



ITS Enter the Second Stage

Smart Mobility for All



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1. Development of ITS

1. Development of ITS

(1) Current Situation of ITS



- ITS services are emerging in Japan and rapidly becoming widespread.
- IT-related services are also becoming a widely accepted part of everyday life.

Car navigation systems	1994: Widespread use	2000: Cumulative total of 5 million units shipped	2004: 3 million units shipped per year, cumulative total of 14.5 million
VICS (Vehicle Information and Communication System)	1996: Services begun		2003: 80% of vehicles equipped for VICS
ETC (Electronic Toll Collection)		2001: Services begun	May 2004: 3 million vehicles equipped, 18.4% utilization rate
ASV (Advanced Safety Vehicles)	World's first practical application of adaptive cruise control (ACC) in 1995	1999: Brake controls (to maintain following distance)	2001: Steering wheel controls (to support lane keeping) 2003: Brake controls (to reduce collision damage)
Telematics	First commercially released in 1997 (first-generation telematics)		2002: Second-generation telematics
Probe cars		2000: Testing in Tokyo	2003: Nationwide system deployment
Bus location systems		1999: Rapid spread of GPS	January 2004: Over 70 operators participating
Cell phones	Widespread use since 1996	January 2001: Availability of cell phones with GPS	January 2004: Over 80 million subscribers
Electronic money		1998: Contactless IC cards introduced by bus operators 2001: Suica introduced by East Japan Railway Company, Edy services begun	April 2004: 14 million cards in Japan
Web information		2000: Full-scale road traffic information services by the private sector	February 2004: Private companies offering services for various media

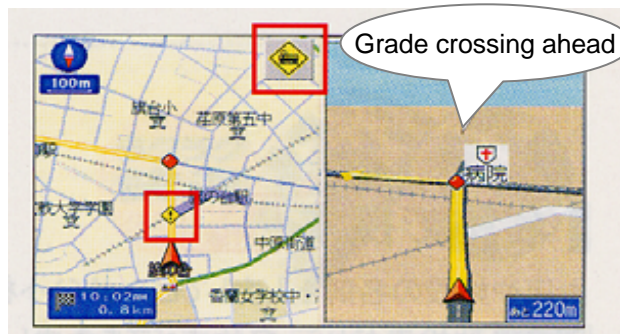
1. Development of ITS

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[Spread of car navigation systems]

- After car navigation systems began to be widespread in 1994, they have already become a common automotive tool.
- Additional functions to support safe driving have appeared in succession.
- Car navigation systems for foreign drivers are already on the market.

