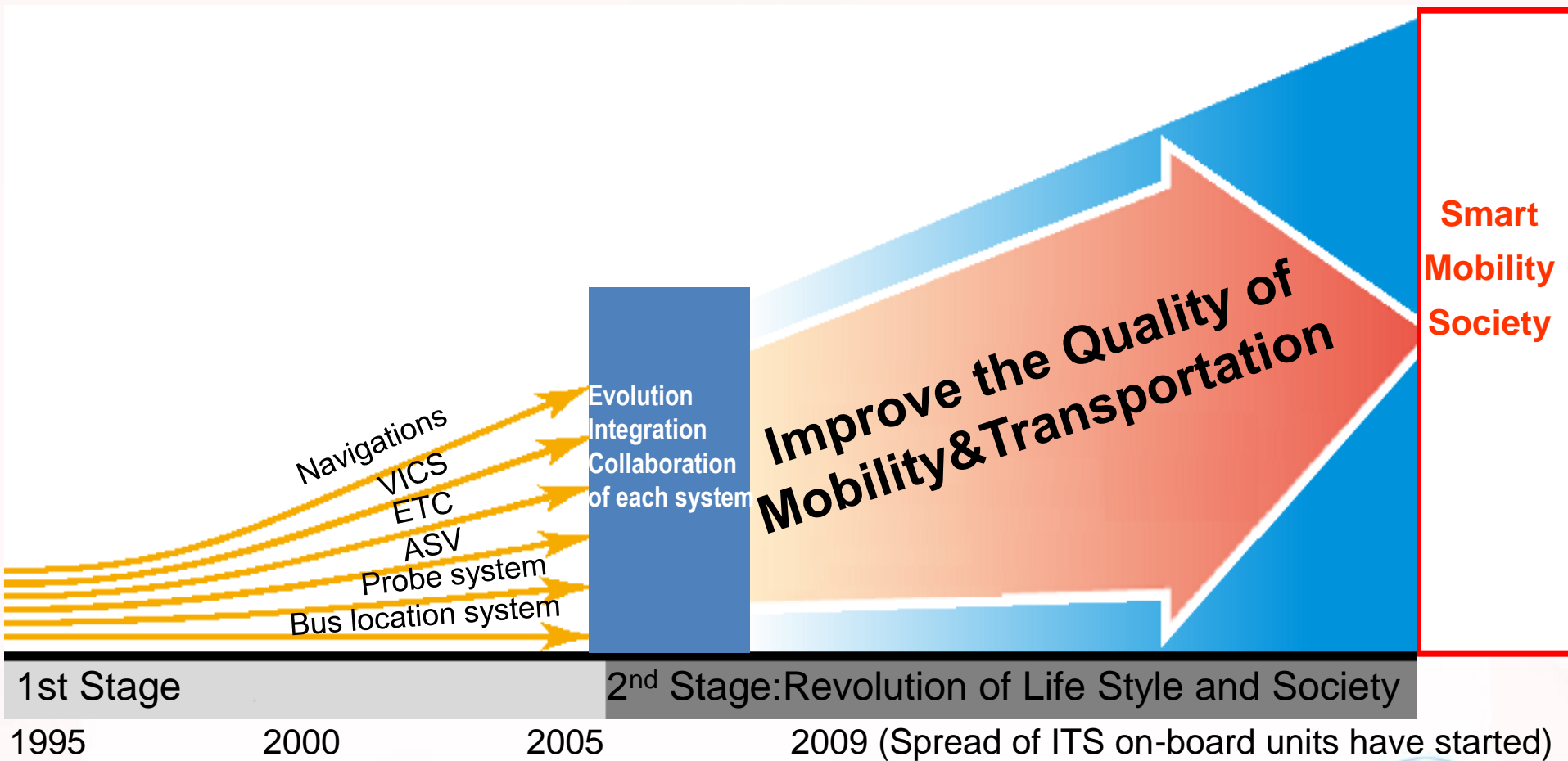


(※ 18 toll barriers on main lines of the Metropolitan Expressway)

Reduction of CO₂ emissions
(85% of ETC-equipped vehicles)



7. 2nd Stage ITS



8. Public – Private Joint Research

Joint research implementation system

The joint research administrative office was established in 2005
National Institute for Land and Infrastructure Management and
23 private companies cooperate



General Meetings

Advisors Meetings

Management meetings

**Road Side
Equipment WG**

**Onboard
Equipment WG**

**Communication
and
Interconnection
WG**

Trials WG



8. Public – Private Joint Research

Promotion of public-private joint research

Dec. 2004 - Jan. 2005

Public recruiting for joint research

Feb. 2005

Commencement of joint research

July 2005

Interim report

February 2006

Smartway Demo2006

March 2006

Joint research report

March 2007

Specifications formulated

October 2007

Smartway 2007



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- 2. Outline of the ITS Spot Service**
3. Under Development Services



