

# ITS

## A Collection of Effectiveness Case Studies: 2007-2008



Intelligent Transport Systems



# 1. Elimination of congestion

## Elimination of urban problems

Creating an environment for safe, smooth, and comfortable road traffic that eliminates congestion-caused frustration

### Eliminating congestion-caused frustration

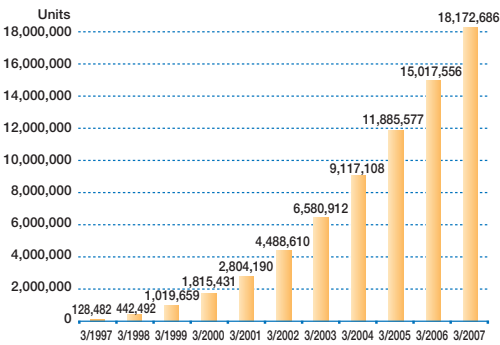
(VICS: Once you've tried it, you won't know how you managed without it.)

The Vehicle Information and Communication System (VICS) provides easy-to-understand, real-time information that drivers need. Using graphics and written messages, VICS supplies information on congestion conditions, required travel time, and other items that are matched to individual requirements.

It is expected that VICS will appropriately disperse traffic flow, improve traffic fluidity, and improve road environments.

**Effect** The VICS unit installation rate has climbed to roughly 80% over six consecutive years. VICS cost effectiveness will increase six-fold over the next 20 years.

By the end of FY2006, some 18 million VICS units for installation in vehicles had been shipped. The percentage of car navigation systems that have VICS units in them has increased to roughly 80% over the past six consecutive years. Thus, VICS is now firmly established as a standard component of car navigation systems. It is expected that VICS will generate an effect of 7.75 trillion yen, or six times the system's cost of 1.2 trillion yen.

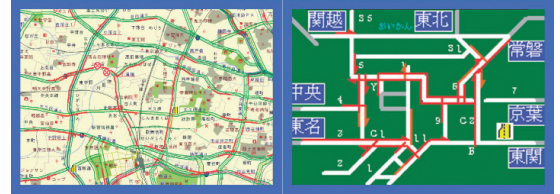


Number of VICS units shipped (cumulative total)

Source : Prepared from materials of the VICS Center



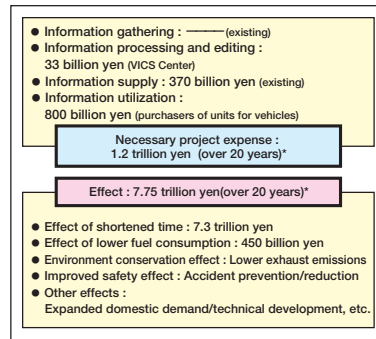
### Information supplied to car navigation systems



Map display

Simple graphics display

Source : Prepared from the ITS Guide



### Cost and effect of VICS

Source : Prepared from materials of the VICS Center

\*Calculated from 1996

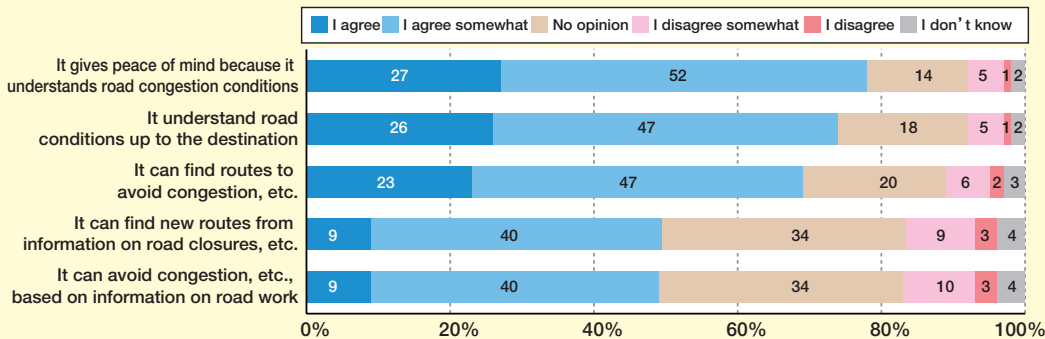
VICS gives me a different sense of security.



**Effect** Roughly 80% of users say VICS gives them peace of mind, is effective in ascertaining to-destination road conditions, and can find less congested routes

The result of an FY2004 users questionnaire show that, when asked about specific areas where VICS is effective, roughly 80% of respondents answered that it "gives peace of mind," "understand road conditions up to the destination," and "can find routes to avoid congestion."

### Results of a questionnaire on specific areas where VICS is effective



Source : Prepared from materials of the VICS Center

Getting real-time road traffic information makes life easier.



### An example of overseas application

In San Antonio, Texas, a program was implemented to improve Internet websites and reinforce traffic information systems for vehicles—including installation of car navigation systems by a local public body—as part of a strategy to develop an urban model. The results of a related survey indicated that users of navigation systems are gaining clear potential benefits. Drivers who used a car navigation system over the course of a year felt there was an 8.1% decrease in instances in which they were late arriving at their destinations. (Texas)

**Feature**

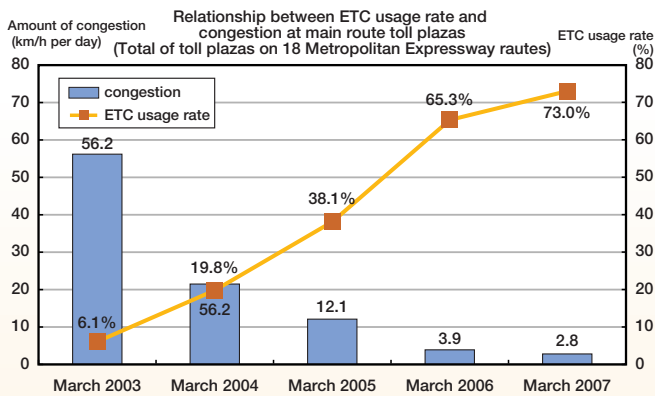
## ETC lanes are now ordinary lanes (ETC has achieved a usage rate of 70%)

The Electronic Toll Collection System (ETC) was developed as an advanced automatic toll payment system that allows vehicles to pass through toll plazas without stopping. The system is intended to alleviate congestion around toll plazas, where the heaviest congestion tends to occur. In addition to alleviating congestion, ETC is expected to have a positive impact in a broad range of areas that include roadside environmental improvement and regional vitalization.



### Toll plaza congestion vanishes!

#### Effect ETC use decreases congestion by 90%



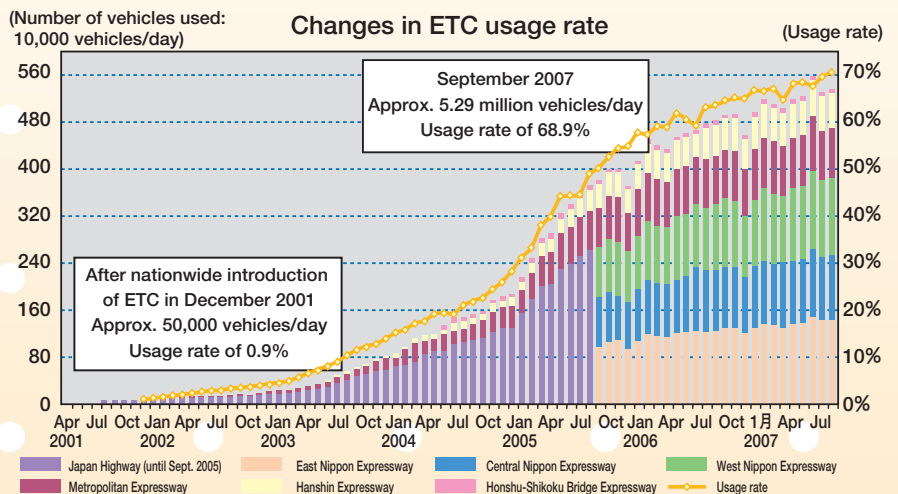
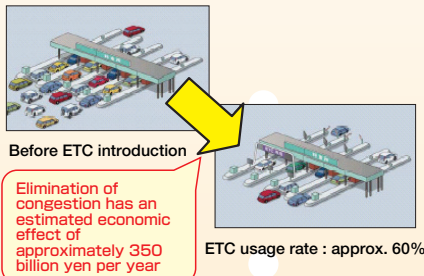
Source : Prepared from materials of the Ministry of Land, Infrastructure and Transport

#### Feature

##### An example of overseas application

In July 2000, Wilbur Smith Associates conducted a field survey targeting 27 toll plazas on expressways of the New Jersey Turnpike Authority. Focusing on traffic volume during peak periods, length of congestion, lane configuration, travel time, and other items, the survey sought to evaluate the effectiveness of the authority's E-ZPass automatic toll collection system. The results of this survey indicated that introduction of the E-ZPass system led to an 85% reduction in delays compared to simulated values of toll plaza delays prior to introduction of the system. They also revealed that user costs resulting from delays fell by \$25.1 million per year, and that gasoline consumption fell by 11.2 million gallons per year due to less time waiting in congestion.