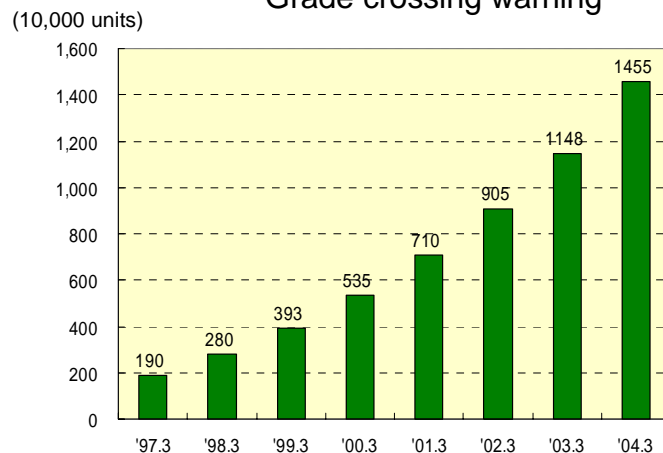


Grade crossing warning



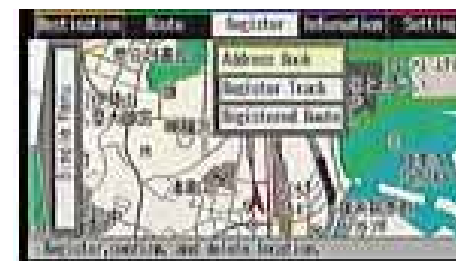
Curve warning

Source: Sony NVX-MV8100



Cumulative total of car navigation units shipped

Source: Web site of the Ministry of Land, Infrastructure and Transport



Car navigation system with English language option

Source: Nissan Xanavi DVD Navigation

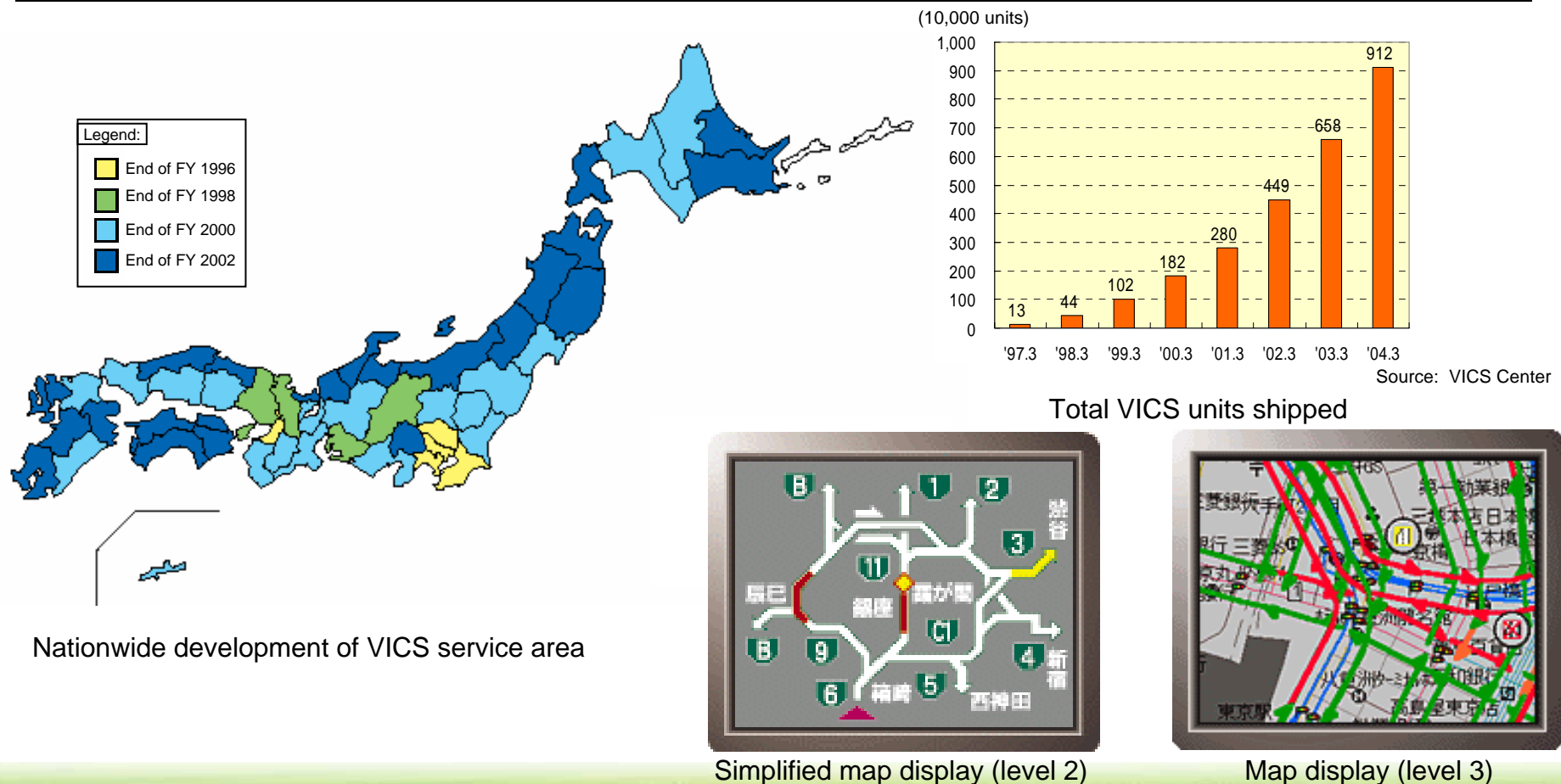
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[Spread of VICS]

- VICS (Vehicle Information and Communication System) started commercially in 1996. Over 9 million VICS units have been shipped.
- Over 80% of car navigation systems in new cars shipped in 2003 were equipped with VICS units. VICS units have become widespread as standard equipment.