9. ITS Spot Services

Released on October 2009

ITS Spot units are deployed Nationwide installed mainly on expressways

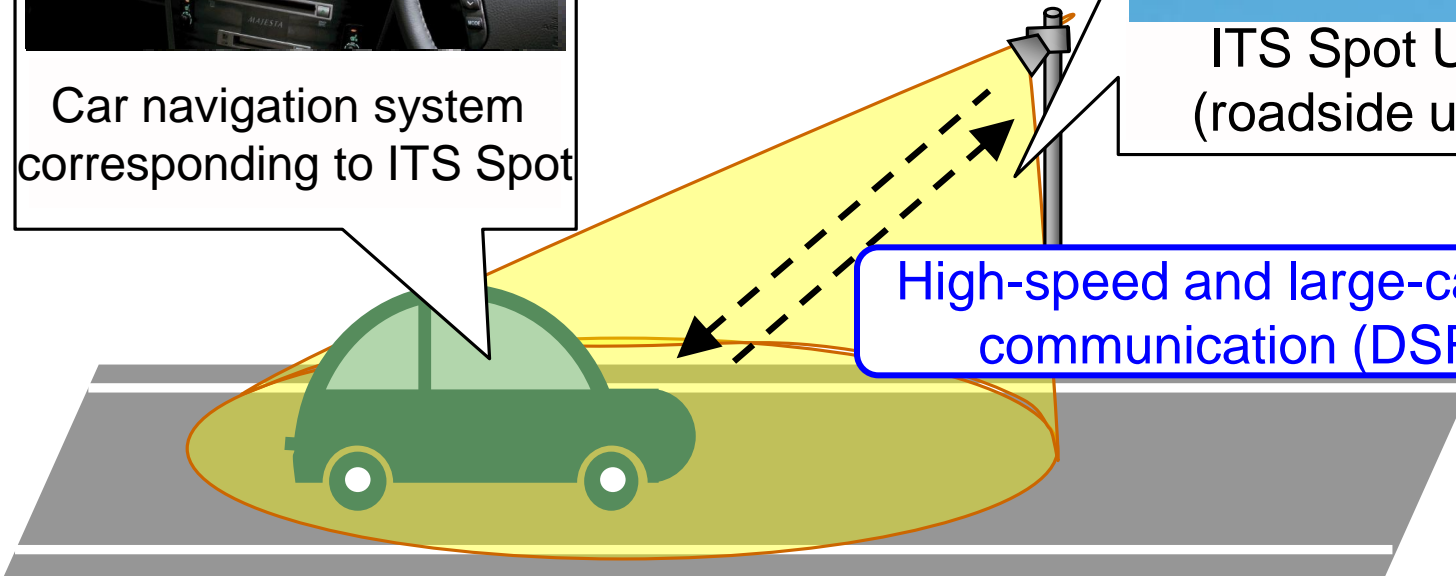


Car navigation system corresponding to ITS Spot



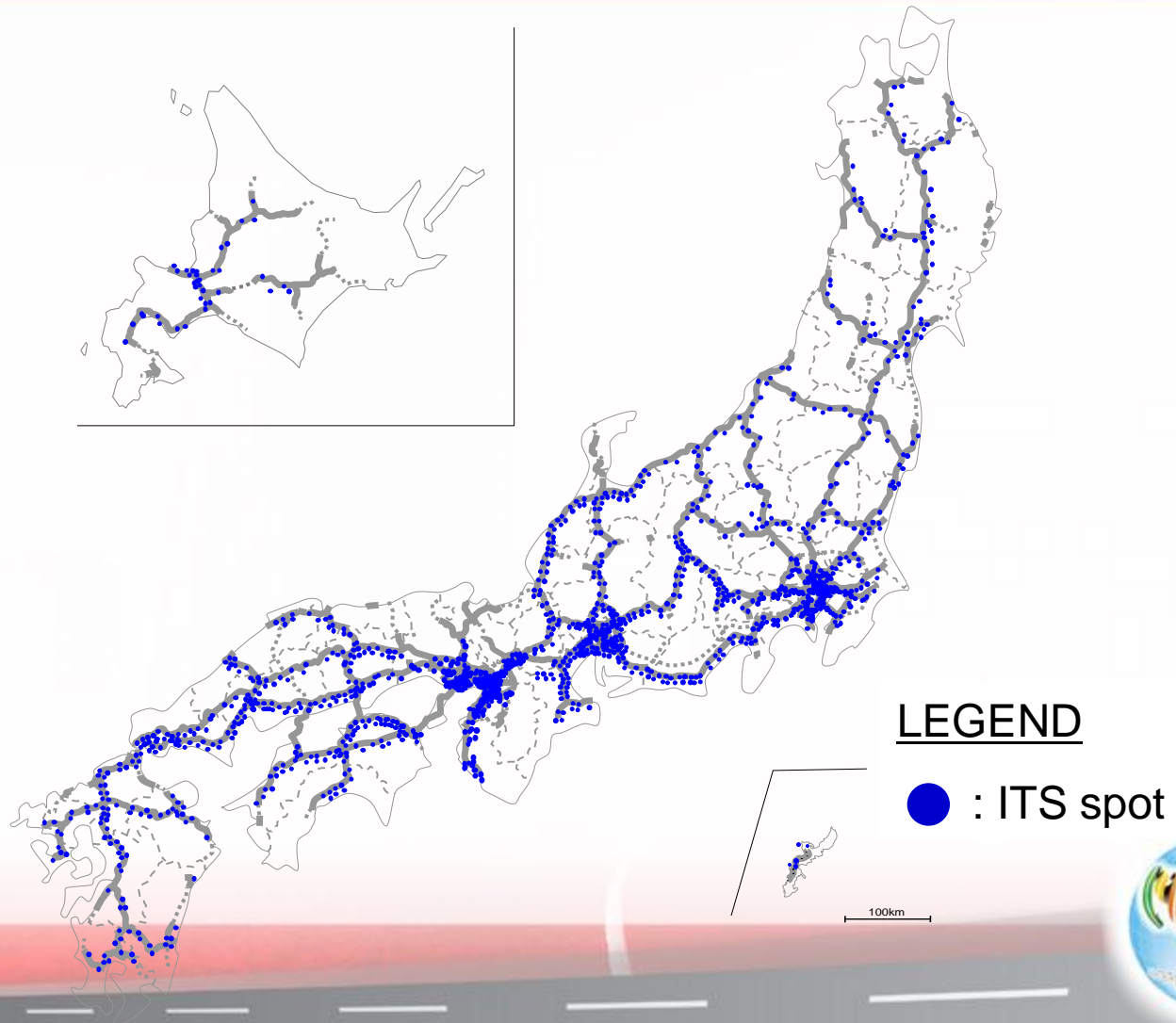
ITS Spot Unit (roadside unit)

High-speed and large-capacity communication (DSRC)



10. Installation of ITS Spot

- 1,600 ITS Spot have been installed on expressways



11. Corresponding ITS Spot car navigation

- 10 million units estimated to be shipped in 5 years



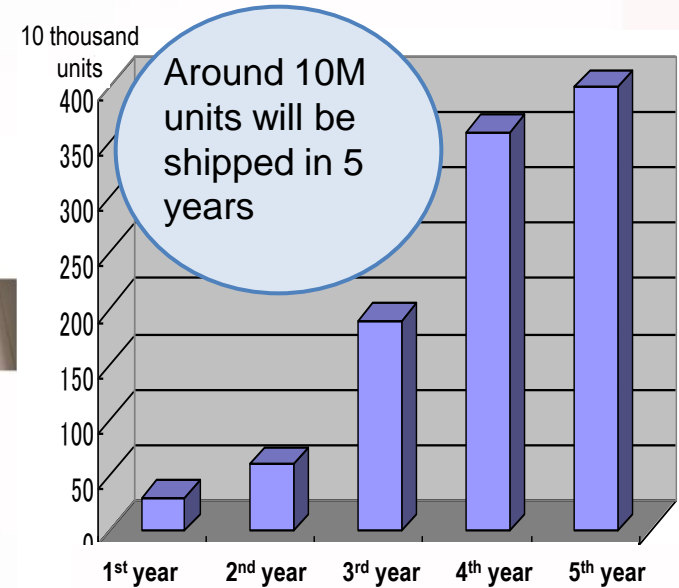
ALPINE



NISSAN



TOYOTA



Reference: ITS Japan



Pioneer



Panasonic



MITUBISHI ELECTRIC



MITUBISHI HEAVY INDUSTRIES



12. Basic Services

- Three Basic Services

 - 【Dynamic Route Guidance】

 - Car navigation equipment receives traffic congestions from large areas and selects the optimum route.

