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NEXCO, Japan

Advancement in in-Vehicle Safety Devices

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India Office, East Nippon Expressway Co. Ltd.

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Diffusion of Car navigation system

History of Car Navigation System in Japan

1973 Comprehensive Automobile traffic Control System initiated

1981 Japan's first Car navigation System by HONDA

1990 GPS Car Navigation System by Pioneer

1991 Standardization of ITS started

2001 HDD Navigation System in Market by Pioneer

2002 Communication Unit mounted by Pioneer

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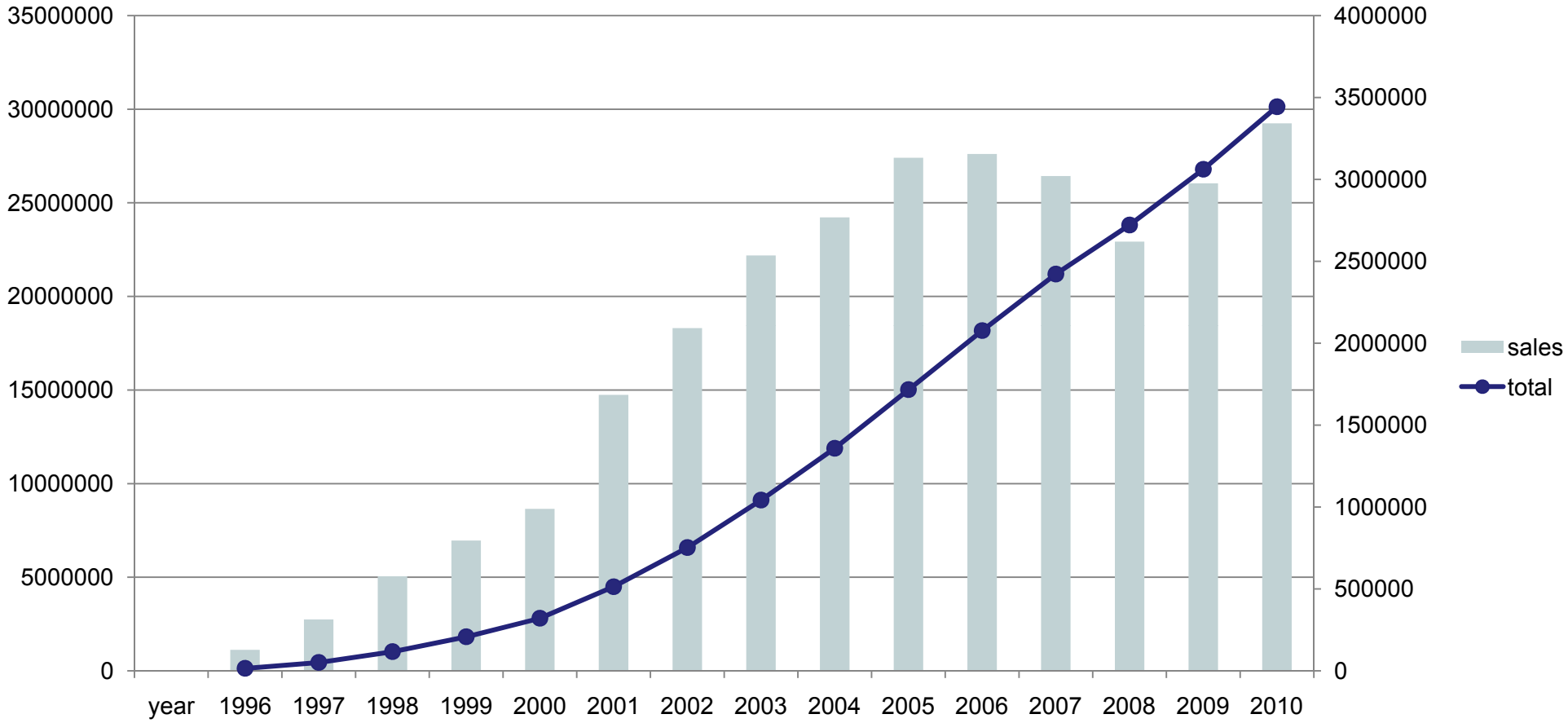
Shipments of VICS



Following the progress of Navigation System, Shipment has been increasing.

First Car Navigation System in 1981

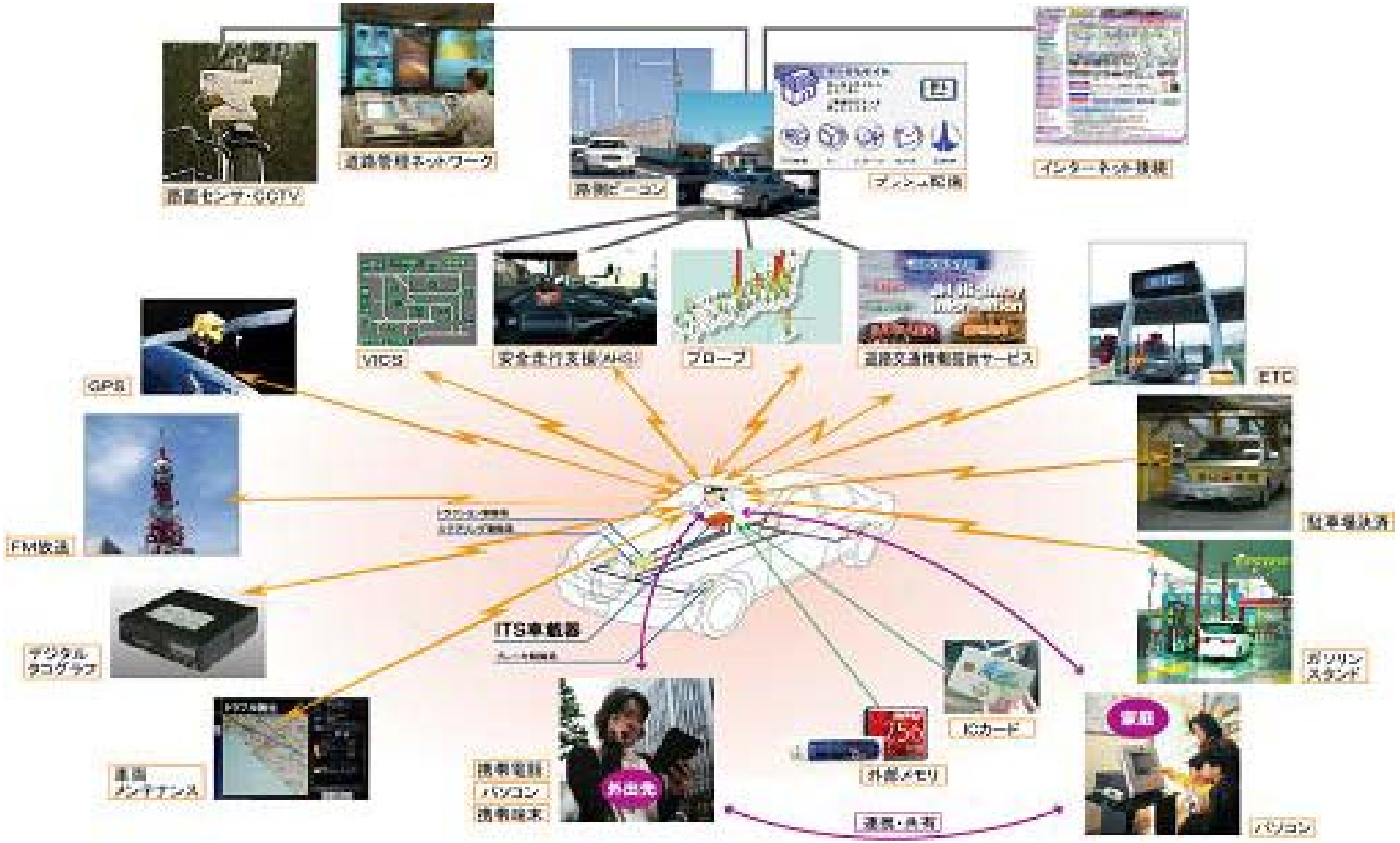
This first autonomous navigation system to calculate the travel distance used the gas rate sensor and distance sensor. When using the map, you had to **set a transparent map sheet** in front of the tube. And you had to need to **set the direction and the vehicle position** at the start. When out of range of the map, you also had to **replaced an another map yourself**. That would be far from driving safely.