(New Jersey Turnpike Authority)



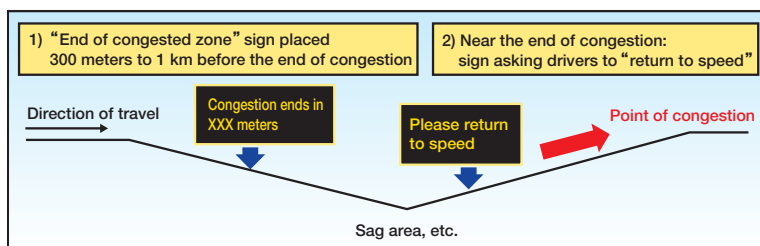
Source : Prepared from materials of the Organization for Road System Enhancement

Total number of cars set up with vehicle-mounted ETC devices: approx. 19.4 million vehicles (September 2007)

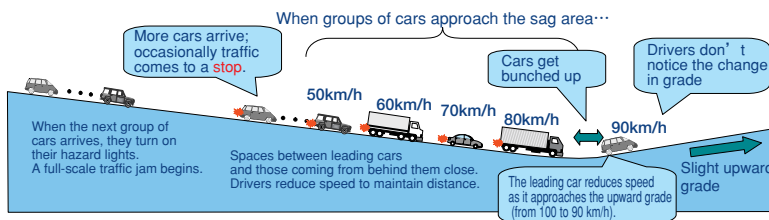
Number of toll plazas equipped to handle ETC nationwide: 1,276 (as of March 2007)

## Eliminating unnoticed causes of congestion through information supply (using LED signs to restore speed)

As a measure to combat congestion on upward grades and sag\* areas on expressways, LED signs are being used to display information that encourages driver awareness of driving slowdowns. This action is intended to restore speeds and alleviate congestion.



Congestion countermeasures based on supply of information on speed restoration

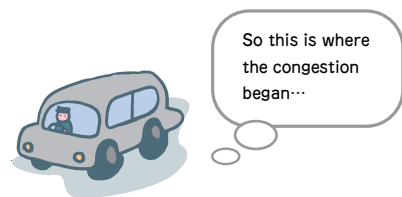


Source : Prepared from materials of the National Institute for Land and Infrastructure Management, MLIT

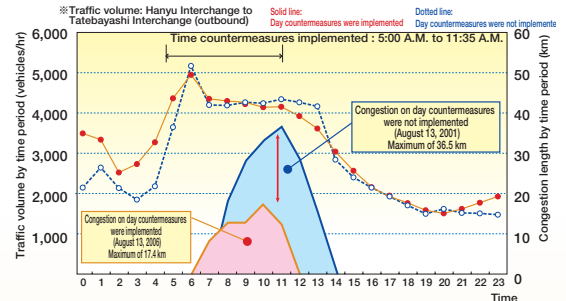
※) Sag : This refers to areas where a downward grade on a road changes into an upward grade. Traffic congestion often occurs at sags.

**Effect** Traffic speed improves by approximately 10 km/h, reducing congestion by half

Using LED sign cars to display information improves traffic speed near the point of the congested by 10 km/h and reduces congestion by half. (\*Tests were conducted near the Hanyu Parking Area on the outbound side of the Tohoku Expressway and near the Hanazono Interchange on the inbound side of the Kan-Etsu Expressway.)



Traffic congestion between the Iwatsuki Interchange and Tateyama Interchange on the Tohoku Expressway (outbound)



Source : Prepared using materials of East Nippon Expressway Company

## Supplying information that encourages appropriate lane use is expected to reduce congestion

In sag areas, drivers tend to use passing lanes as traffic volume increases. This can lead to traffic congestion as highly dense vehicle groups often form in these lanes. Based on this, a simulation was run to see what would happen if drivers were provided with information that encouraged them to use lanes appropriately in sag areas. Then the effect that such information had in decreasing congestion was calculated.

~ Example of supplied information ~  
Information that encourages drivers to move to left-hand lanes  
"Help us prevent traffic congestion, Please move to the left-hand lanes."

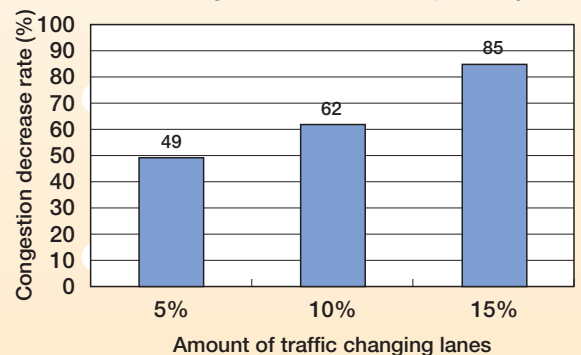


### When 10% of traffic volume changes lanes

- ◆ The rate of reduction of average congestion time when congestion conditions (0 to 5 km.h) occur is 62%.
- ◆ When the effect of reduced congestion is converted into a monetary amount for all sag areas of interurban expressways in Japan, this amounts to 4.6 billion yen per year.

(\*Figures pertain to congestion occurring in sag areas of interurban expressways nationwide in 2006.)

Example of congestion decrease rates using the Yamato sag area of the Tomei Expressway



Source : Prepared from materials of the National Institute for Land and Infrastructure Management, MLIT



## 2. For the environment

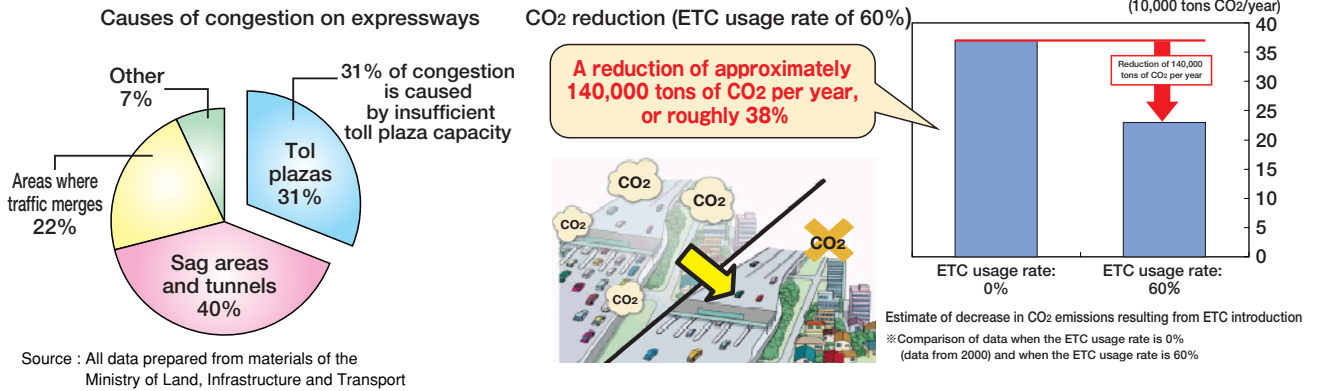
# Changing people's relationship with cars

Reducing CO<sub>2</sub> by increasing ETC use

### Effect of raising the ETC usage rate

**Effect** Increasing ETC usage will reduce CO<sub>2</sub> emissions by approximately 140,000 tons a year

Approximately 30% of all traffic congestion on expressways is caused by insufficient capacity at toll plazas. Use of ETC dramatically reduces congestion at toll plazas and helps prevent global warming and improve air quality.



Source : All data prepared from materials of the Ministry of Land, Infrastructure and Transport

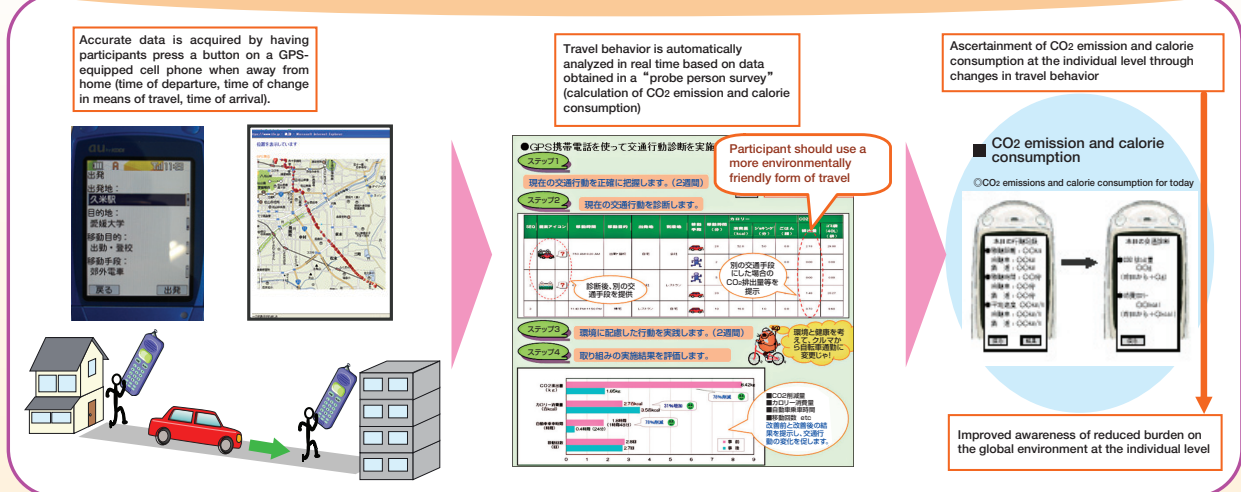
### Changing traffic behavior under the Travel Feedback Program (TFP) (Matsuyama City, Ehime Prefecture)

**Effect** A 26% per-capita decrease in CO<sub>2</sub> emissions

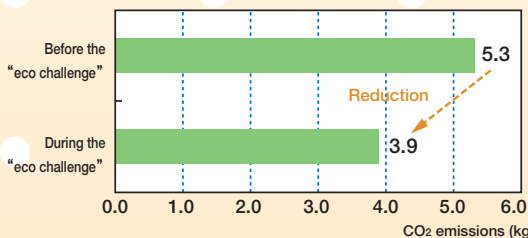
A Travel Feedback Program (TFP; a program to review travel behavior) was implemented in Matsuyama City. This program was a practical exercise toward raising participants' awareness of CO<sub>2</sub> emissions by showing them how much they reduce such emissions by changing their travel behavior at an individual level. Following commencement of the TFP as an "eco challenge" project in 2006, an analysis of traffic behavior revealed that the 63 TFP participants attained a per-person CO<sub>2</sub> emission reduction of approximately 26%.