 - 【Assisting Safety Driving】

 - Advanced warning reduces unexpected troubles.

 - 【ETC】

 - ETC service is provided.

- Other Services

 - Access to the Internet at highway rest areas (accepted by some car navigation products)

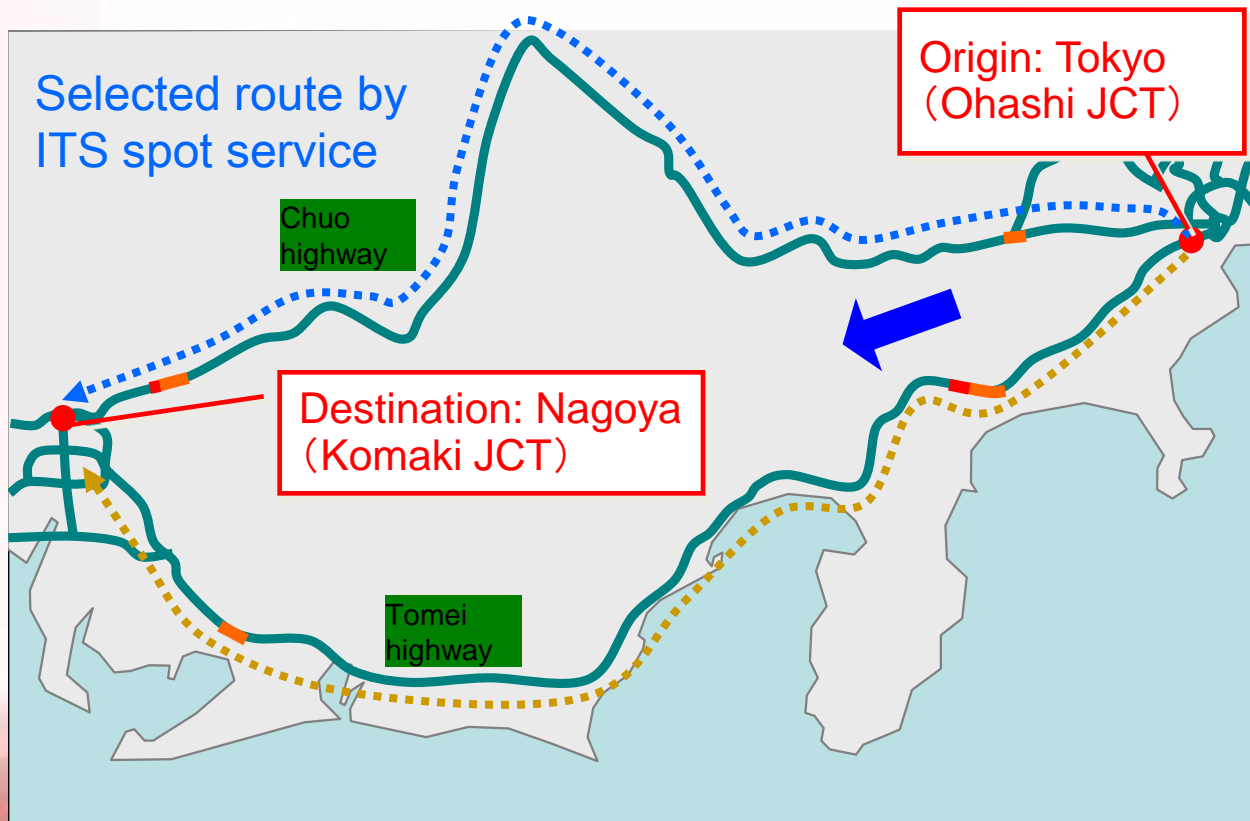
 - ➔ Additional services including payment service, sightseeing guidance, logistics support service will be deployed in the future.



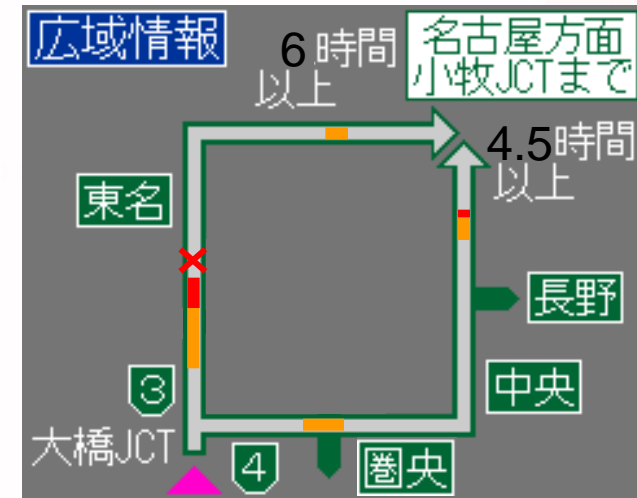
13. Dynamic Route Guidance#1

- Smarter Route Guidance Considering Wide Area Traffic Data

Long distance driving from Tokyo to Nagoya (200 miles), ITS spot provides two alternative highway routes (Tomei and Chuo) and car navigation system shows faster route by both routes' travel times.