First GPS Car-navigation system in 1990

This is a first GPS navigation in market. Four CDs included all Japan's map, which provides scale up to 1/40,000.

The price was about \350,000 at that time.

What we can do now?



Function of the Latest OBU

- Voice Control
- 3D-Jyro
- Congestion Prediction
- VICS Optical beacon/Radio beacon
- On-demand VICS
- Probe
- Route Study
- Map of Multi-story Car Parking
- 3D-Polygon
- One-way indication

- Internet
- ETC synchronization

- Rea-View Camera
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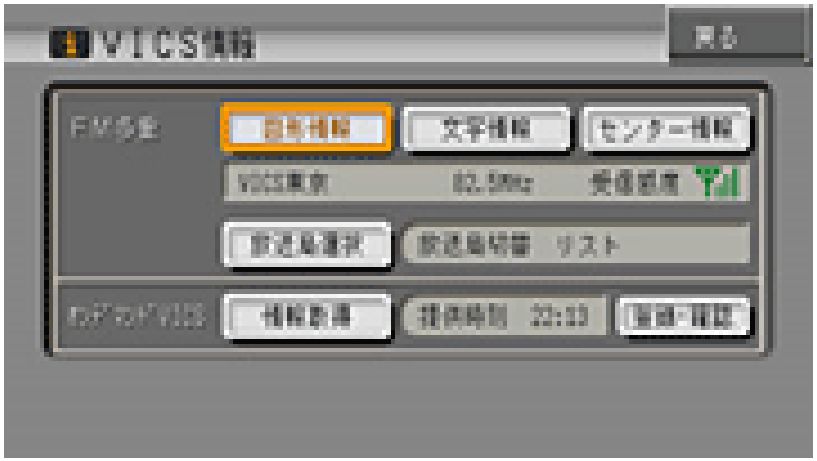
Voice Control

- Voice command can manipulate the car navigation system.
- No finger manipulation leads to drive safely

On-demand VICS



The VICS information has been provided by **FM multiplex broadcasting** or **beacon** which installed road side.

On-demand VICS has made it possible to receive VICS information from **mobile phone**s and other **communication system**.

Then, if you are not in route which VICS point is there, Route searching now becomes higher accuracy.

Contents Displayed

Congestion Information

Heavy congestion is indicated by a red arrow, and light congestion is indicated by an orange arrow. The length of an arrow represents the distance of the congested road blocks.

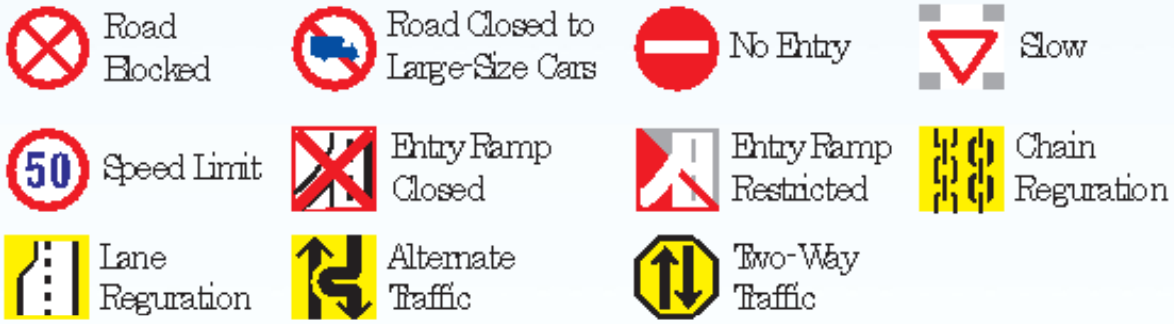
Degree of congestion	Ordinary road	Inner-city expressway	Inter-city expressway
Heavy Congestion → Red	less than 10km/h	less than 20km/h	less than 40km/h
Light Congestion → Orange	10km/h to 20km/h	20km/h to 40km/h	40km/h to 60km/h
Smooth Traffic → Distinct colors from the two above	more than 20km/h	more than 40km/h	more than 60km/h

The car navigation system's default setting for display of "Smooth traffic" is generally "OFF"

Contents Displayed

Information on Traffic Restrictions

These icons indicate blocked roads, speed limits, lane regurations, etc.

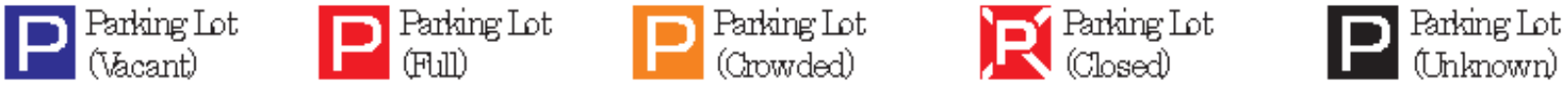


Information on Traffic Hazards

These icons indicate accidents, disabled cars, traffic obstructions, constructions, etc.

Information on Parking Lots

These icons indicate the locations of parking lots and service areas, showing by colors if it's available or not, and what kind of facilities they have.



Map Display


Entry Ramp Closed
Parking Lot
Construction
Traffic Obstruction
Lane Reguration
Disabled Car
Alternate Traffic
Accident
Road Blocked
Road Work
大久保
榎町
飯田橋駅
秋葉原駅
両国駅
岩本町
四谷駅
代々木駅
東京駅
深川
霞が関
銀座
新橋駅
西麻布
虎ノ門
豊洲
渋谷駅
indicates the car location

Prediction of Congestion

This function is to guess traffic congestion based on **historical data** and to suggest a optical route avoiding traffic jam.

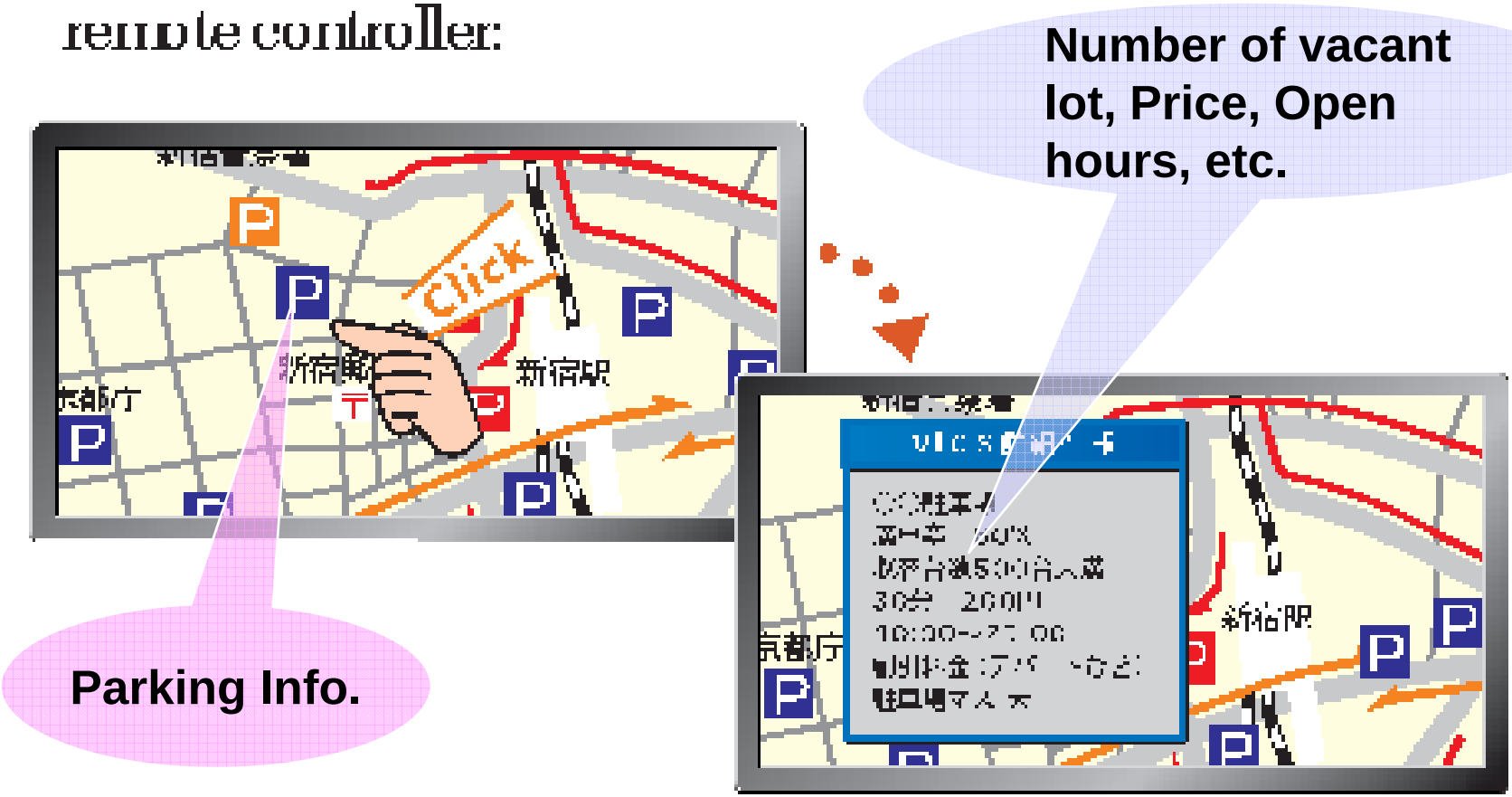
These data come from **Traffic senses** by MLITT, HDD accumulated **by driving yourself** or a data base accumulated by members driving history.