Changing behavior by giving people information (changing departure times, using public transport, using bicycles, etc.)

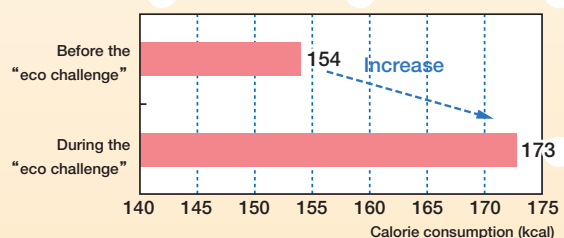
"Probe person" survey using GPS-equipped cell phones → analysis of travel behavior → proposals for other means of travel (TFP)



CO<sub>2</sub> emission trends



Calorie consumption trends



Source: Prepared from materials of the Matsuyama Rivers and National Roads Office, Shikoku Regional Development Bureau, MLIT



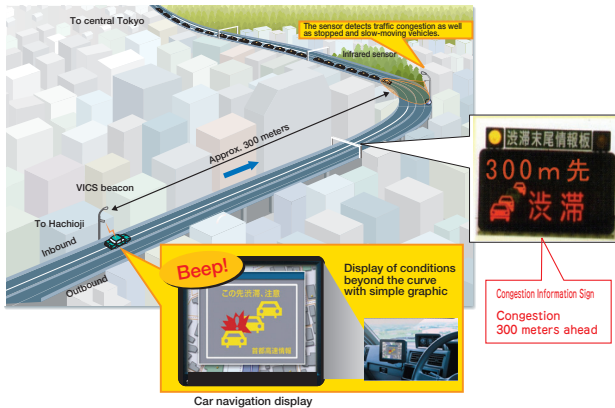
### 3. For safety

## Assisting drivers by providing information ahead of time

Providing real-time, easy-to-understand information that drivers need to drive safely

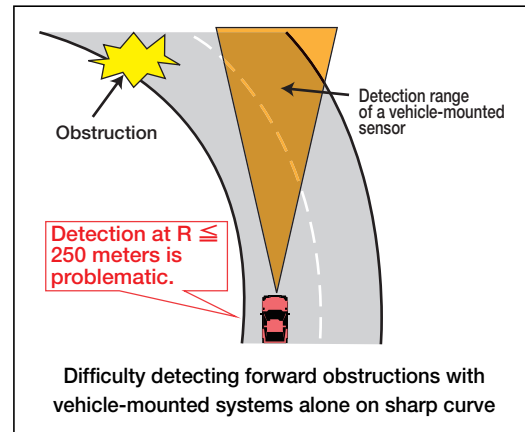
### Realizing a society with the world's safest and securest road traffic (introduction of AHS at Sangubashi, Tokyo)

Of all accidents on the Metropolitan Expressway, 21% occur on accident-prone curves (6% of the entire expressway length). Since March 2005, the Ministry of Land, Infrastructure and Transport has been responding by implementing a "pilot program on road-car harmonization systems" in the Sangubashi curve section of the Metropolitan Expressway Route 4 Shinjuku Line (inbound) as an AHS (Advanced Cruise-Assist Highway System) service.



Outline of services provided in the pilot program

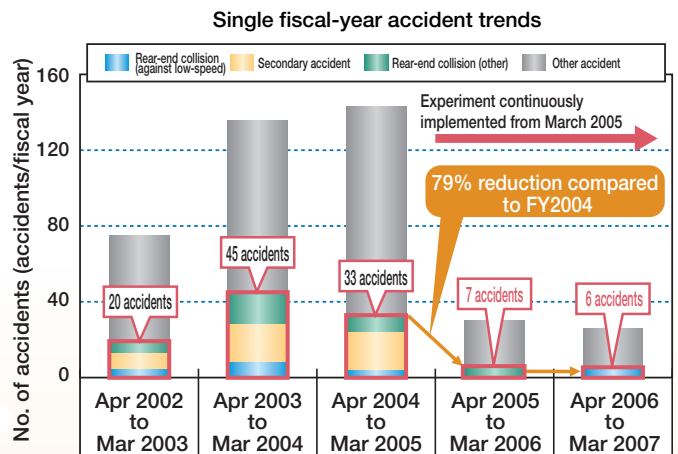
Source : Prepared from materials of the Ministry of Land, Infrastructure and Transport



#### Effect The number of rear-end collisions and accidents caused by forward obstructions fell nearly 80% compared to the previous year.

Accidents targeted by the service (rear-end collisions and secondary accidents\* caused by forward obstructions) fell significantly to just seven over the one-year period of FY2005 (a fall of 79% compared to the previous fiscal year\*\*). A similar low rate has continued ever since trial application of the service began.

※1 Here, accidents that occurred within 60 minutes (average amount of time required to clear an accident on the Metropolitan Expressway) of the initial accident (primary accident) are considered secondary accidents.

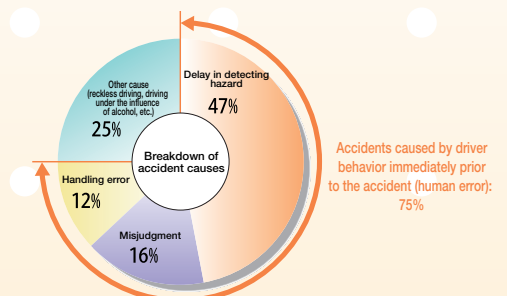


Source : Prepared from materials of the Ministry of Land, Infrastructure and Transport

※2 Includes other equivalent effects, such as repaving.

#### ◆AHS (Advanced Cruise-Assist Highway System) is effective in roughly 80% of accidents

Accidents caused by driver behavior immediately prior to the accident (i.e., human error) account for 75% of all accidents. AHS—which provides information, warnings, and operational assistance to drivers—is effective in these situations and can thus significantly reduce accidents.



Sources : "Statistical data on traffic accidents in fiscal 2000" Prepared by Institute for Traffic Accident Research and Data Analysis

Lack of preparedness is our greatest enemy. Let's keep our wits about us.



### Feature


#### ■An example of overseas application

The Western Transportation Institute and Montana State University Bozeman conducted a survey to evaluate the effectiveness of a curve-speed warning system that was installed on five curves on Interstate 5 in a mountainous region of northern California. This system warned drivers when they were approaching curves with signs, and it used radar to measure actual speed for relay to drivers using dynamic road signs. The survey compared the speeds of passing vehicles after installation of the system with speeds prior to installation. Results showed that, of the five locations at which the system was installed, the speed of trucks passing through the curve dropped by at least 5% compared to measurements taken prior to system installation at two locations. For the other three locations, as well, it was confirmed that installation of the system produced specific results.


(Mountainous region of northern California)

## Realizing safe road use during winter months using information from the Internet (Kita-no-Michi Navi; Hokkaido)

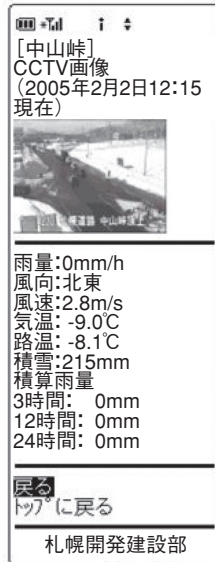
This system provides road information on mountain passes and other locations together with tourist information as a response to increasing numbers of tourists to Hokkaido who use rental cars to get around.



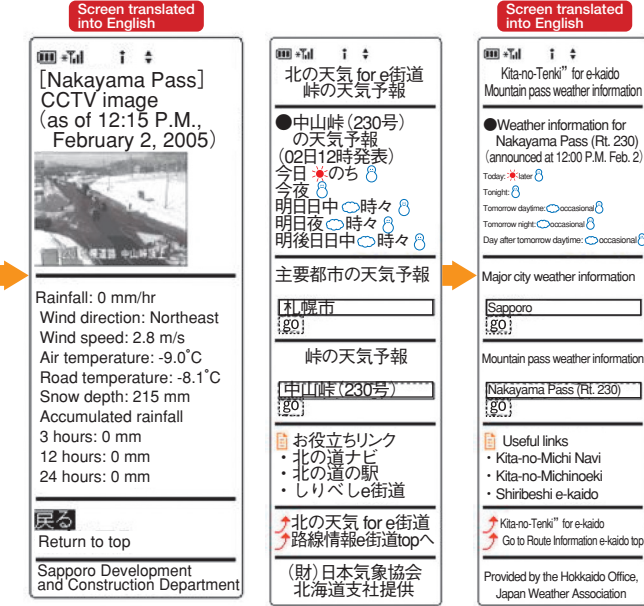
Screen for finding information on travel between tourist sites: "distance and time search"



Screen showing information for mountain passes (PC version)



Camera image screen (cell phone version)



Screen providing weather forecasts for mountain passes (cell phone version): "Kita-no-Tenki" for e-kaido

### Kita-no-Michi Navi site images

Source : Prepared from materials of the Public Works Research Institute (Civil Engineering Research Institute for Cold Region)

Being able to see images in real time really helps!