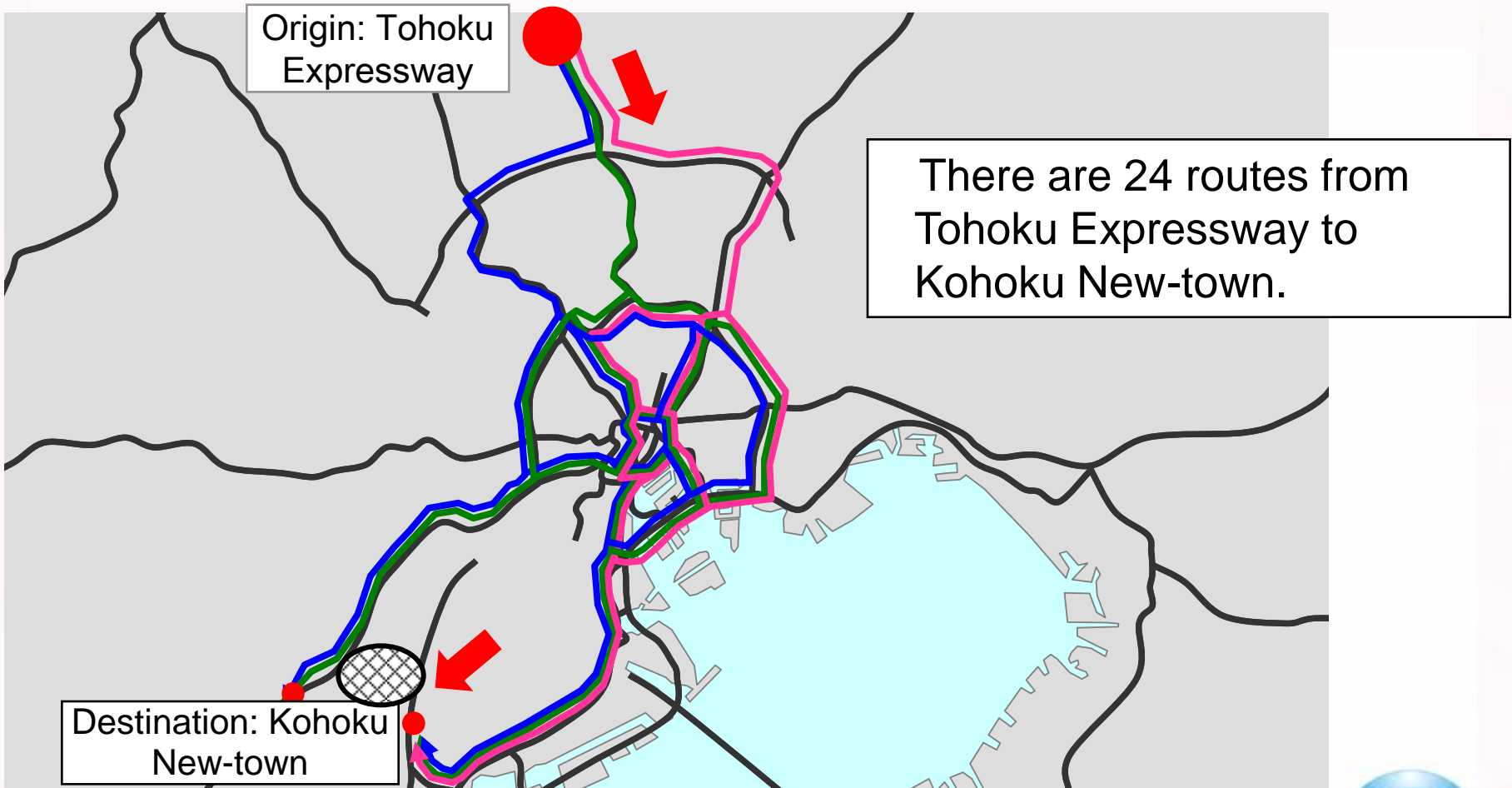


Example of Simplified map



14. Dynamic Route Guidance #2

- Select the most suitable route from various candidates



Length of the inner side of Tokyo Gaikan Expressway is **600km** (two-way)



15. Assisting safety driving

- object on the road, congestion behind a blind curve.
- pictures of snow, fog and hazardous weather conditions ahead

Cautions of obstacle on road

In Metropolitan Expressway, **one obstacle every 10 minutes**



(Cautions are provided)

Caution to notify traffic congestion beyond curve

60% of collisions have been reduced at Sangubashi Curve.

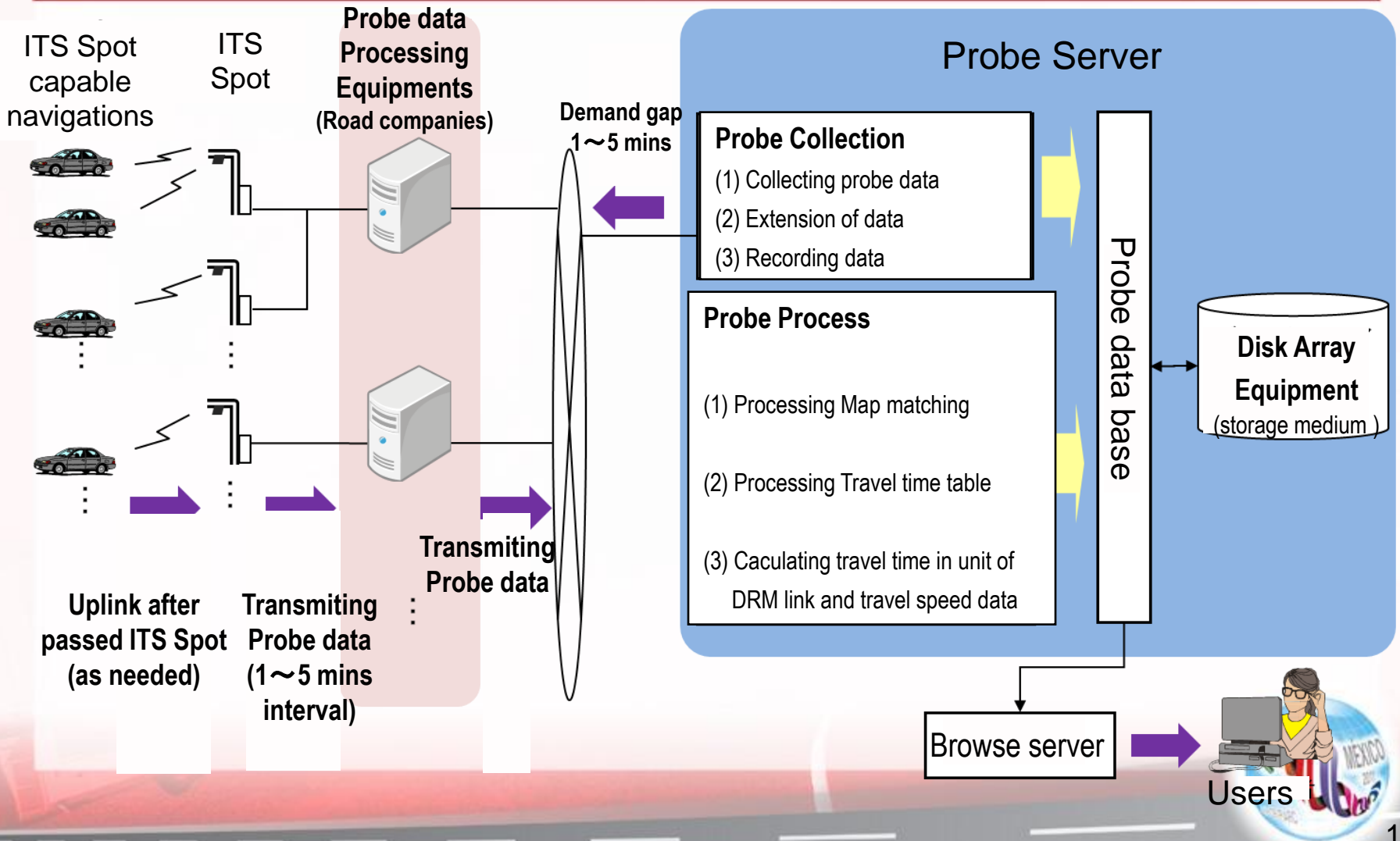


On-board display **shows pictures** on weather conditions such as snow and fog and traffic conditions.