Detailed Information

Detailed information can be found by clicking on a VICS icon, such as restrictions or hazards, using the car navigation system's touch panel or remote controller.

Detailed Information

Detailed information is displayed by clicking on a P icon using the carnavigation system's touch panel or remote controller:



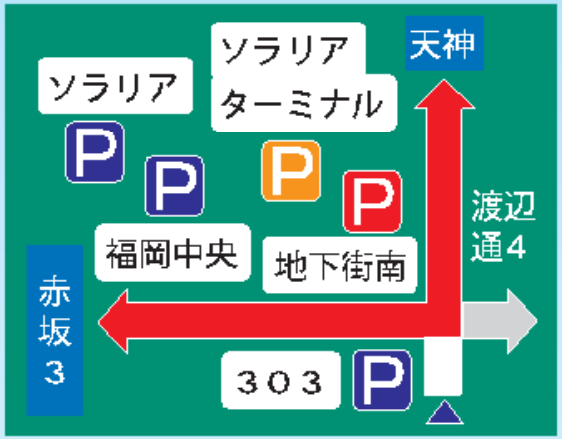
Number of vacant lot, Price, Open hours, etc.

Parking Info.

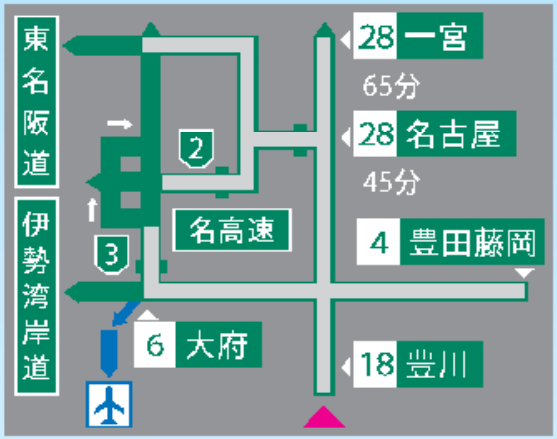
Sample Graphic Display

Beacons

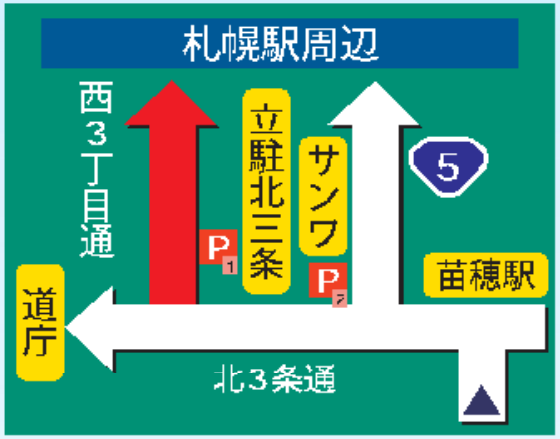
Ordinary Roads
(Fukuoka area)



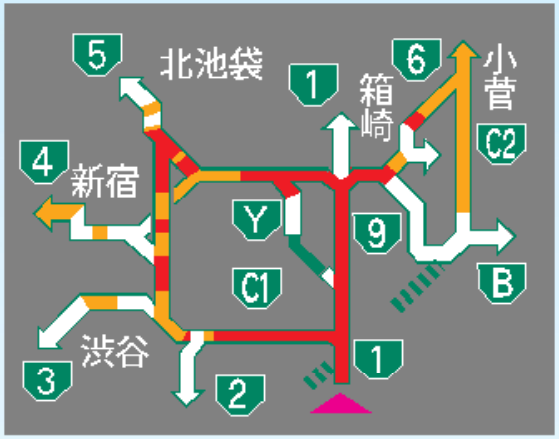
Inter-City Expressway
(Tomei Expressway)



Ordinary Roads
(Sapporo area)



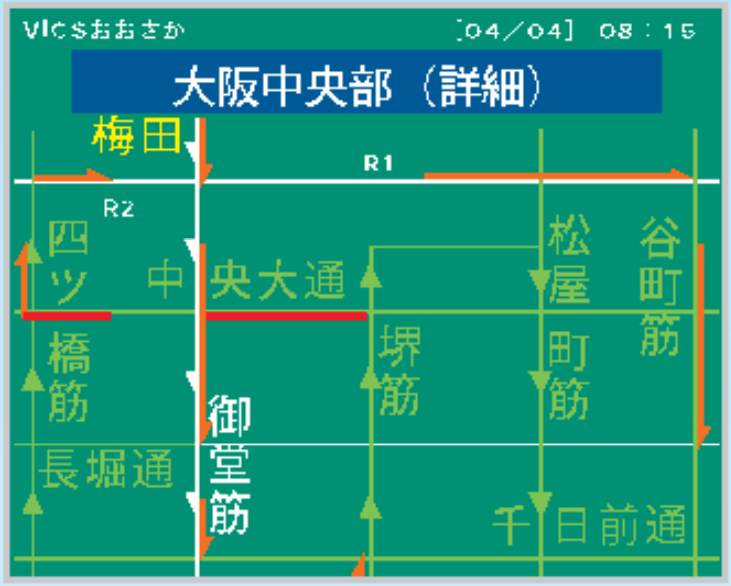
Inner-City Expressway
(Tokyo Metropolitan Expy.)



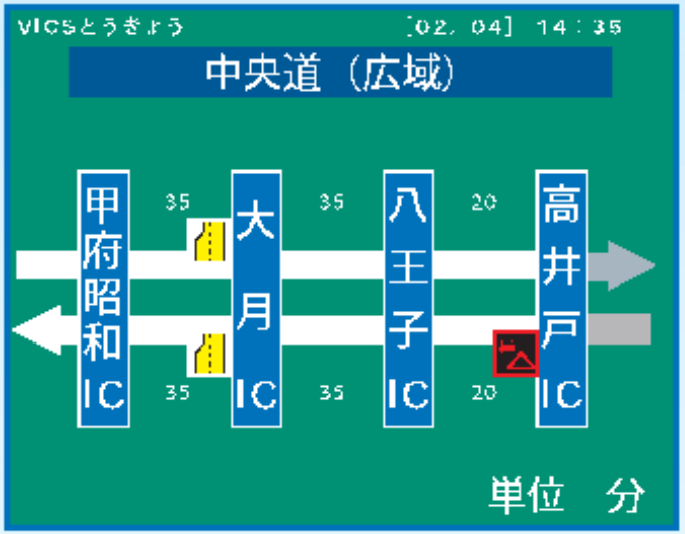
Sample Graphic Display

FM Multiplex

Ordinary Roads
(Osaka area)



Inter-City Expressway
(Chuo Expressway)



Text Information

Beacons

●Ordinary Roads
(Tokyo area)

新宿通り上り　四谷見附付近
渋滞0.5KM

靖国通り東行き　九段坂上→
神保町　渋滞　1.0KM

●Inter-City Expressway
(Tomei Expressway)

御殿場→裾野　事故渋滞　5km

11km先→横浜町田出口
渋滞　7km

FM Multiplex

●Ordinary Roads
(Miyagi area)

VICSみやぎ　(01/09)　08：35
国道48号下り　車線規制
作並→本町3丁目

●Inter-City Expressway
(Tomei Expressway)

VICSとうきょう　(03/08)　09：24
東名　下り　事故
東名川崎IC→東京IC　車線規制

What on earth is VICS ?