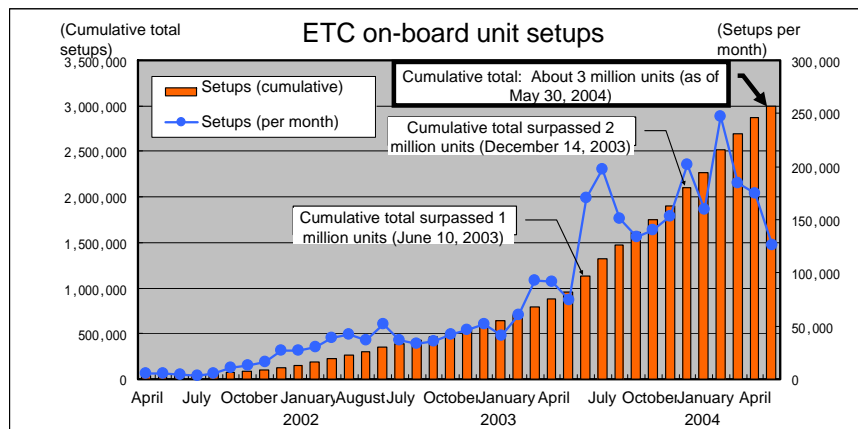
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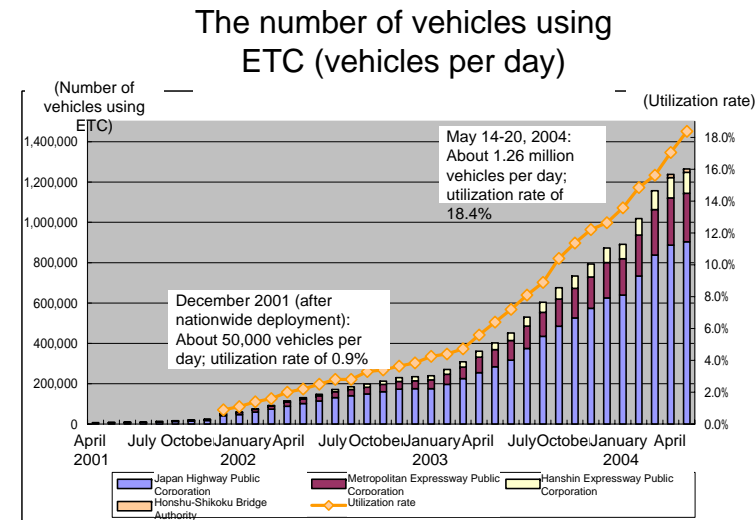


[Spread of ETC]

- The numbers of on-board units have increased rapidly since services commenced in 2001. By May 2004, the number of unit setups had already surpassed 3 million.
- ETC is used by 22% of vehicles and will be a standard automotive function in the near future.



ETC on-board unit setups



Trends in numbers of vehicles using ETC and utilization rate

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[Enhancement of Advanced Safety Vehicles (ASV)]

Note: Advanced Safety Vehicles are vehicles that use new technologies including electronic technologies for dramatically improved safety and comfort.

- ACC*(Adaptive cruise control) started commercially in 1995.
- Advanced technologies has become available since then, including steering wheel control to support lane keeping, and braking control to reduce collision damage.

* ACC is a technology that automatically adjusts the following distance in relation to the vehicle ahead.

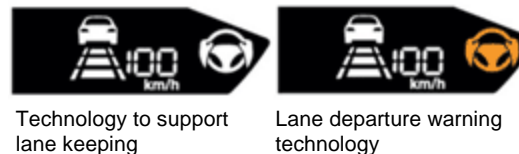


Example of technology to automatically adjust following distance using ACC

Source: Web site of Nissan Motor Co., Ltd.



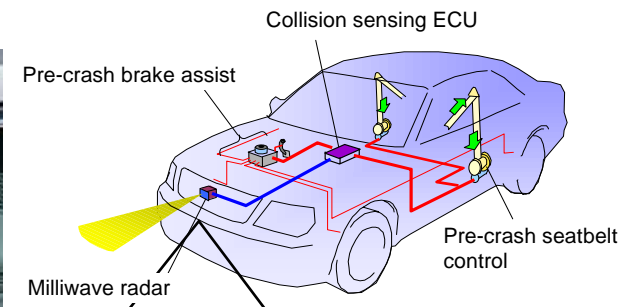
Lane departure warning and camera to support lane keeping



HMI displays

Example of technology for steering wheel control to support lane keeping

Source: Web site of Honda Motor Co., Ltd.