16. Probe data collection

- Nationwide probe data is consolidated into Probe Server

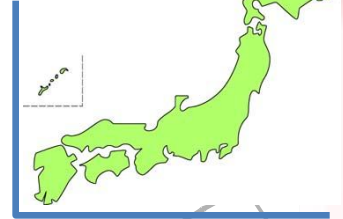


17. Make use of Probe Data #1

4/23 (Sat) ~ 5/10 (Tue) AM 12h Average

Sapporo City

Sapporo City

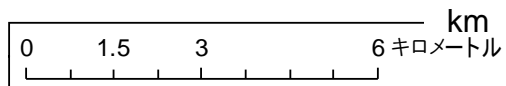


Do-ou Expressway
(To Takikawa)

Sasson Expressway
(To Otaru)

Type of Roads	Legend
Expressway	—
Highway	—
Beacon	●

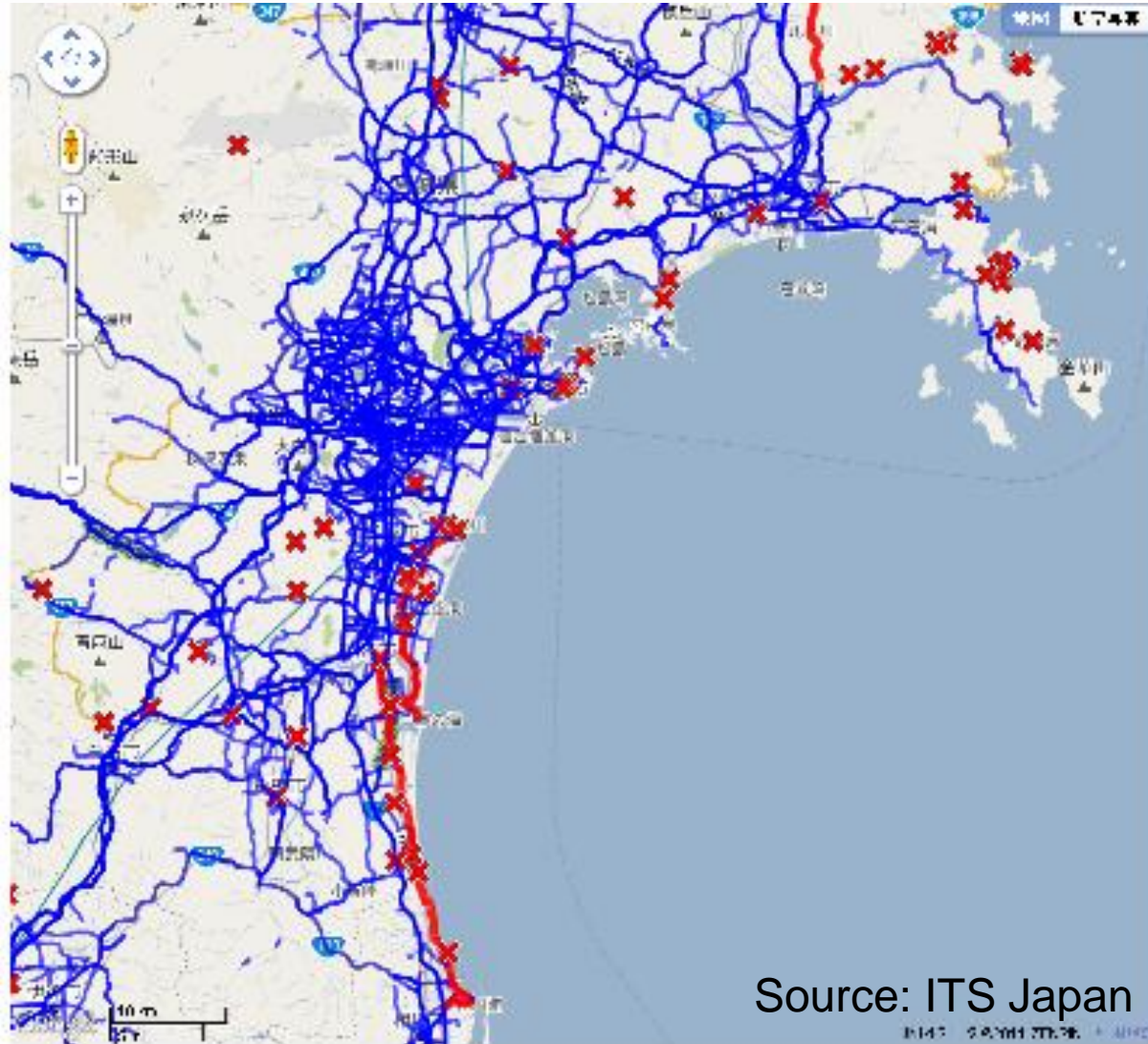
Speed	Legend
0~20km/h	—
20~40km/h	—
40~60km/h	—
60~80km/h	—
80~100km/h	—
Over 100km/h	—



Do-ou Expressway
(To Tomakomai)

18. Make use of Probe Data #2

Trafficable routes were identified on map with collected probe data after the Great East Japan Earthquake



Source: ITS Japan



19. Internet connection at rest areas

- Navigations able to connect to the Internet at rest areas



Portal site's top page (Nationwide)



ITS Spot Area (Arai Road-station, Nigata Prefecture)



20. Internet connection : Nationwide contents

Prefecture

→ Select Route · Area

ITS スポット
ITSスポットポータルサイト(北陸地方)

道の駅・SA/PA情報	渋滞・規制・工事情報	道路状況(現地画像)
高速道路利用案内	気象・防災情報	冬の道路情報
日本風景街道	ITSスポット紹介 お問い合わせ	観光情報
北陸地方の 情報接続サイト	他の地方の情報へ	

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Checking Road traffic conditions
on real-time

→Able to change the destination
or time due to weather



21. Benefit of ITS Spot Service for the road operator

- 1. Provide mobility and safety services widely and improve quality of services**
- 2. Traffic situation can be grasped more accurately.**