VICS = Vehicle Information and Communication System

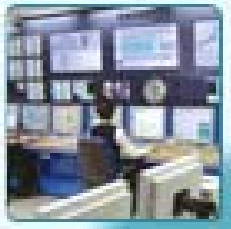
VICS is an innovative information and communication system, enables you **to receive real-time road traffic information** about congestion and regulation.

This information is edited and processed by Vehicle Information and Communication System Center, and shown on the navigation screen by text or graphical form. You can receive information 24 hours a day, everyday.

For smoother, safer, and more comfortable

How VICS works ?

Prefectural police



Japan Road Traffic Information Center

VICS Center

Road Traffic Information

Highway administrators

FM multiplex broadcasting

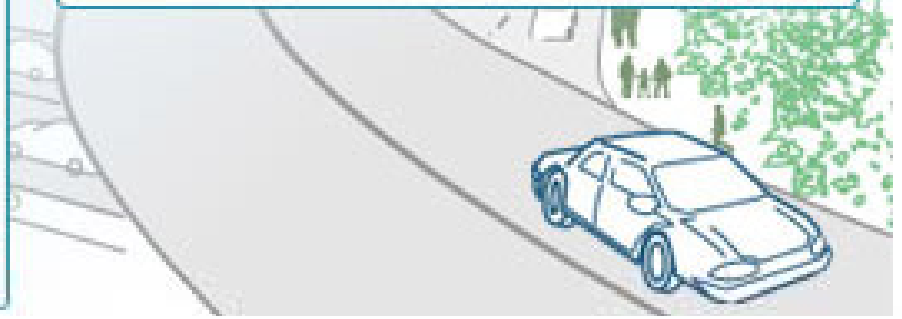
VICS-FM stations in every region of the country broadcast FM waves, which provides prefectural-wide-area information all at once.

Radio wave Beacon

Devices on major expressways, which is installed by highway administrators, send waves(quasi-microwave), and you can receive traffic information on expressway as far as 200 kilometers away.

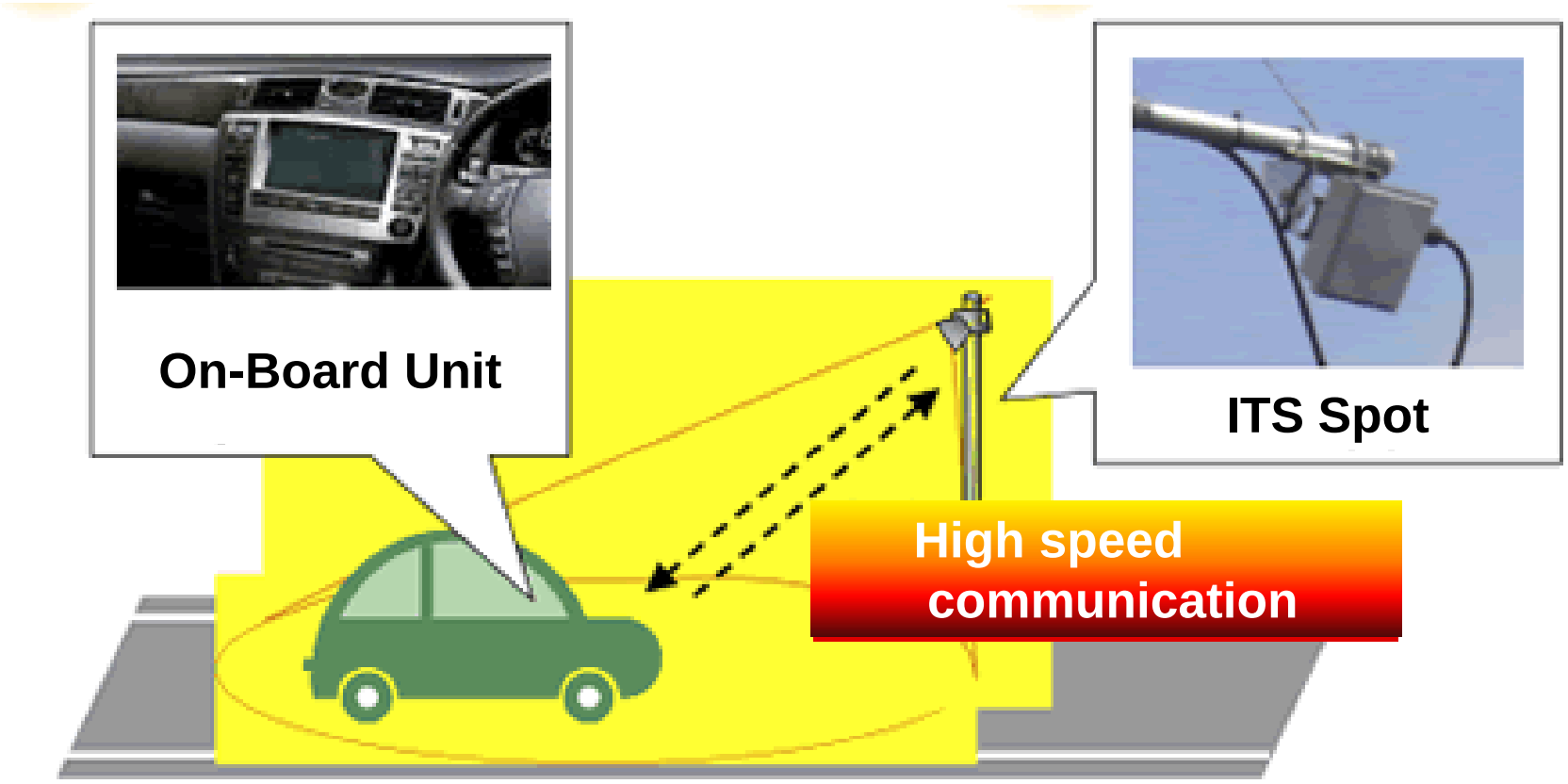
Infrared Beacon

Devices on major open roads, which is installed by prefectural police, send optical signals(near infrared rays), and it enables you to receive general road traffic information about 30 kilometers away