Example of technology for braking control to reduce collision damage

Source: Web site of Toyota Motor Corporation

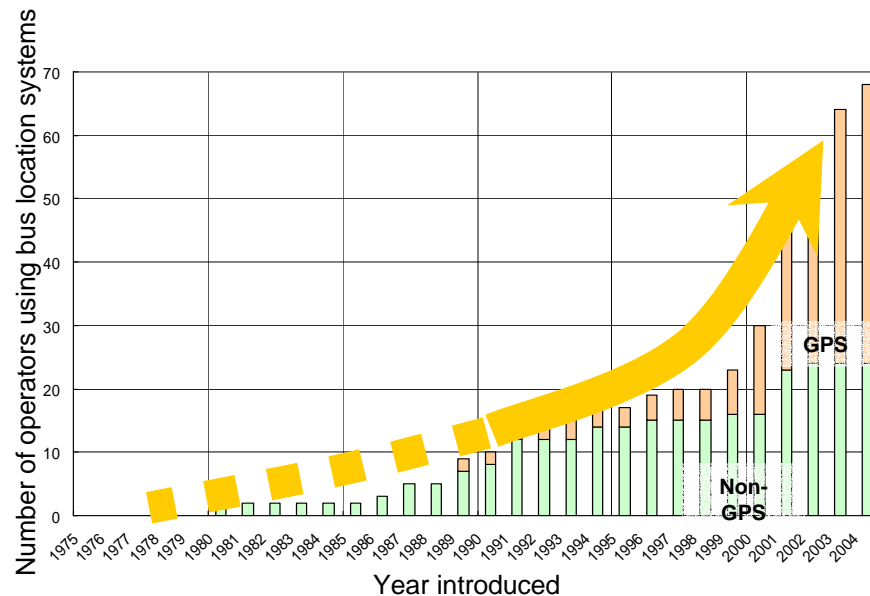
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[Bus Location Systems]

- The first bus location system using the Global Positioning System (GPS) was introduced in 1989, and the number of operators using these systems has gradually increased since then. In 2003, over 70 operators were using bus location systems.