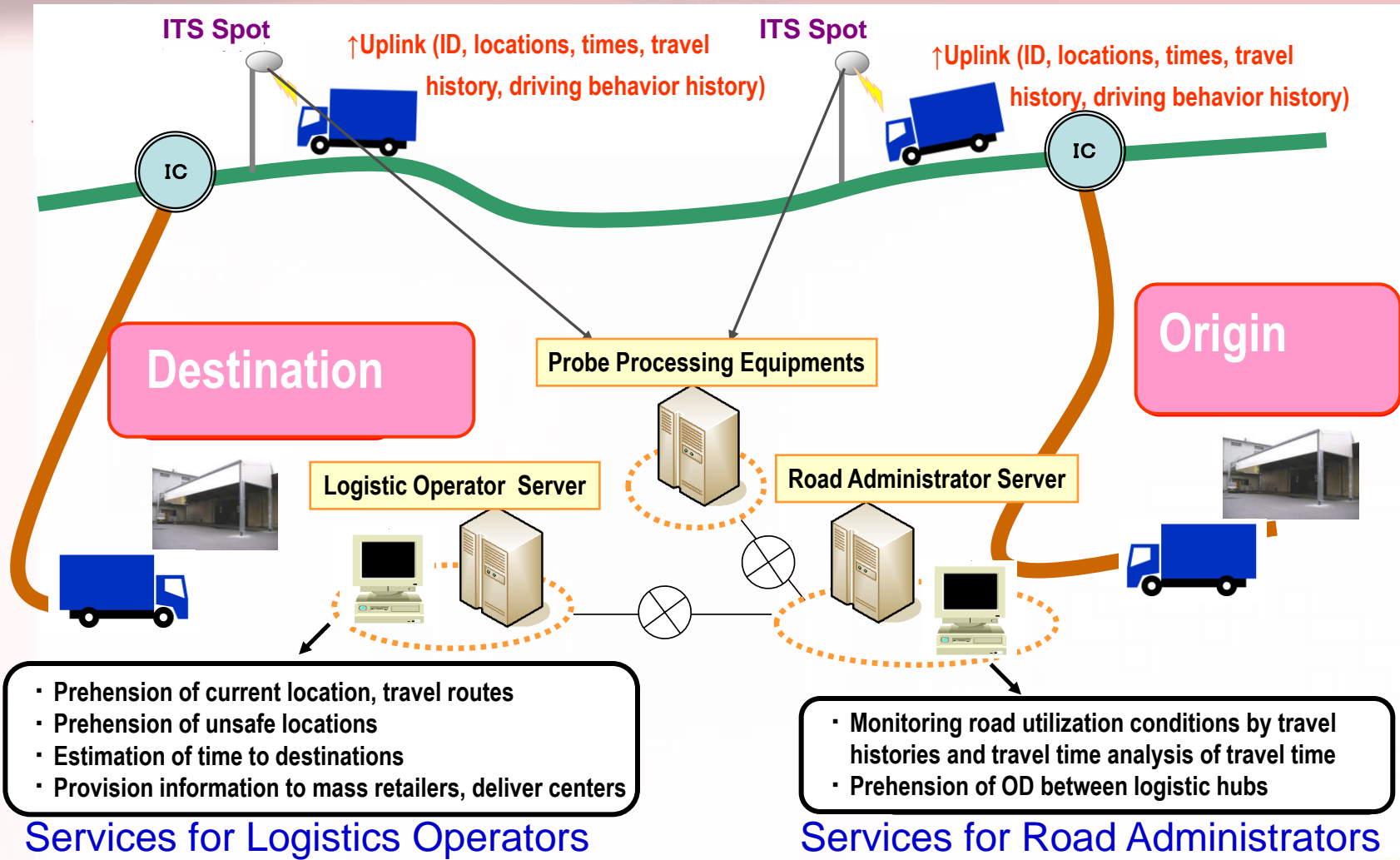


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2. Outline of the ITS Spot Service
3. **Under Development Services**