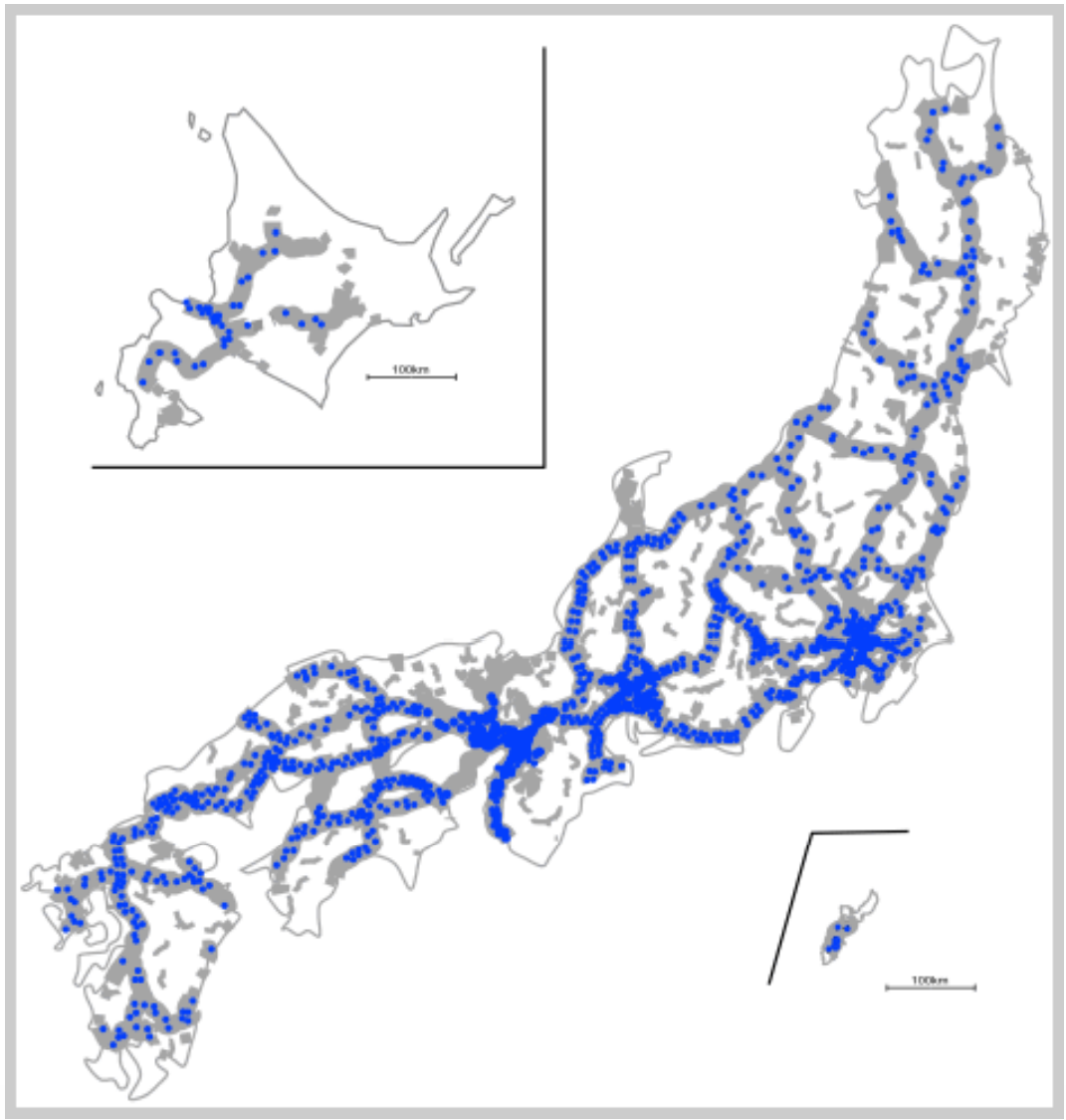


Information via three communication and broadcasting media.

How VICS works ?