The number of operators using bus location systems

Source: Data from the Ministry of Land, Infrastructure and Transport



Approaching bus indicator at a bus stop



Bus stop information accessed by cell phones

How bus location systems work

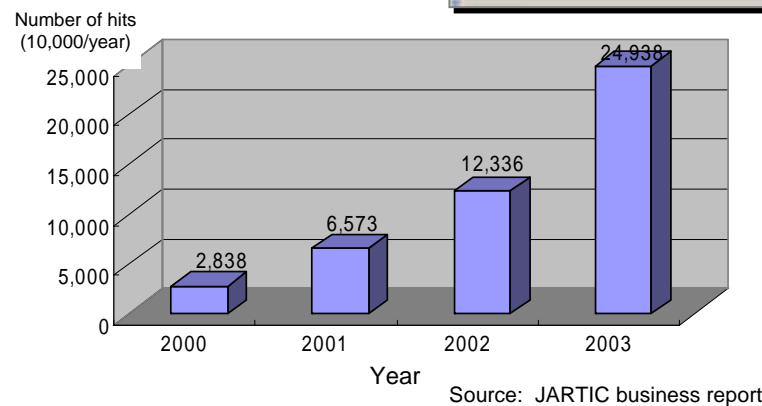
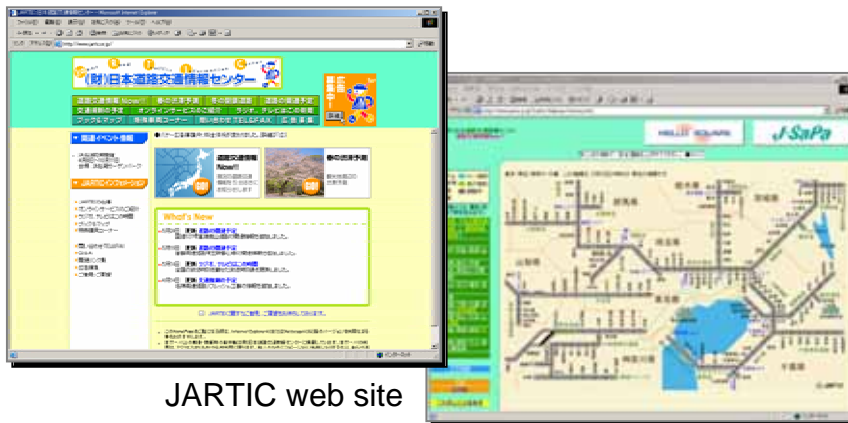
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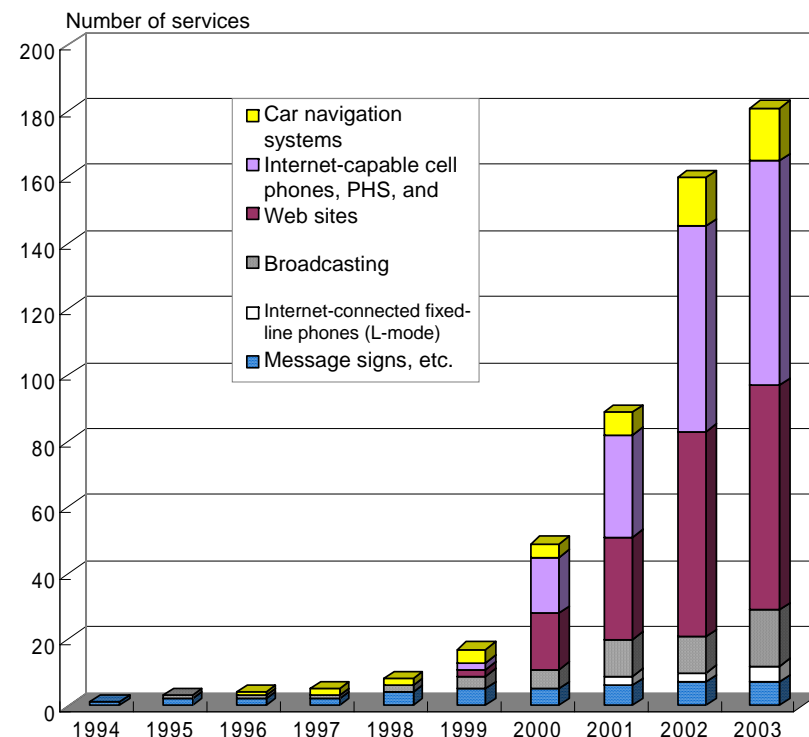
[Using web sites to provide information]

- In 2000, Japan Road Traffic Information Center (JARTIC) began providing "Road Traffic Information Now" on its web site.
- Private businesses using information from JARTIC to develop services for a variety of media.



Hits recorded by the "Road Traffic Information Now" web site

Note: "Road Traffic Information Now" is a web-based service offered by JARTIC.



The number of road traffic information services provided by local government organizations, private businesses, etc.

Source: JARTIC business report

- Notes:
- Figures include information services based on road traffic information purchased from JARTIC.
 - Services offered by a single company are counted more than once if the company provides services using multiple media.

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[Advancement of telematics]

- Japan's first telematics service started in 1997. In 2002, several automobile manufacturers launched new services.
- Telematics services will be increasingly widespread as communications technologies become more advanced and as the use of information technology grows.