### Effect Supporting plans for driving on winter roads

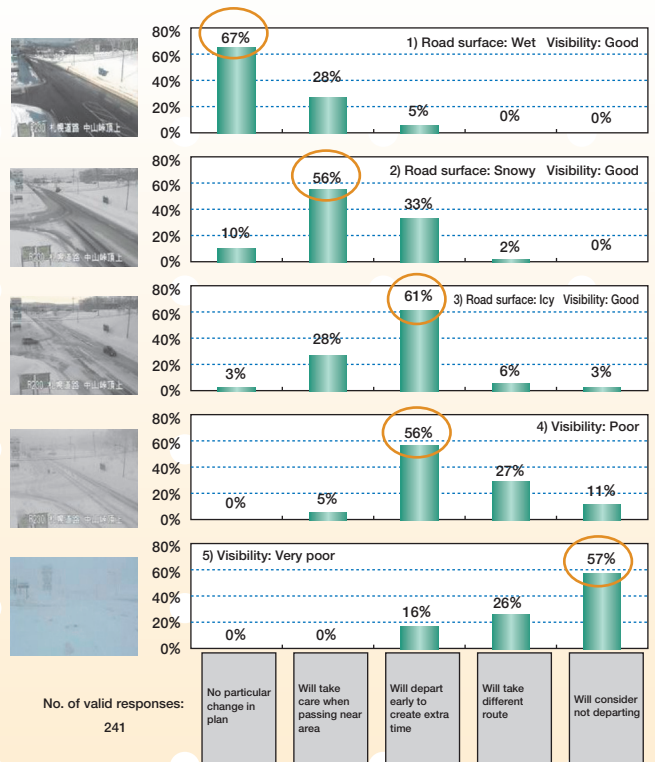
The results of a user questionnaire revealed that most people take safer action (alter driving plans, etc.) when they are able to obtain road images/information depicting snowfall, icing, and poor visibility.

Since the site started in 1999, it has been accessed some 5 million times (February 2007).

### Feature

#### An example of overseas application

A survey conducted by the Idaho Transportation Department found that, when weather-related warnings were displayed on changeable signs, the speed of passing vehicles decreased. When warnings for strong winds or snowfall on roads were displayed, vehicles moved at a speed of 35 mph (roughly 56 km/h), or 35% slower than the normal speed. On the other hand, when no changeable signs were used during similar poor weather conditions, vehicles moved at a speed of 45 mph (roughly 72 km/h), or 9% slower than the normal speed. (Idaho)

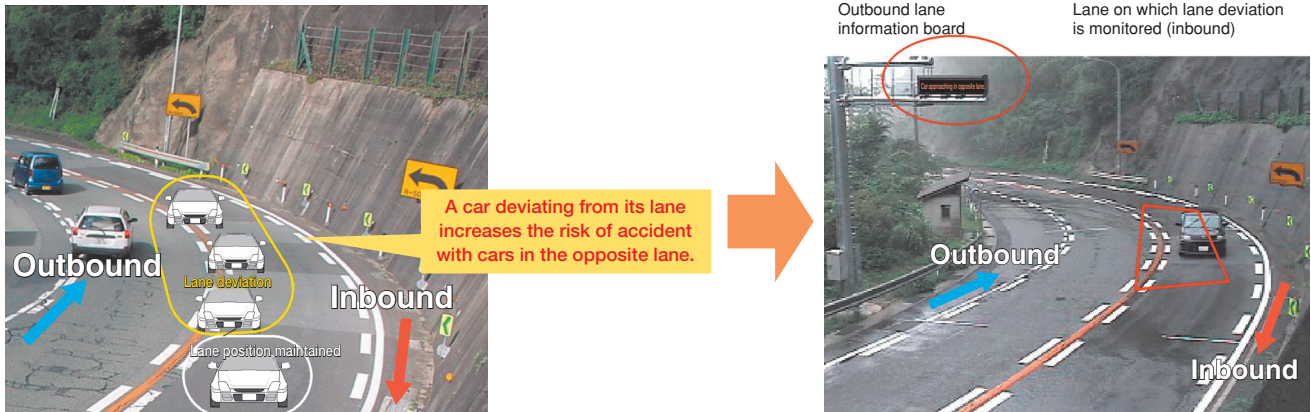


### Changes in behavior when road images/information obtained (From a Kita-no-Michi Navi user questionnaire conducted in the winter of 2004)

Source: Prepared from materials of the Public Works Research Institute (Civil Engineering Research Institute for Cold Region)

## Real-time hazard warnings using an information board (indication of approaching car in opposite lane; Yamaguchi Prefecture)

A service that displays information on approaching cars in the opposite lane on an information board is being provided on National Route 191 in the Sanmi district of Hagi City (service started in April 2005). If a car is approaching in the opposite direction, the board reads "Car approaching in opposite lane." If no cars are approaching, the board reads "Curve ahead. Drive with care."



Outline of experiment site

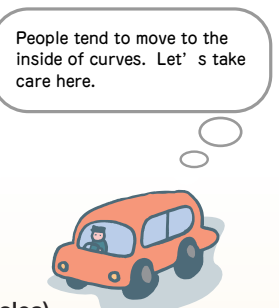
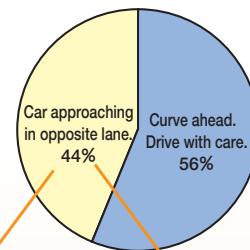
**Effect** Vehicle collisions are eliminated, and lane deviations are reduced by at least one half for both inbound and outbound lanes.

Notifying drivers in advance that cars are approaching in the opposite lane eliminated accidents and reduced hazardous vehicle behavior.

### Accidents are eliminated

Classification	Before implementation of service				After implementation of service (as of Jan. 17, 2006)
	1999	2000	2001	2002	April 2005 and after
Time period	1999	2000	2001	2002	April 2005 and after
No. of accidents	4	13	None	9	None

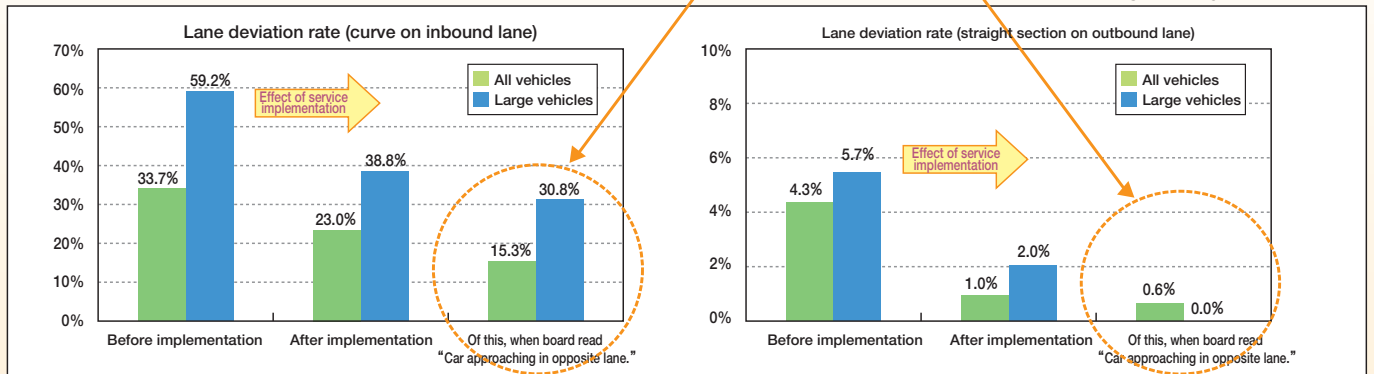
### Breakdown of display for opposite lane



(5 days × 3 hours<sup>※</sup>), total of 6,848 vehicles)

※ One-hour measurements taken in the morning, midday, and afternoon

### The lane deviation rate fell by at least one half for both inbound and outbound lanes.



Source : Prepared from materials of the Advanced Cruise-Assist Highway System Research Association

### Examples of overseas application

- In San Antonio, Texas, information boards interfaced with an accident control program were installed at locations along important expressway routes as part of ITS reform. Of the regions in which signs were installed, it was confirmed that delays were reduced by 5.7%, head-on collisions measured over the course of a year fell 2.8%, and the annual amount of fuel consumed fell 1.2% in specific model zones. (Texas)
- Road signs and other ITS facilities were installed on the John C. Lodge Freeway in Detroit, Michigan. The results of a simulation conducted based on data obtained from a field survey on vehicle speed and flow confirmed that average speed improved by 5.4 mph (approximately 9 km/h), average travel time was shortened by approximately 4.6 minutes, and delays caused by traffic congestion were reduced by a maximum of 22% after these ITS facilities were installed. (Michigan)

COLUMN  
**Feature**



## Real-time hazard warnings using an information board (device to prevent wrong-way travel; Oita Prefecture)

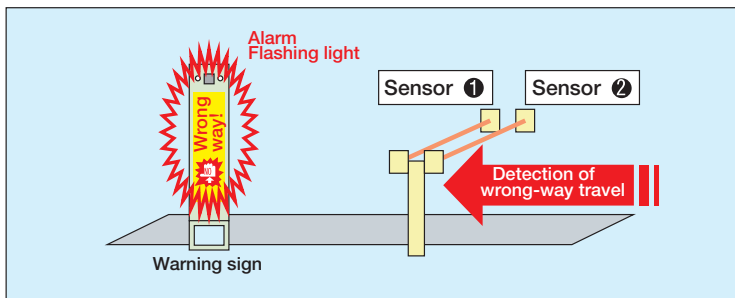
A test on the use of sensors to detect cars traveling in the wrong direction and on the use alarms and flashing lights to immediately warn wrong-way drivers was conducted at the Yamada Service Area (outbound) on the Oita Expressway.