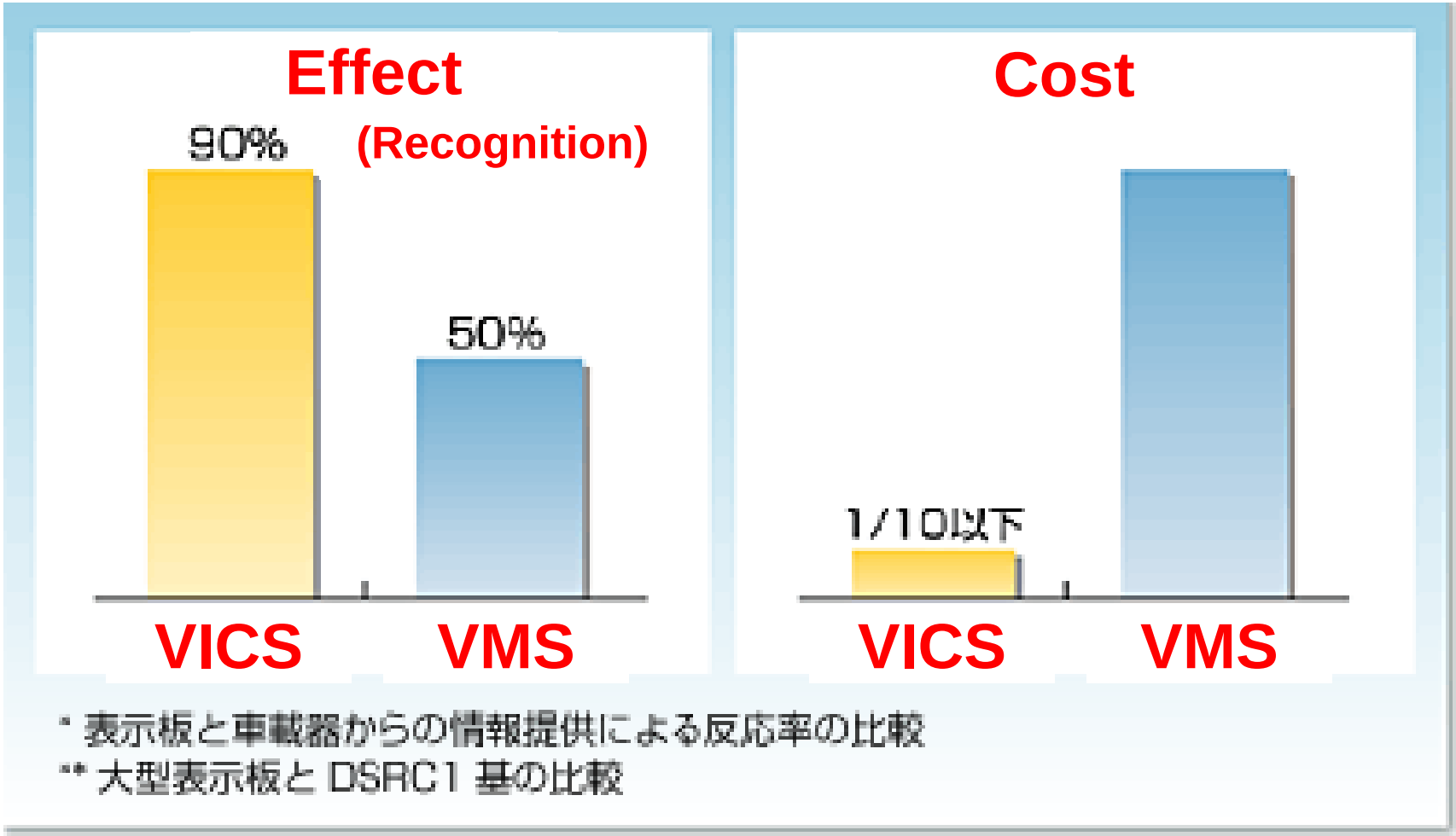


ITS Spots Map



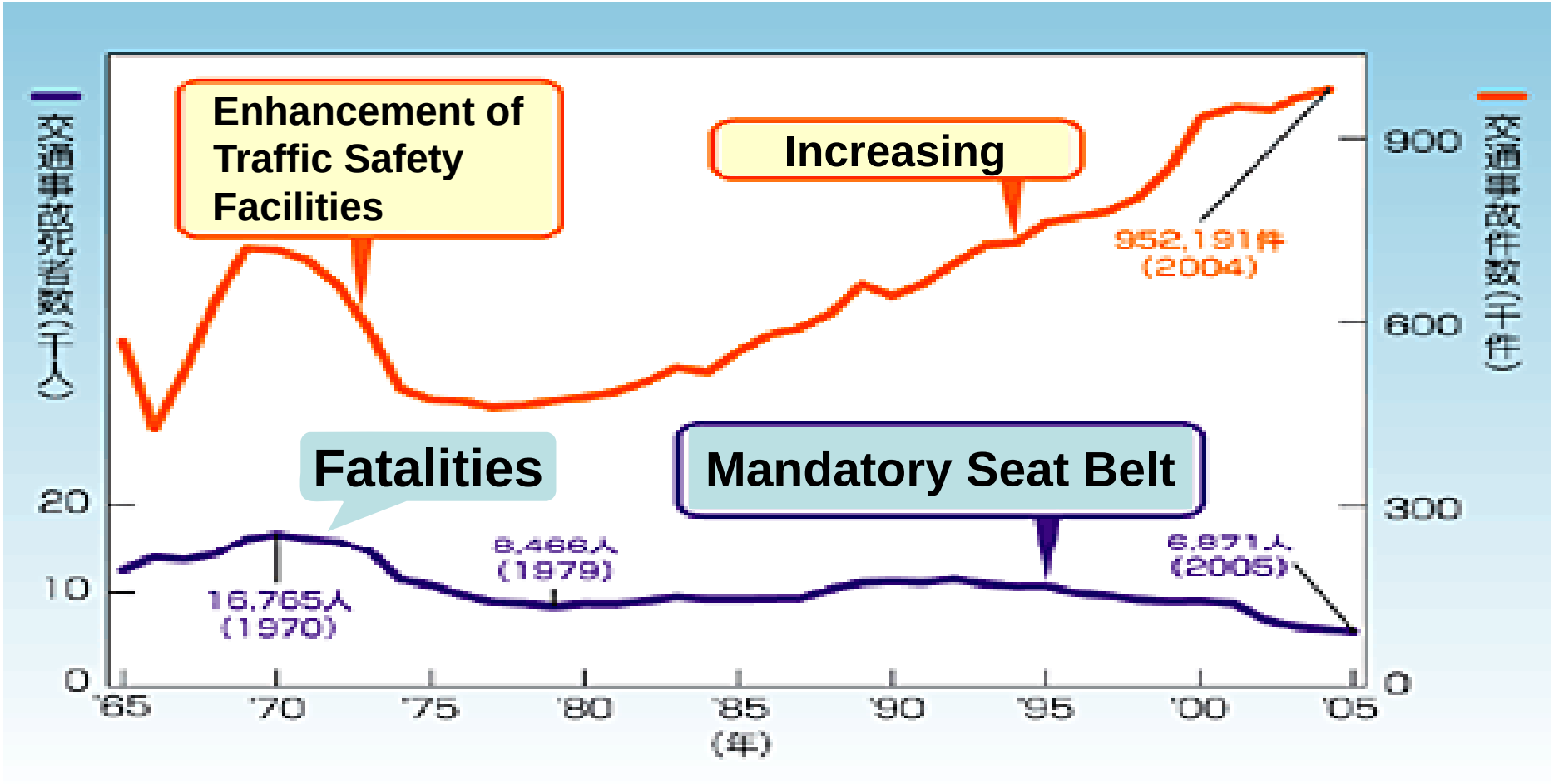
1600 ITS Spots

Why such information important ?



出典：【効果】平成 10 年度「走行支援道路システム技術研究開発研究成果報告書」（1999 年 3 月）より
【整備コスト】民間企業ヒヤリング結果より

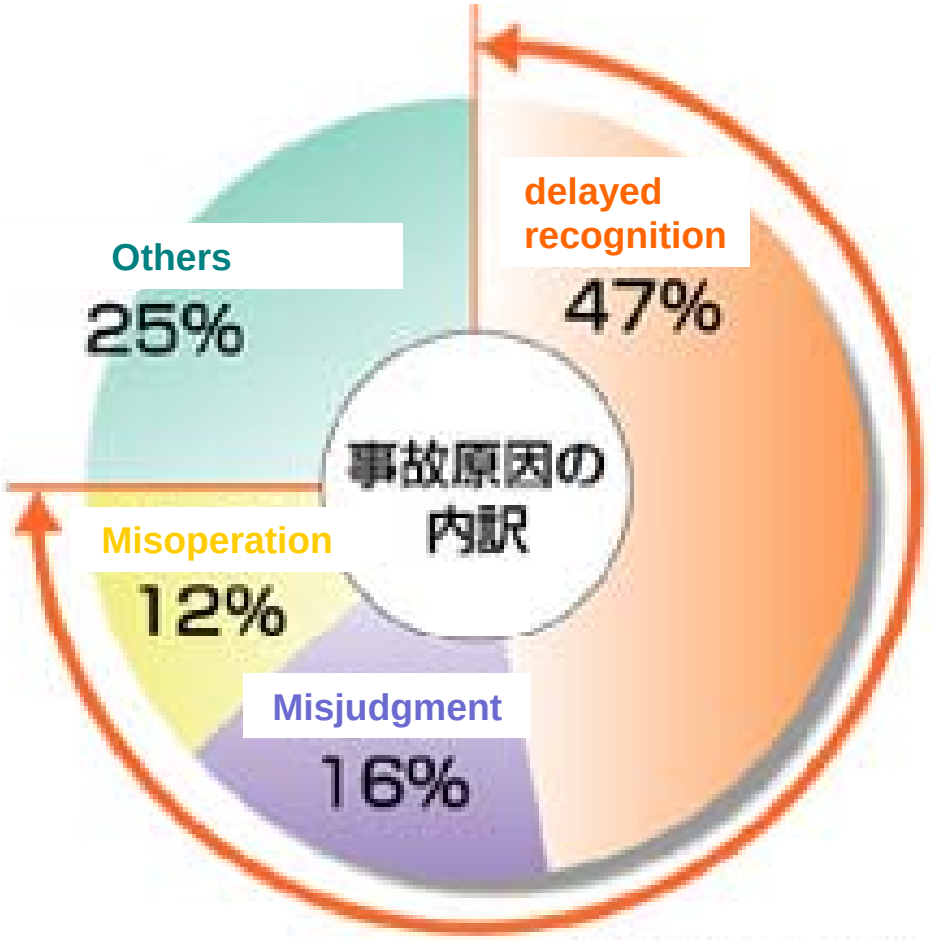
Why such information is important ?



出展：(財) 交通事故総合分析センター

We found that only enhancement of traffic safety facilities would not reduce the number of Traffic accidents.

Cause of Accidents



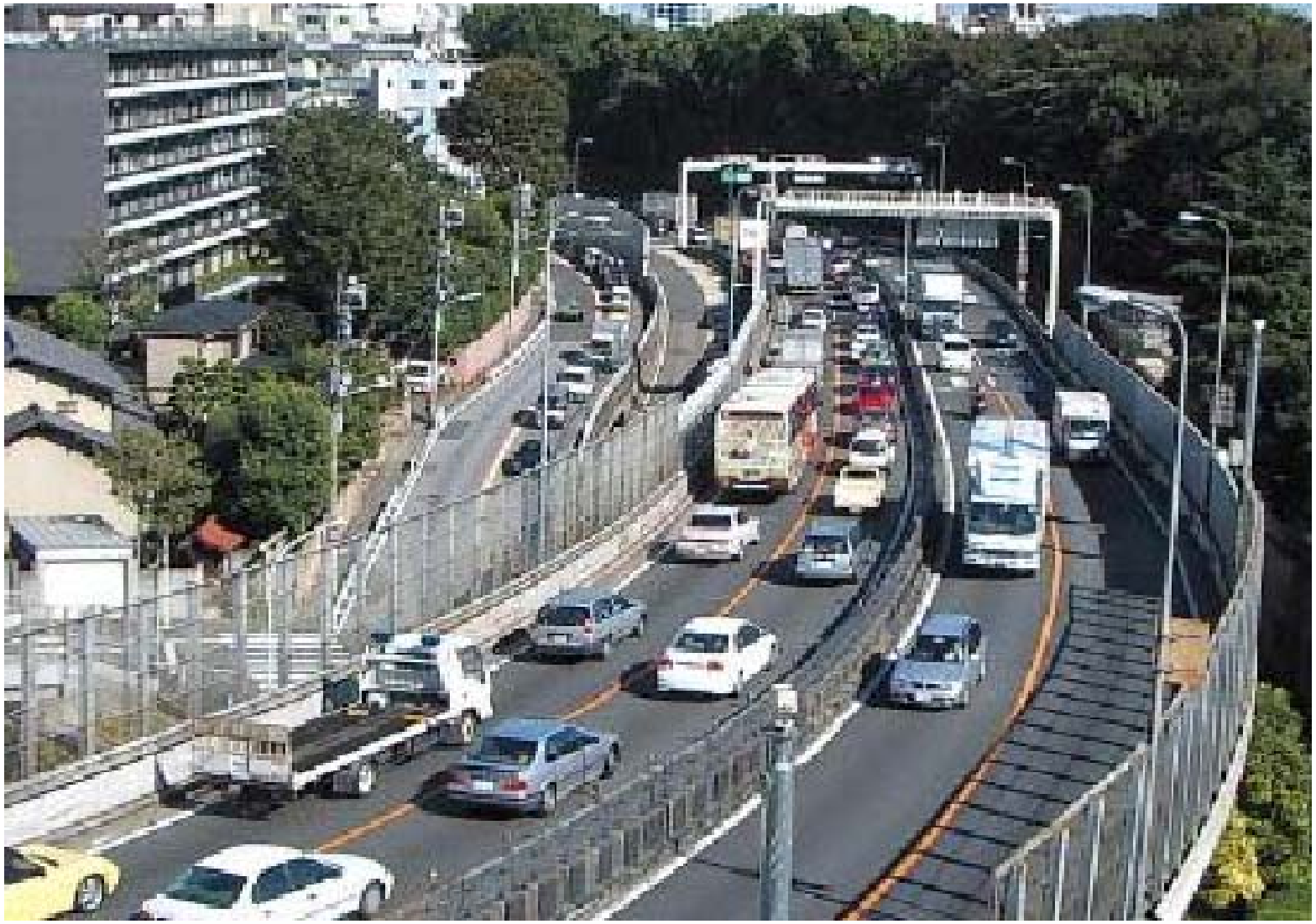
Traffic accidents are caused by driver's behavior just before it.