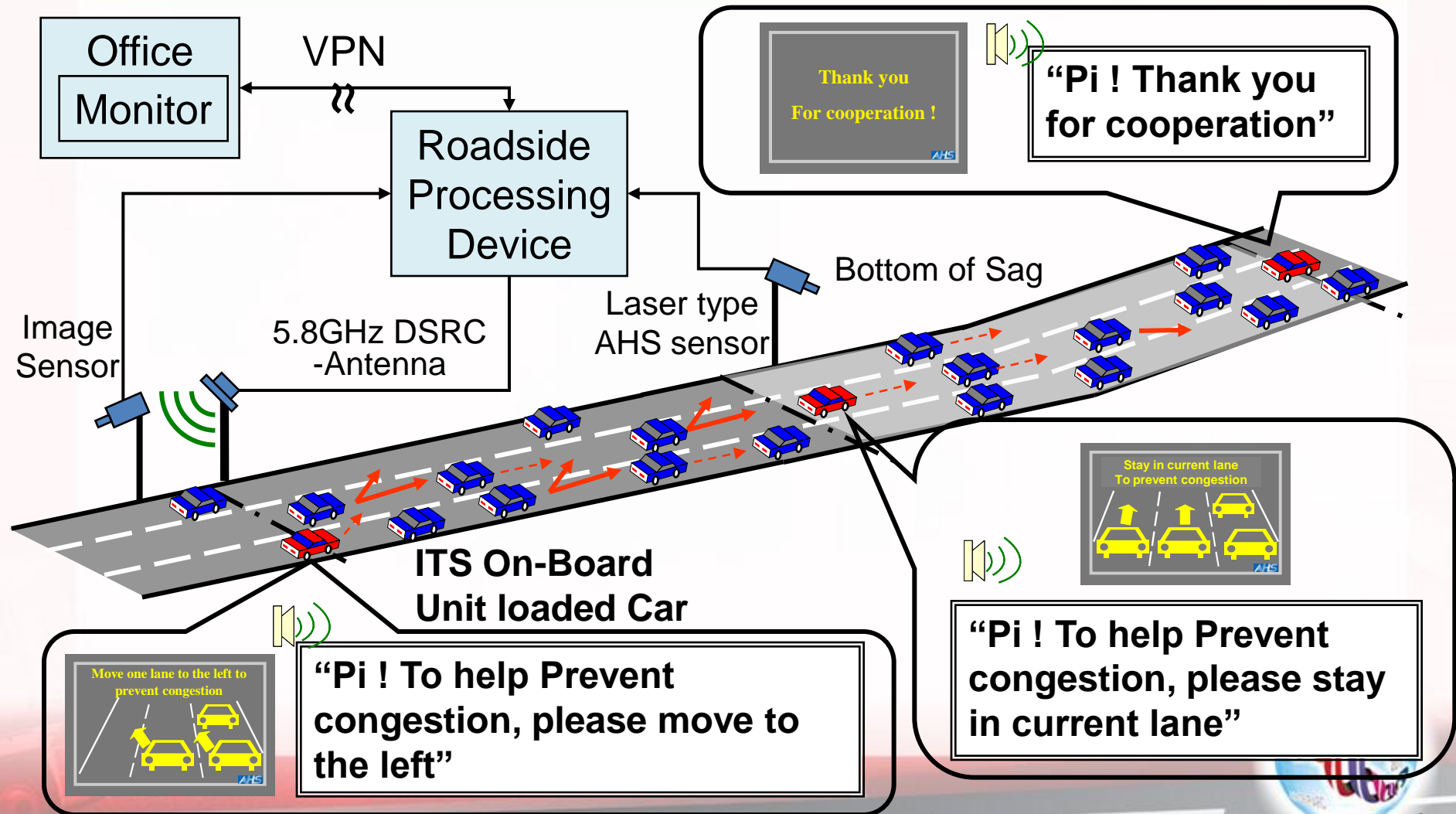


21. Logistic support service



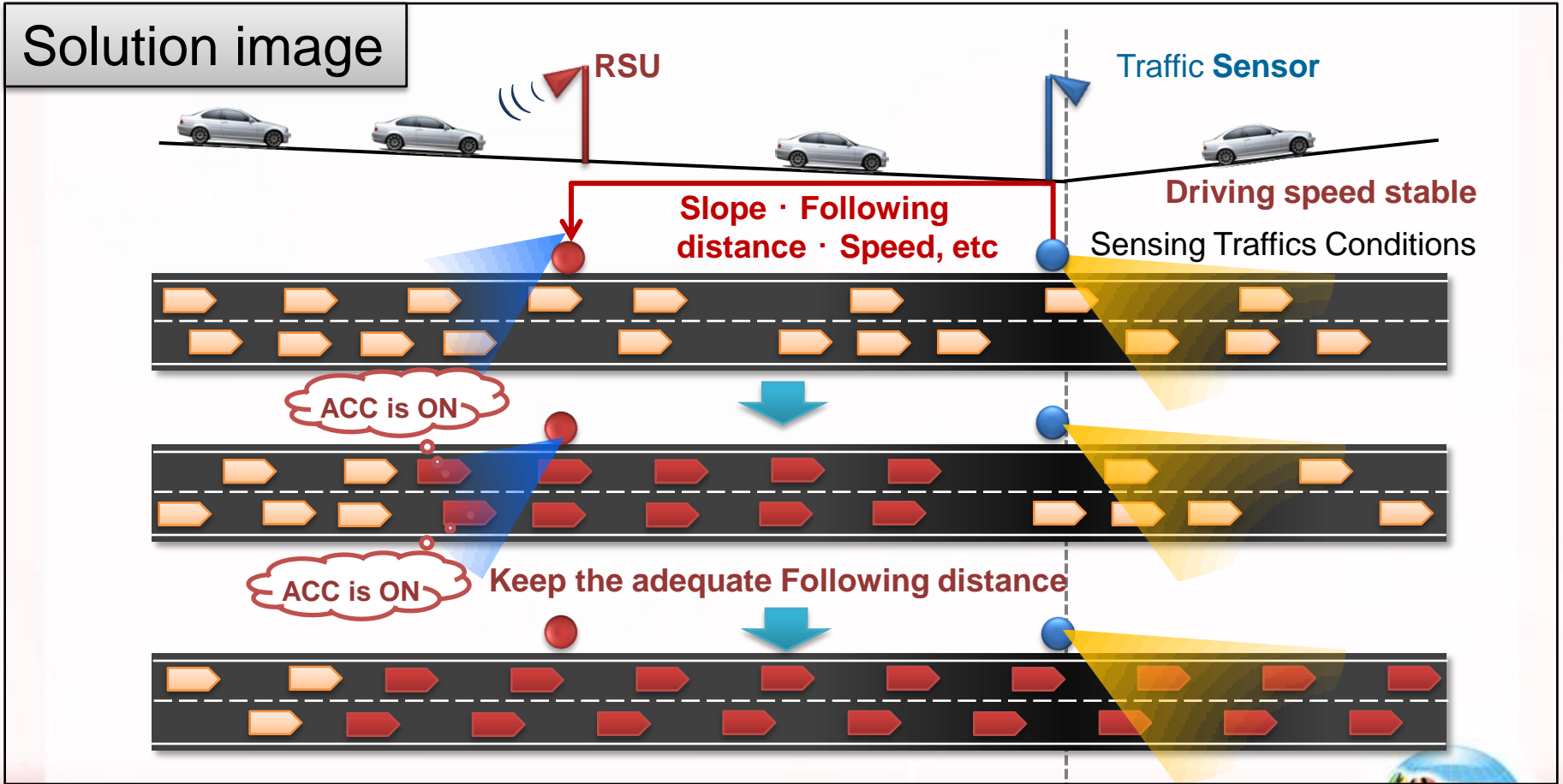
22. Congestion Mitigation Service #1

- Dissolution of unbalanced lane usage



23. Congestion Mitigation Service #2

- ACC – 1. keep following distance stable
- 2. keep driving speed stable

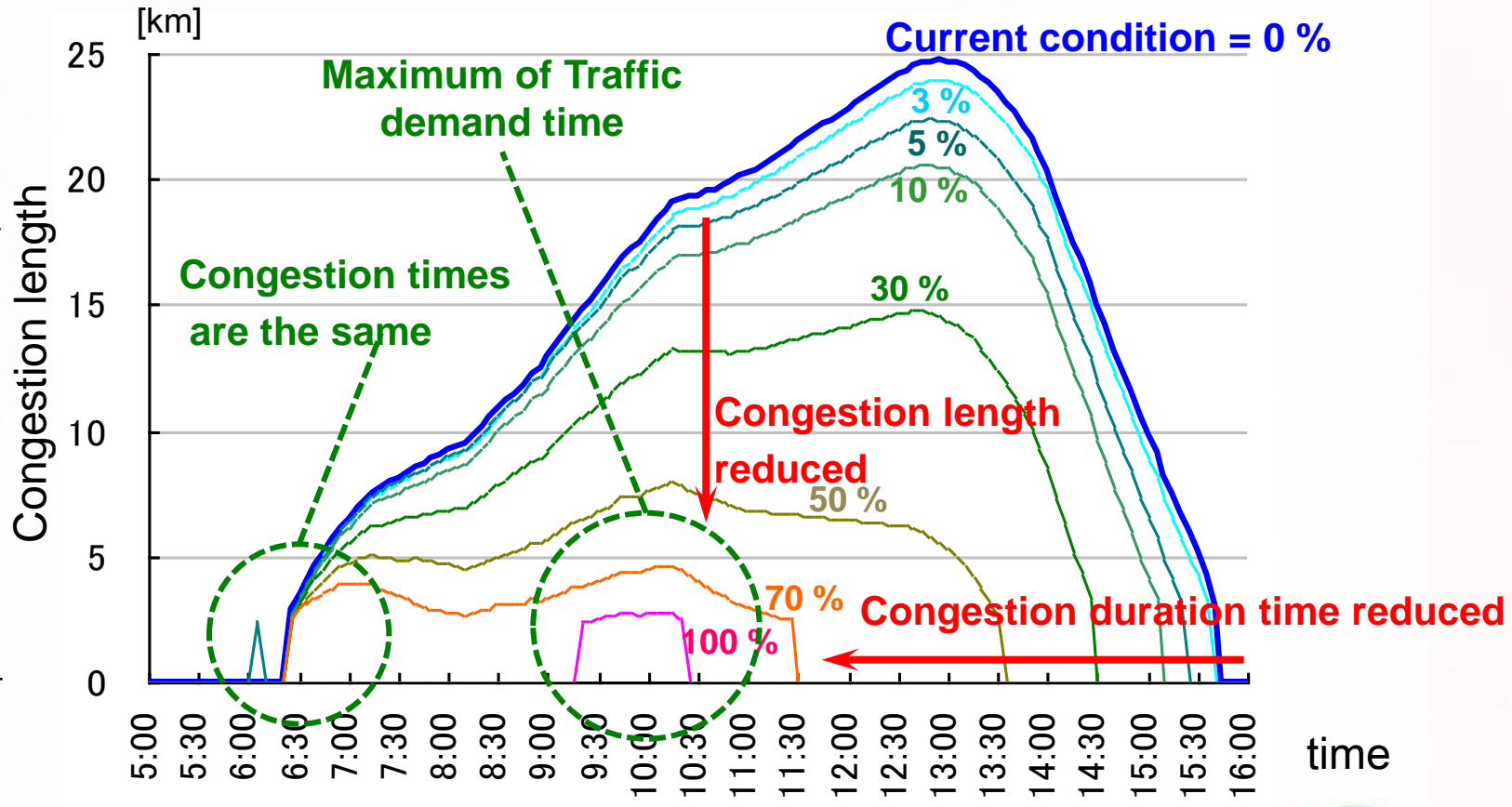


ACC: Adaptive Cruise Control



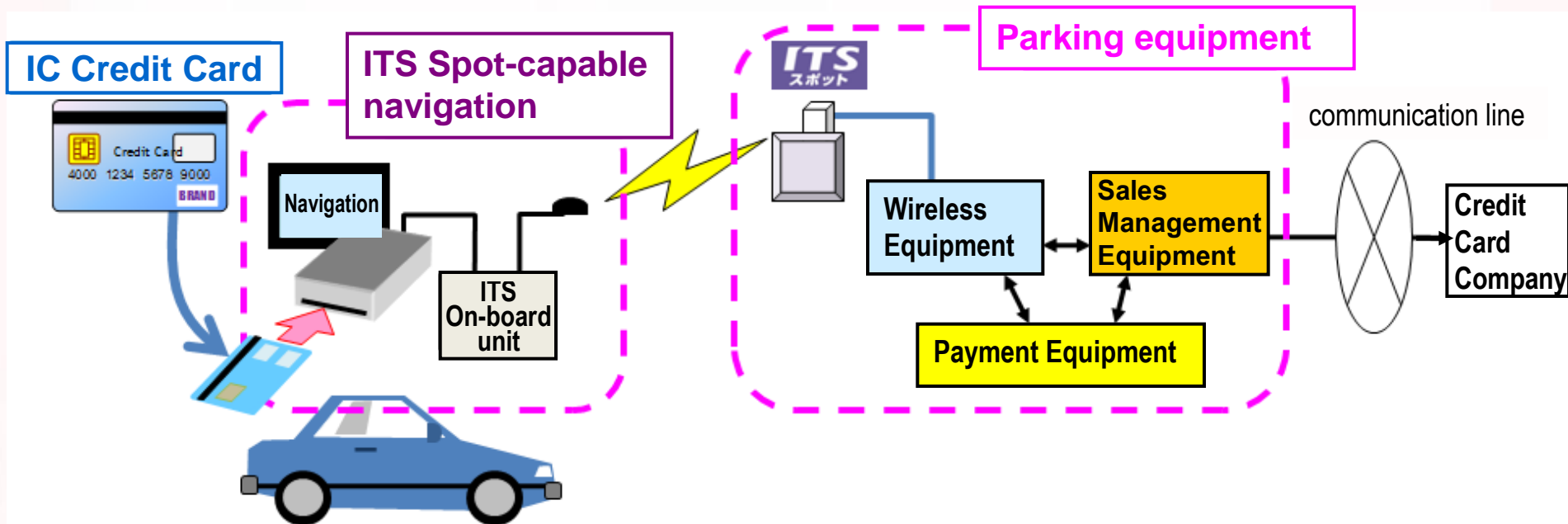
24. Congestion Mitigation Service #3

- Estimation indicates congestion length will be reduced to 50% with 30% of ACC-like driving vehicles



25. Payment Service

- Payment with ordinary credit card at parking lots, drive-thru, gas-station, and etc. with ITS Spot



26. Payment Service

Public and Private Joint Research

Research aims and assignment

Practical Test

	National Institute for Land and Infrastructure Management	Co-Researchers
Deployment of Equipment (Exected Road side equipment)		Toshiba Co., Ltd. Toshiba Tech Co., Ltd. Oki Electric Industry Co., Ltd. Amano Co., Ltd. JVC KENWOOD HD Co., Ltd. Pioneer Co., Ltd.
Deployment of Road side Equipment	○	
Interconnect Testing	○	○
Practical Test Discussion& Alignment	○	