**Effect**  
Two cars traveling in the wrong direction were detected during the 32-day test period.

Detection of wrong-way vehicles (during the 32-day test period)

Date of detection	Time	Description of wrong-way driving	Vehicle type	Remarks
March 7 (Mon.)	3:17 P.M.	Entered driving forward	Ordinary passenger car	Car stopped and reversed
March 25 (Fri.)	12:33 P.M.	Entered driving forward	Ordinary passenger car	Car stopped and reversed

Source : Prepared from materials of West Nippon Expressway Company (NEXCO)



Source: Prepared from materials of West Nippon Expressway Company



Warning sign (reflective type)

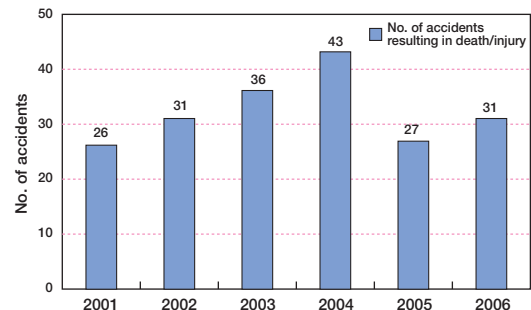
Outline of the test system (implemented from February to March 2005)

### Wrong-way driving on expressways and other such roads is extremely dangerous!

For example, of the 27 accidents resulting in death or injury that occurred in 2005, 13 (approximately 48%) involved fatalities.



Number of wrong-way accidents resulting in death or injury on national expressways or vehicles-only roads connecting to national expressways



## Efforts by various countries to support safe driving

### Smartway (Japan)

The Ministry of Land, Infrastructure and Transport is striving to realize the world's safest and securest road traffic through Smartway, a service that utilizes ITS units installed in vehicles.

A public-road test of this system was conducted on the Metropolitan Expressway in 2007. This test was conducted with an eye to practical application of a safe-driving support system using image and voice guidance. Implementation of this service is scheduled to begin during fiscal 2007.

**Assistance in merging**

Beep! Watch for merging cars ahead.

**Information on forward obstacles**

Beep! Traffic congestion ahead. Please drive with care.

Source: Prepared from materials of the Ministry of Land, Infrastructure and Transport  
<http://www.smartway2007.jp/>

### Vehicle Infrastructure Integration (VII) (United States)

Plans call for the implementation of an actual road test of the US's VII system in the suburbs of Detroit in 2007. A decision on whether infrastructure should be built will be made based on the results of this test in 2010.



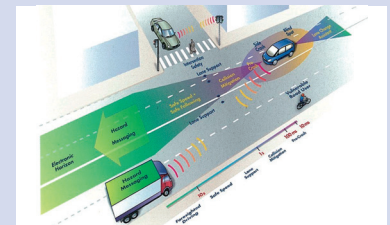
Outline of the actual-road test scheduled for implementation in suburban Detroit

Source : Prepared from US VII materials

### PREVENT (Europe)

This name applies to a group of joint public-private R&D projects that are being implemented in Europe for accident prevention.

A large-scale demonstration based on the results of R&D conducted thus far was held in suburban Paris (Versailles) in September 2007.



Outline of an accident-countermeasure system to promote R&D in PREVENT

Source : Prepared from display materials of ERTICO PREVENT



## 4. Approaches matched to regional needs

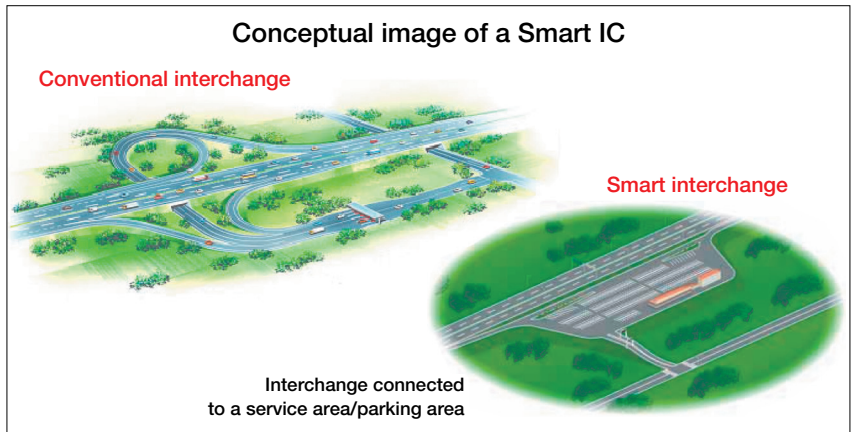
Providing information and infrastructure that is closely tied to the community

Moving people easily and conveniently to create a vibrant community

### Large expectations for regional vitalization (use of "smart interchanges" [Smart IC])

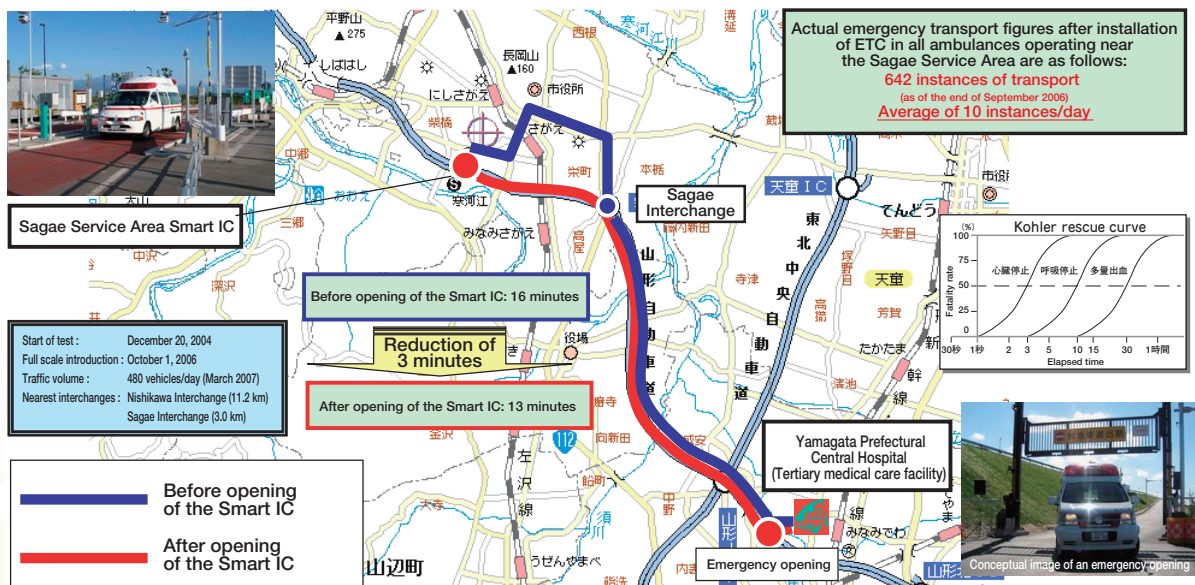
Smart ICs are interchanges that make reduced manpower and traffic dispersal possible through the use of ETC (electronic toll collection). Because they require less construction and management costs, they make it easier to build additional interchanges.

Even if only direct benefits (shortened travel time, etc.) are considered, estimates show that the benefit to regional society to be obtained from building more interchanges nationwide would reach 3 trillion yen. An even more substantial effect can be expected if regional economic effects are also included.



#### (1) Support for rescue and medical activities (Saga Service Area Smart IC on the Yamagata Expressway, Yamagata Prefecture)

**Effect** A three-minute reduction in time required to transport patients to an advanced medical facility



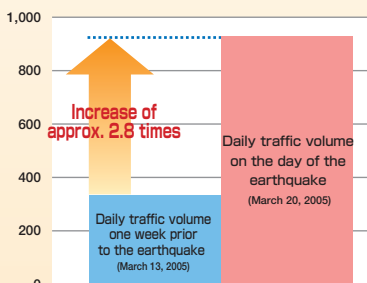
Source : Prepared from materials of the Ministry of Land, Infrastructure and Transport

The average daily number of vehicles using the interchange is approximately 480 (March 2007), which is 3.2 times the initial average.

#### (2) Contribution to traffic dispersal during disasters and emergencies (Sue Smart IC on the Kyushu Expressway, Fukuoka Prefecture)

**Effect** Use of Sue Smart IC grew approximately 2.8 times compared to normal periods, which helped disperse traffic.

When the Fukuoka Seiho-oki Earthquake Struck on March 20, 2005, the Smart IC at Sue Parking Area was used as an emergency exit due to traffic congestion at the exits of Fukuoka Interchange and Dazaifu Interchange.



Change in traffic volume at the Sue Parking Area Smart IC due to the earthquake

Source : Prepared from materials of the Ministry of Land, Infrastructure and Transport

Having interchanges close by makes travel much more convenient.