75%

出典：「平成 12 年交通事故統計データ」（財）交通事故総合分析センター

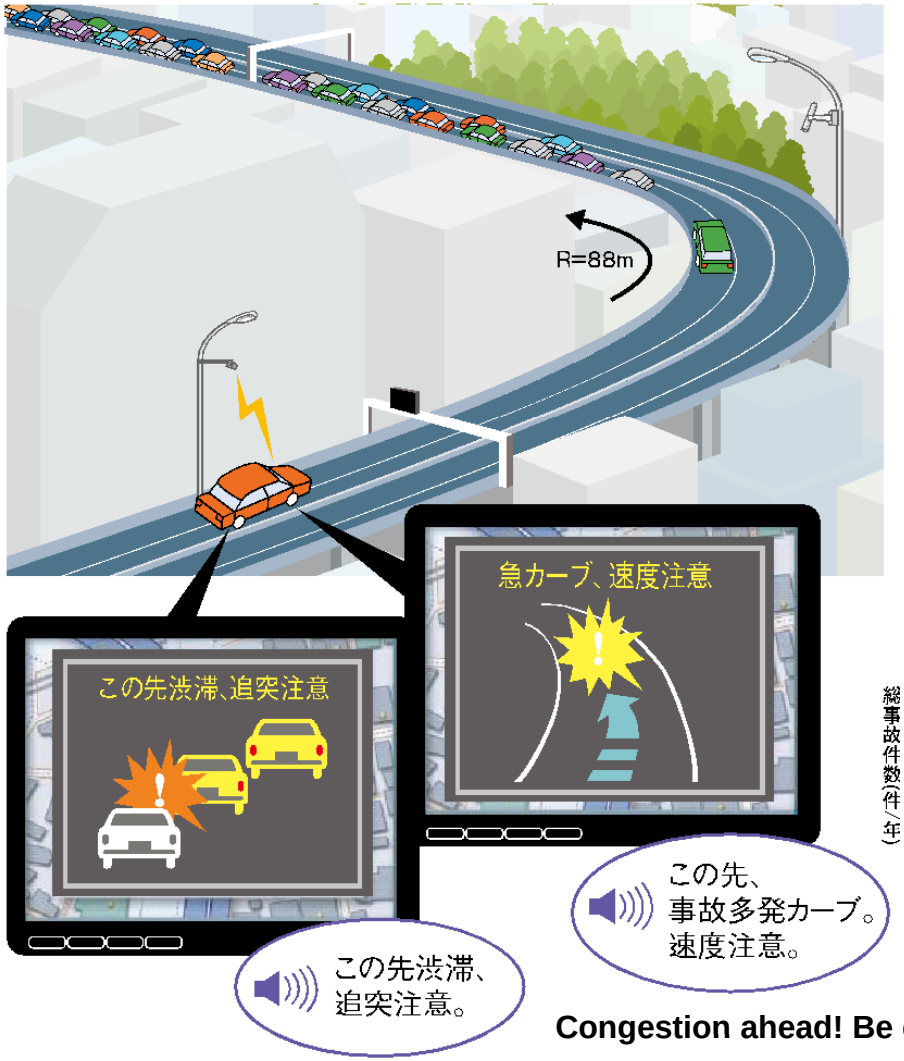
By the previous information, it would be possible to reduce traffic accidents.

Example of Installation



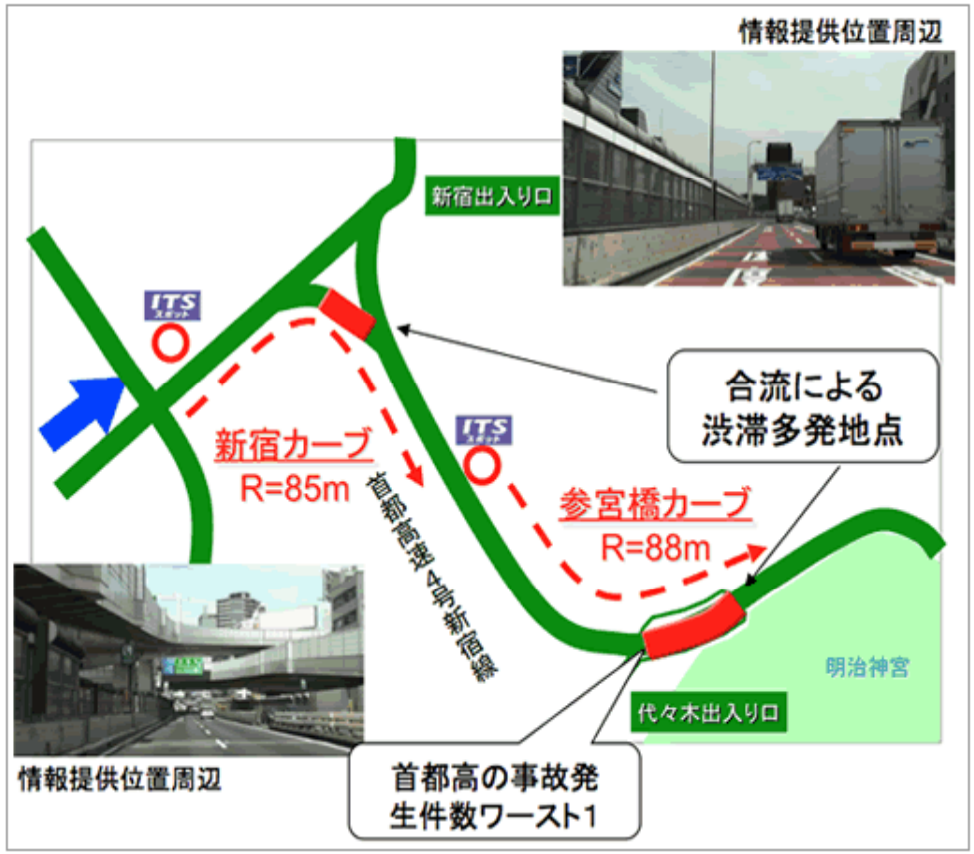
Notorious Place as Blood Alley in Tokyo Metropolitan Expressway