Summarization	○	○



※ Deployment of equipment interface is based on “The guidelines of Installed DSRC vehicle-use EMV payment (proposal) (Highway Industry Development Organization)



ITS Organizational Structure and Achievements

- Organizational Structure for ITS Promotion in Japan
- Achievements 1st Stage ITS deployment
 - VICS
 - ETC
- Efforts towards the next generation ITS



Outline of the ITS Spot Services

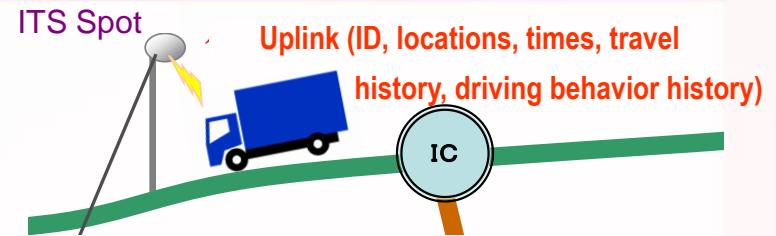
- ITS Spot Services has widely launched in 2011
- Large scale road-vehicle cooperative ITS
- Multi ITS services deployment
 - Dynamic Route Guidance
 - Assisting Safety Driving
 - ETC
 - Internet Connection
 - Probe Data Collection



R&D for ITS Spot Services Expansion

1. Logistic support service

Vehicles operations management



2. Congestion mitigation

Controlling driving speed and following distance to mitigate traffic congestion



3. Payment service

Automatic payment by credit card while on board



45minutes.
Your payment is 300
yen



ITS World Congress 2013 will be held in Tokyo.

Touch real ITS services in Japan!

See you in Tokyo!!



Thank you very much.

¡Muchas gracias!

Merci beaucoup.