Feature

#### An example of overseas application

According to a report prepared when a team participating in the Federal Highway Administration's International Technology Exchange Program made an overseas tour, a real-time parking lot information service is being introduced into the urban districts of several major European cities. This service measures the number of cars that enter and exit parking lots and then provides information on usable parking lots to drivers based on these measurements. It is confirmed that, in areas in which the service has been introduced, traffic volume in urban districts has been reduced by as much as 25%. Moreover, these areas are also seeing improved transport flow and increased use of park-and-ride systems. (Europe)

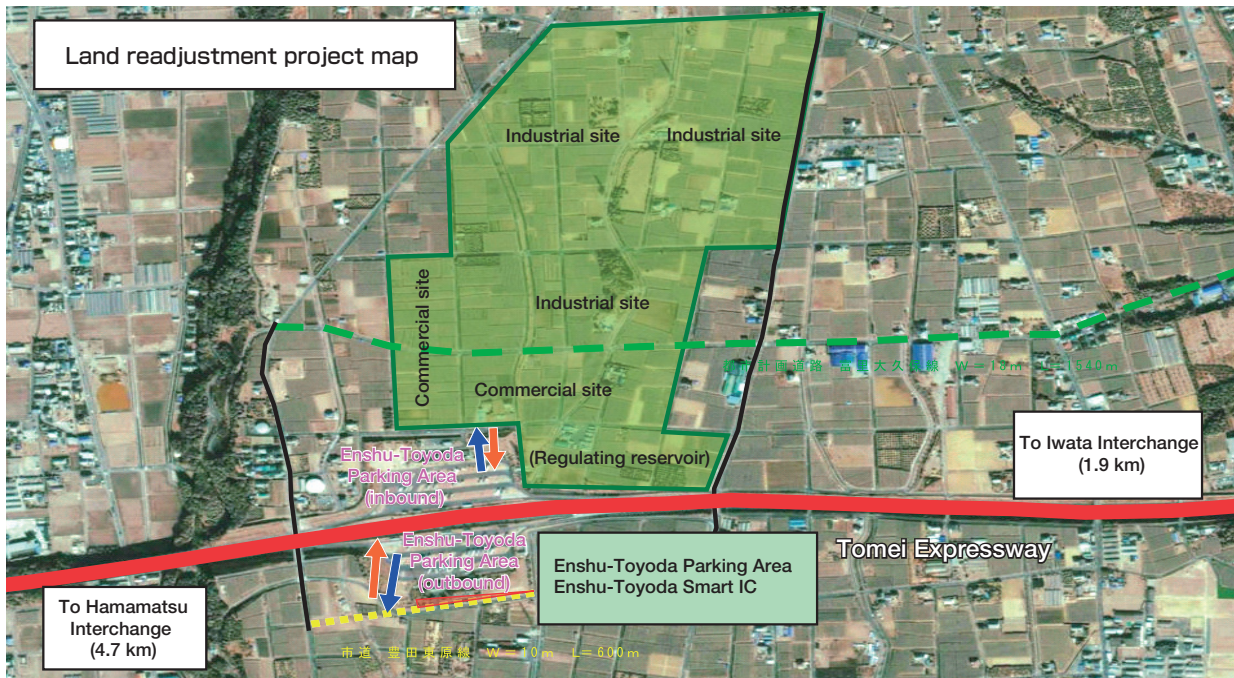
(3) Expectations for creation of employment (Enshu-Toyoda Smart Interchange on the Tomei Expressway, Shizuoka Prefecture)



Regional vitalization by attracting development around a Smart IC

In January 2005, a pilot program involving a Smart IC was commenced on both inbound and outbound sides of the Enshu-Toyoda Parking Area on the Tomei Expressway. This program was moved to full-scale implementation in April 2007.

- ◆ A decision was made to attract 13 companies operating factories and other facilities, one large commercial facility, and one accommodations facility to a land readjustment project near the Smart IC.
- ◆ It is expected that this will create jobs for some 2,700 people.



Source : Prepared from materials of the Ministry of Land, Infrastructure and Transport

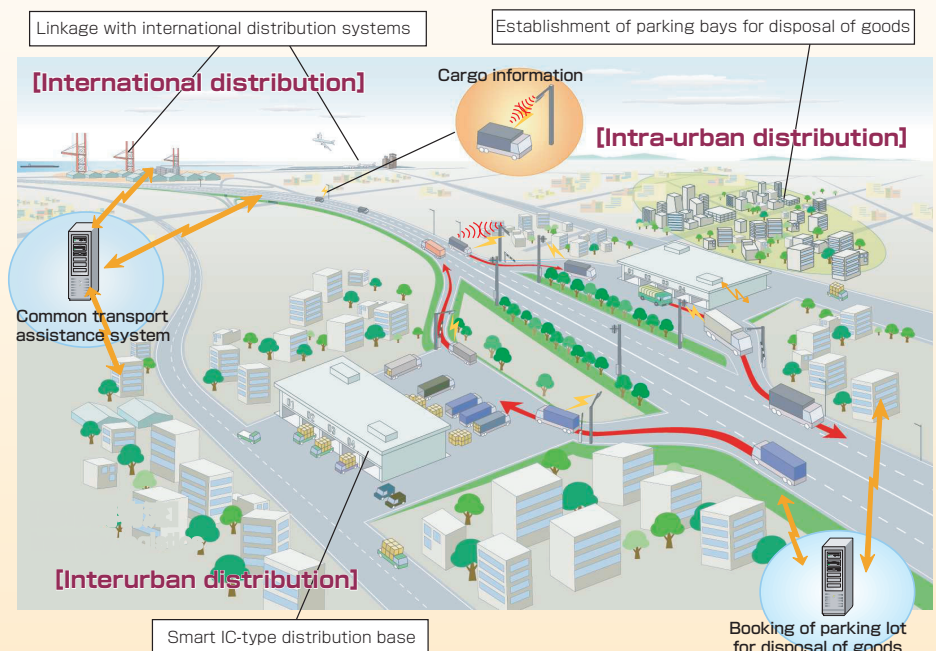
Efficient distribution systems (overseas examples)

Feature

Examples of overseas application

- A 15% increase in productivity after introduction of a vehicle location system  
Trimble of the United States developed a GPS/AVL system that can shorten the response time of public services by 45 seconds. Distributing businesses that use this system have succeeded in increasing their productivity by 15% and in lowering their operating expenses by approximately 10%.
- Use of a truck tracking system increases cargo volume by 15%  
Bilspeidation Transport & Logistics (BTL) of Europe (Scandinavia) uses a GPS-based vehicle tracking system that uses remote-accessed computers installed in vehicles to improve productivity in southern and central Sweden. During the time that this system was introduced from 1994 to 1997, success was achieved in eliminating unnecessary movement and reducing fuel costs. This success resulted in a 15% increase in cargo volume.

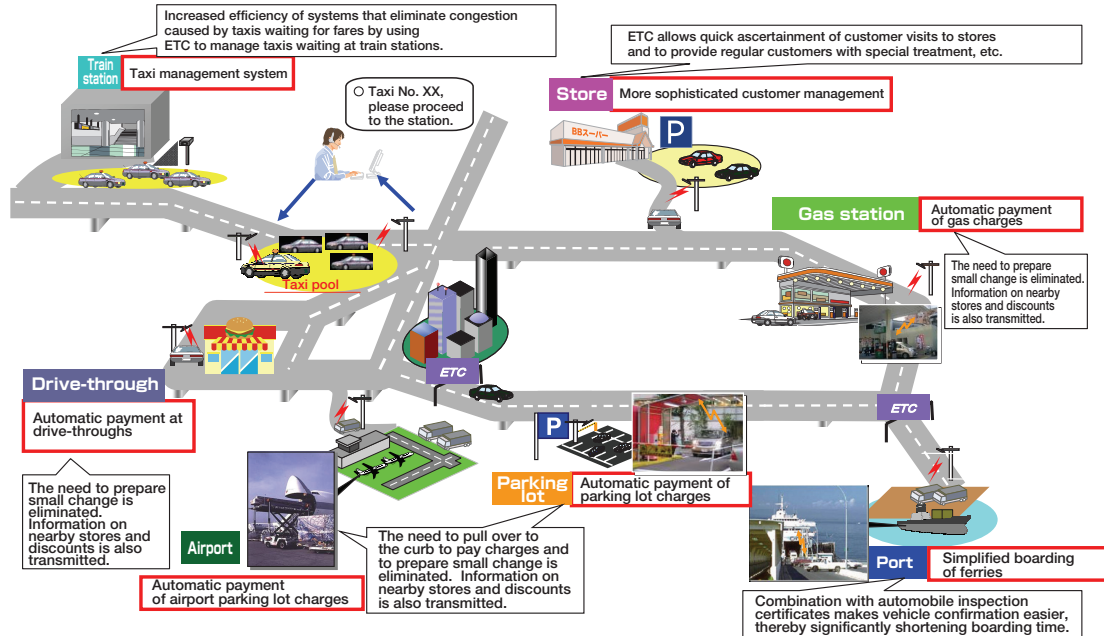
Working to raise expressway utilization rates through support for increased transport efficiency using information technology, and to realize an efficient and environment-friendly distribution system



Source : Prepared from materials of the Ministry of Land, Infrastructure and Transport

## Broad-ranging application, from parking lots to ferries (multipurpose use of ETC)

Beginning in April 2006, private-sector businesses and others have been permitted to offer services that include parking-lot fee collection using vehicle-mounted ETC devices.