Example of Installation



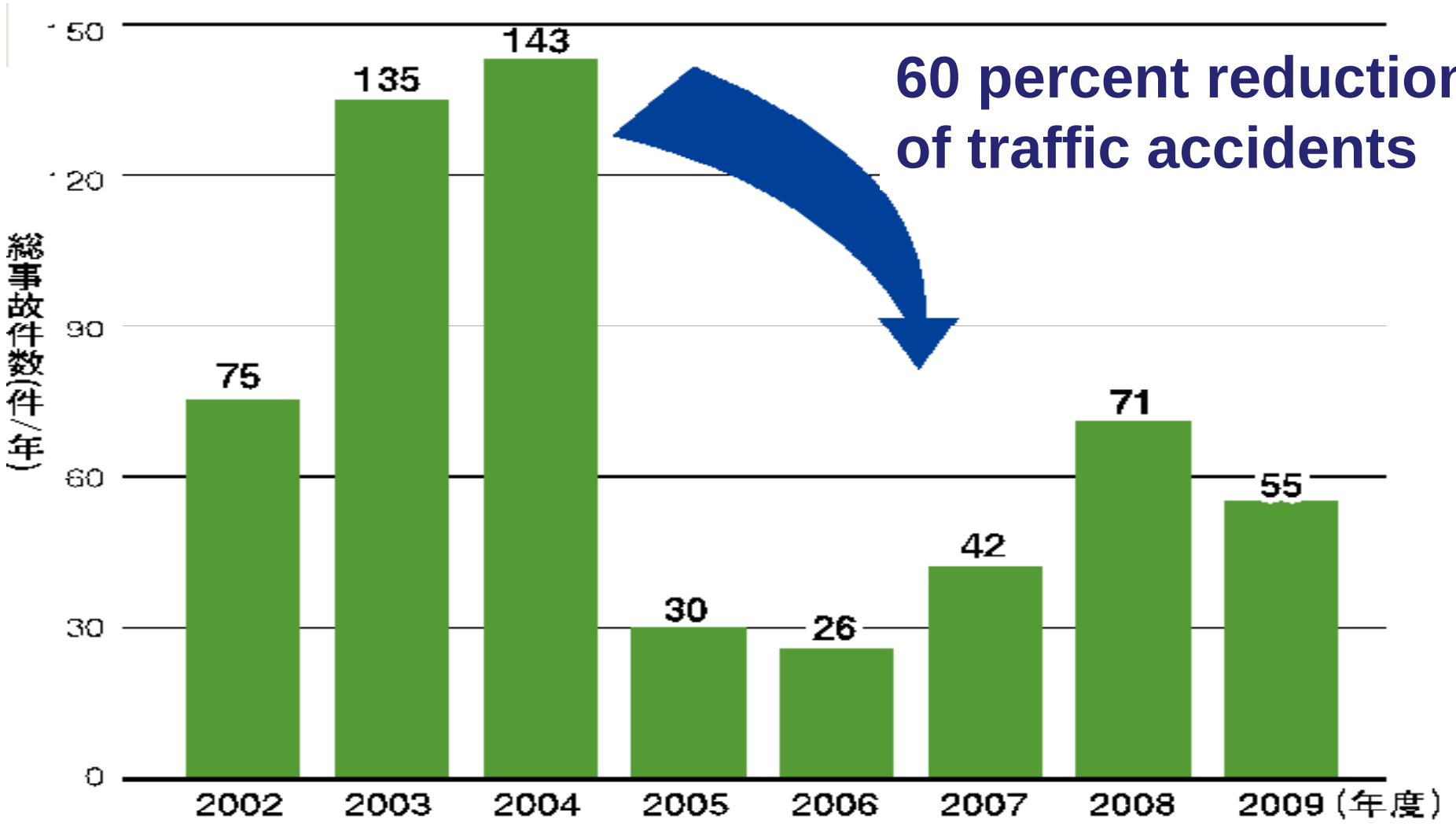
総事故件数(件/年)

(例)事故多発地点における情報提供



Congestion ahead! Be careful Collusion! By visual & Voice

Example of Installation



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Smartway

Smartway is a Highway Network installed ITS.

GoJ has been proceeding Smartway project cooperated with
The National Police Agency
Ministry of Economy, Trade & Industry
Ministry of Internal Affairs & Communications
Ministry of Land, Infrastructure, Transport & Tourism
& Related Industries & Academia receiving subsidies from G.

ITS is a new transport system which is comprised of an advanced information and telecommunications network for drivers, roads and vehicles. And ITS contributes much to solving problems such as traffic accidents and congestions.

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Future

We can make a society as

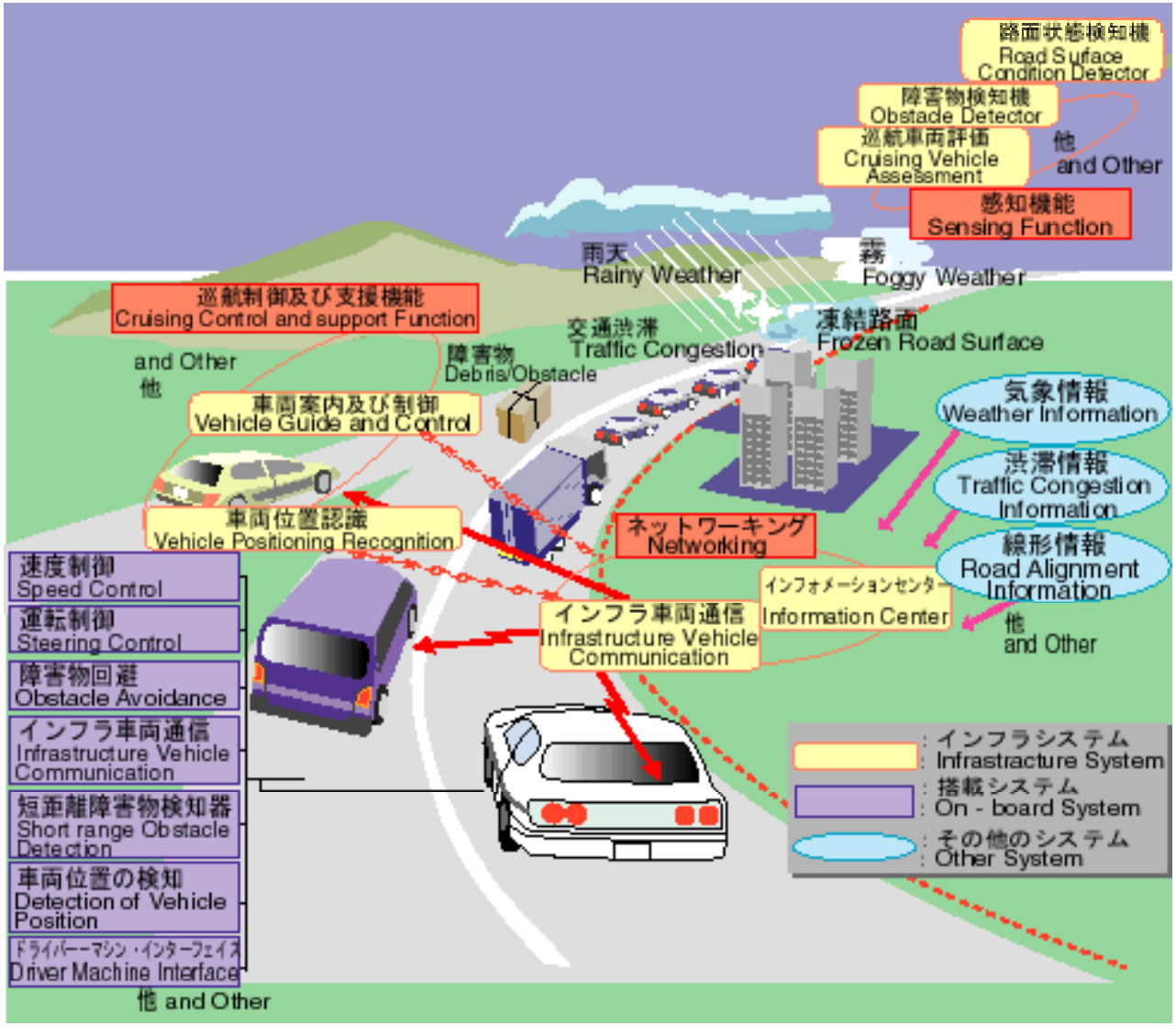
Reduction of Traffic Accidents/Jams
Elderly/disabled feel safe to move
Effective use of expressway/Public Transport
Improvement of business climate

by Smartway.

END

Thank you
very much

Reference (Advanced Cruise Assistant System)



Reference (Advanced Cruise Assistant System)

The Advanced Cruise Assist Highway System (AHS) is one of the most advanced systems in the ITS field. The goal of AHS is to reduce traffic accidents, enhance safety, improve transportation efficiency as well as reduce the operational work of drivers. A number of related effects are also expected.
In Japan, AHS research is being carried out in the following fields:

AHS-"i" (information): focusing on providing information;

AHS-"c" (control): vehicle control assistance;

AHS-"a" (automated cruise): fully automated driving.

Many kinds of road-side infrastructures for monitoring highway conditions (such as other vehicles, obstacles, highway surface conditions and vehicle position), controlling the vehicle based on highway condition, and road-to-vehicle communications are necessary for the realization of AHS. Information such as traffic condition, weather and highway alignment is also required. As for vehicle functions, obstacle detection and avoidance, speed control, driving control and man-machine interface are required. The development of AHS-"i", "c" and "a" should also consider compatibility with other ITS system components.