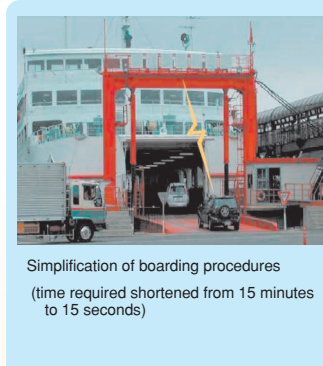


Source : Prepared from materials of the National Institute for Land and Infrastructure Management, MLIT that were commissioned by the Japan Society of Civil Engineers

### Application of ETC technology

#### Effect Less time needed for ferry boarding procedures

Beginning in April 2006, even private-sector businesses have been providing payment services using ETC. For example, ETC was introduced into boarding procedures for a car ferry running between Kobe and Takamatsu, thus greatly simplifying these procedures. Other services being offered include those for payment of charges at gas stations and privately-run parking lots, and those that provide information through linkage with cell phones.



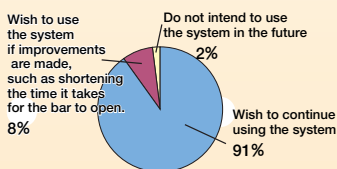
Source : Prepared from materials of the Ministry of Land, Infrastructure and Transport

#### Ninety-six percent of monitors rated use of ETC at the Sakurabashi Parking Lot as convenient (Osaka Prefecture)

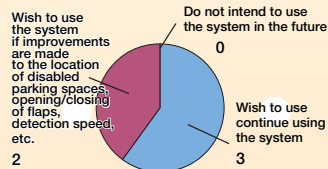
A monitor questionnaire conducted in FY2006 revealed that approximately 96% of respondents viewed use of ETC as convenient, and that approximately 91% hoped to continue using the test system. Moreover, physically disabled monitors said that the service provided them with peace of mind and convenience, as parking spaces for the disabled were not taken up with vehicles of non-disabled people.

#### Expectations for parking-lot ETC systems

- ◆ 91% of monitors hoped to see the parking-lot ETC system continued
- ◆ Three in five disabled monitors wished to continue using the disabled-parking guidance system

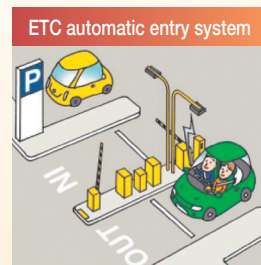


Regarding the parking-lot ETC system (No. of samples: 129)



Regarding the disabled-parking guidance system (No. of samples: 5)

Source : Prepared from materials of the Kinki Regional Development Bureau, MLIT



<Ordinary periods>  
 • Flap is raised  
 • No parking is allowed when the flap is in this position



<When used>  
 • Flap is lowered  
 • Parking is permitted when the flap is in this position



➤ ETC pilot program conducted by the Kitaichijo Underground Parking Lot (Hokkaido)

Because linking vehicle-mounted ETC devices with credit cards has made automatic payment possible, entering and exiting from parking lots can occur more speedily.

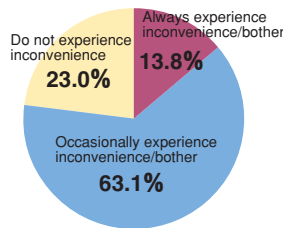


When entering	When exiting
<ul style="list-style-type: none"> <li>Time required shortened to roughly one-half or less compared to ordinary vehicles and regular users.</li> <li>Time required shortened to roughly one-third even when cars wait ahead</li> </ul>	<ul style="list-style-type: none"> <li>Time required shortened to roughly one-third compared to ordinary vehicles</li> <li>Time required shortened to roughly one-half compared to regular users</li> <li>Time required, shortened to one-eighth or less compared to "general users who pay with parking stub + discount ticket + payment"</li> </ul>

**Parking lot use during winter**

According to a survey, nearly 80% of respondents experience inconvenience when using parking lots in Sapporo during the winter. When asked why, more than 60% answered that "snow gets in the car when opening car windows."

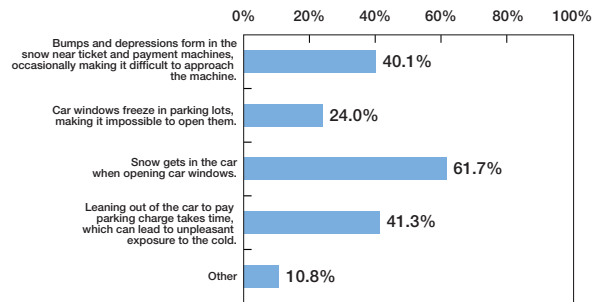
Use of parking lots in Sapporo during the winter



Note : Based on a monitor questionnaire (221 respondents as of March 15, 2007)

Source : Prepared from materials of the Hokkaido Regional Development Bureau

Reasons use of parking lots in Sapporo during winter is inconvenient/bothersome



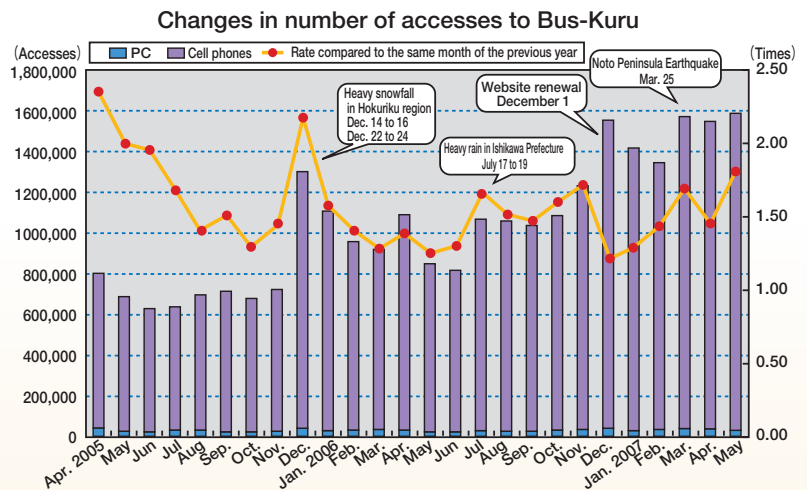
**Improving the convenience of public transport**

**Kanazawa City bus location system (Bus-Kuru) (Ishikawa Prefecture)**

**Effect** Accesses for bus information number roughly 27,000 per day.

Information on route buses near Kanazawa and express buses (information on approaching buses and real-time information on bus operation) is provided through personal computers and cell phones.

- ◆ For all of FY2006, the number of accesses numbered approximately 9.87 million (an average of roughly 27,000 per day).
- ◆ Accesses from cell phones make up a large majority.



Source : Prepared from materials of the Kanazawa Rivers and National Roads Office, Hokuriku Regional Development Bureau, MLIT

**Maebashi City bus location system (Gunma Prefecture)**

**Effect** A roughly three-fold increase in the number of users compared to the beginning of operation

The Maebashi bus location system allows users to obtain operational information on specific bus routes that pass through the city center using their cell phones. The system also provides information on a special screen for personal computers via the Internet. This screen supplies not only the same information available via cell phones but also bus schedules as well.

◆ 97% of users wish to continue using the system

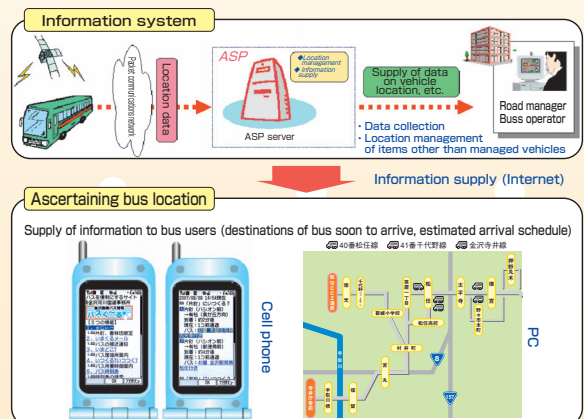
**Number of bus location system users**

Approx. 4,000 users/month in July 2003 → approx. 14,000 users/month in December 2005

The "approximately 540 users/day" during rainy periods is 2.3 times higher than the "approximately 230 users/day" during sunny periods.

**Desire for continuance**




- 97% of users wish to continue using the system
- 43% of non-users indicate they "wish to try the system in the future"

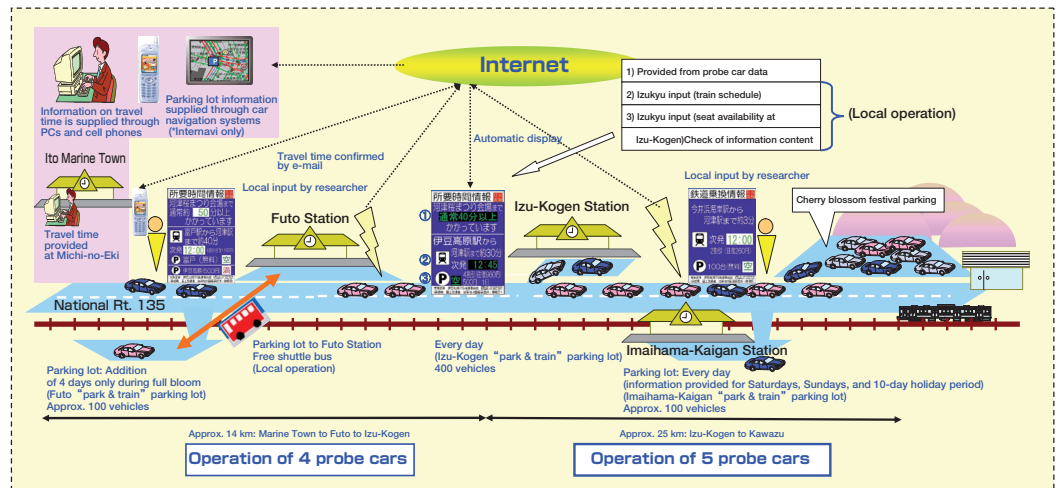


Source : Prepared from materials of the Takasaki Rivers and National Roads Office, Hokuriku Regional Development Bureau, MLIT

## Making access to sightseeing locations easier through supply of information (This Izu Navi; Shizuoka Prefecture)

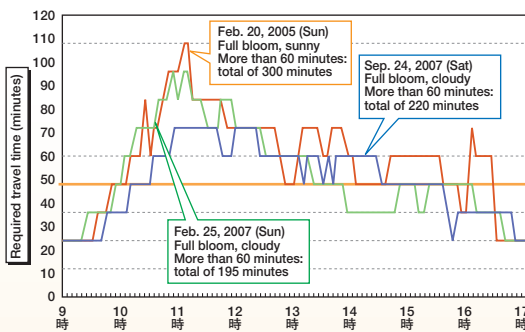
Beginning with information during peak periods for cherry-blossom viewing and beach visits, this service provides a broad range of information that covers road restrictions, traffic congestion, weather, transfers on public transport systems, required travel time, and other items.

-  Local information board (Futo, Izu-Kogen, Imaihana-Kaigan)
-  Large-screen TV at Michi-no-Eki: Izu Marine Town
-  This Izu Navi (personal computers and cell phones)

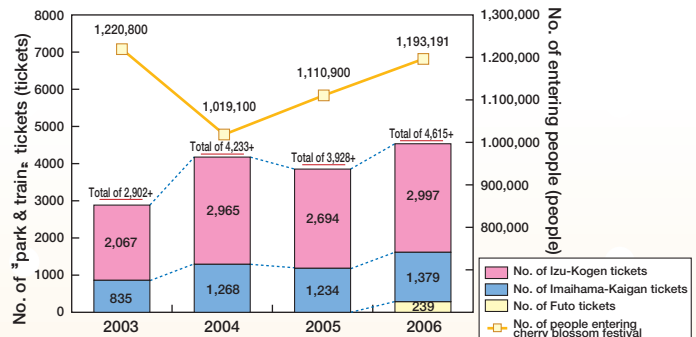


**Effect** Effect of shortening travel time through information supply: 24.6 million yen over 4 days

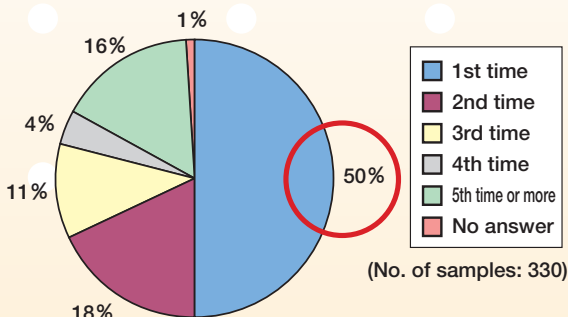
**Effect** Time periods over 60 minutes included one for 300 minutes → Shortened to around 200 minutes



Shortening of travel time between Izu-Kogen and Kawazu



No. of tickets sold



Breakdown of respondents' number of visits to the Kawazu cherry blossom festival using "park & train"



Getting more information makes things easier.

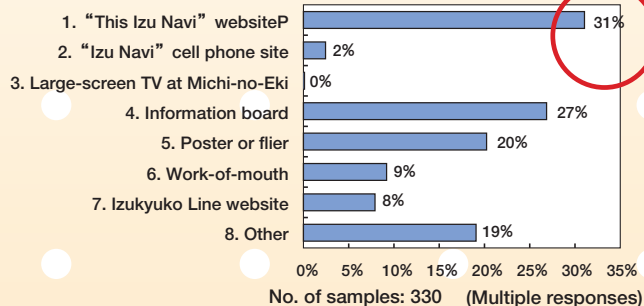
Relationship between characteristics of "park & train" users and Izu Navi

Source : All data prepared from materials of the Numazu Rivers and National Roads Office, Chubu Regional Development Bureau, MLIT

### ◆ Effect of This Izu Navi on transport decisions

[People who had decided from the beginning to use "park & train"]

- 50% were coming to the Kawazu cherry blossom festival for the first time
- Many of these people used This Izu Navi



## Examination of feasible systems using grass-roots ITS (Kochi Prefecture)

Low-cost, highly feasible ITS are being introduced into Kochi Prefecture under the name “grass-roots ITS.”

1

### Test of a regional bus information system



Display of the current time together with the times buses passed the two previous bus stops

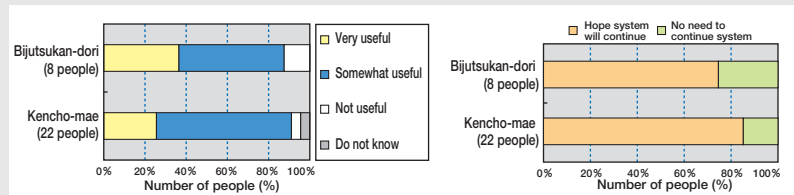
#### Test results



### A “regional bus information system” currently implemented as a pilot program

A “regional bus information system” was developed that, by providing information on the times that buses pass at bus stops, allows users to determine whether or not a scheduled bus has already gone by. This system was then placed in actual operation on a trial basis at bus stops.

When asked if they thought the system is useful, more than 80% of users said it is “very useful” or “somewhat useful.” Moreover, roughly 80% of users expressed a desire to continue using the system.



Do you think the system is useful?

Users hoping to see system continued

2

### System warning of cars approaching from the opposite direction



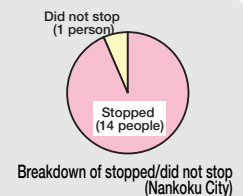
#### Test results



### Driving support system for mountainous roads

On auxiliary arterial roads in mountainous regions that have comparatively little traffic, there are many narrow sections where vehicles become involved in passing accidents or have difficulty getting around each other. For such roads, an inexpensive system that warns of cars approaching from the opposite direction was developed and installed at various locations as part of efforts to improve roads having 1.5-car widths. Two devices were installed in Kochi Prefecture in FY2004, and seven were installed in FY2005.

Of 228 sample vehicles obtained in Nankoku City, 15 vehicles passed system devices as other vehicles approached from the opposite direction; of these, 14 stopped and waited for the other vehicle to pass. From this, it can be said that, at least in Nankoku City, the system encourages drivers to stop.



3

### Regional pedestrian ITS

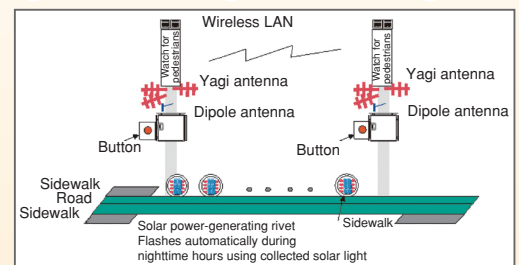


#### Test results



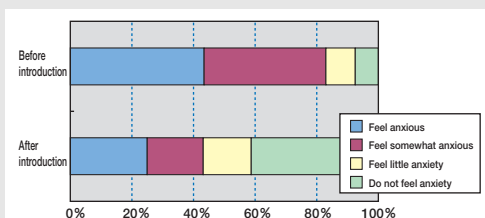
### Regional pedestrian ITS

A system was developed to warn drivers of the presence of returning schoolchildren in sections where no sidewalks or other pedestrian facilities exist.



Outline of a pedestrian warning system in mountainous areas

After introduction of this system, anxieties drivers have when they encounter pedestrians and bicyclists were reduced dramatically. Changes in degree to which hazard is perceived when drivers encounter pedestrians and bicycles (questionnaire survey of drivers)



## ● ITS-related websites ●

### <Government and public office>

Ministry of Land, Infrastructure, Transport and Tourism  
[http://www.mlit.go.jp/road/road\\_e/index\\_e.html](http://www.mlit.go.jp/road/road_e/index_e.html)

### **ITS Homepage of the Road Bureau, MLIT**

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<http://www.mlit.go.jp/road/ITS>

National Institute for Land and Infrastructure Management, MLIT  
<http://www.nilim.go.jp/english/eindex.htm>

### <Related organizations>

Japan Institute of Construction Engineering (JICE)  
[http://www.jice.or.jp/itschiiki-j/en\\_top/index.html](http://www.jice.or.jp/itschiiki-j/en_top/index.html)

Organization for Road System Enhancement (ORSE)  
<http://www.orse.or.jp/english>

Highway Industry Development Organization (HIDO)  
[http://www.hido.or.jp/ITSHP\\_e/](http://www.hido.or.jp/ITSHP_e/)

Advanced Cruise-Assist Highway System Research Association (AHSRA)  
[http://www.ahsra.or.jp/index\\_e.html](http://www.ahsra.or.jp/index_e.html)

ITS Japan  
<http://www.its-jp.org/english>

Vehicle Information and Communication System (VICS) Center  
<http://www.vics.or.jp/english/index.html>

### ITS information service

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<http://www.jice.or.jp/itslist-je/index.html>

(In general, updated information of the ITS website is delivered to registered people twice monthly.)