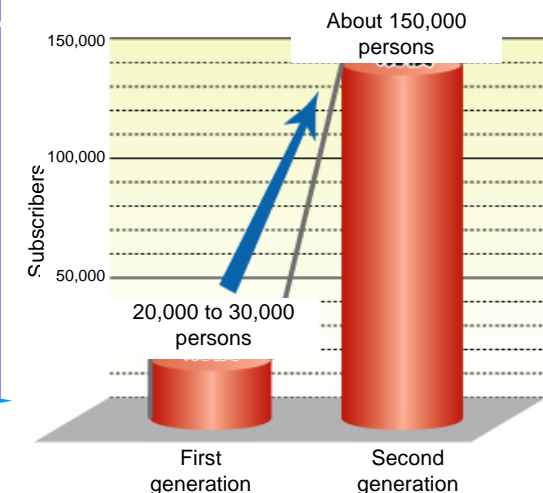


Early stage	Further development and maturity
<ul style="list-style-type: none"> - Low communications speed (9.6 kbps) - High communications cost - Car navigation systems with CD drives (providing road traffic information) - Sending and receiving e-mail 	<ul style="list-style-type: none"> - Higher communications speed (2.4 Mbps) - Lower communications cost and fixed pricing - Car navigation systems with hard disk drives and large volumes of information (providing information on weather, news, and the surrounding area in addition to road traffic information) - Downloading needed information from the Internet - Connection and linkage with cell phones and PDAs; hands-free phones - Read-aloud function for e-mail
First generation of telematics	Second generation of telematics
Increasingly widespread use of information technology	

Increasingly widespread use of information technology and the development of telematics

Telematics services

Source: Toyota Motor Corporation



Trends in the number of subscribers to telematics services

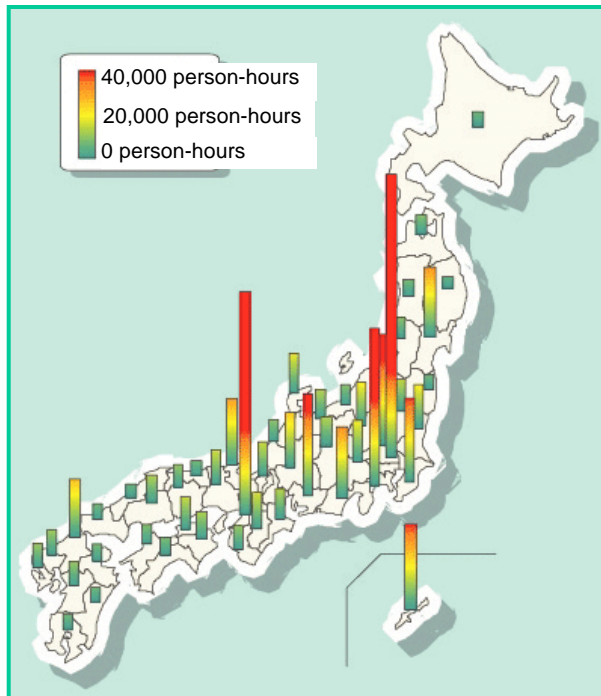
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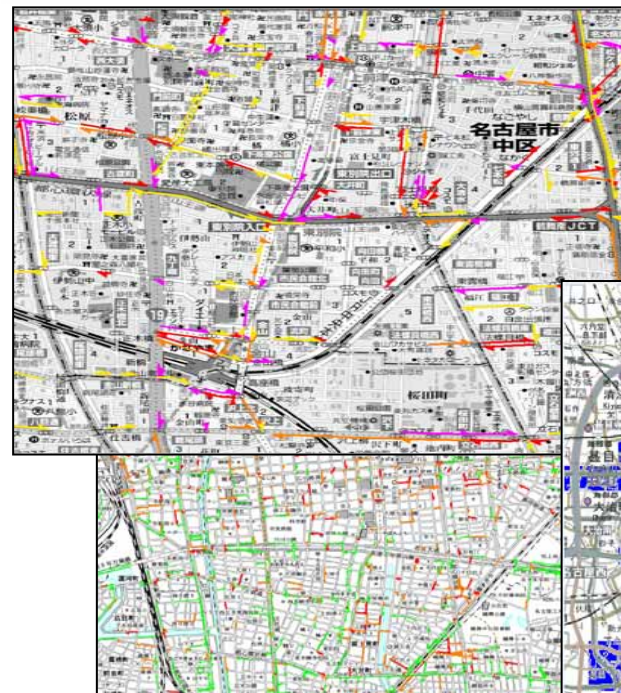
[Deployment of probe cars]

- The data from probe cars is used to evaluate the effectiveness of measures for relief of congestion and provide explanations to the public. Nationwide deployment began in 2003, using bus location systems.
- Tests are underway concerning the use of taxi location data and windshield wiper activation data in services to provide information on road congestion and weather conditions.



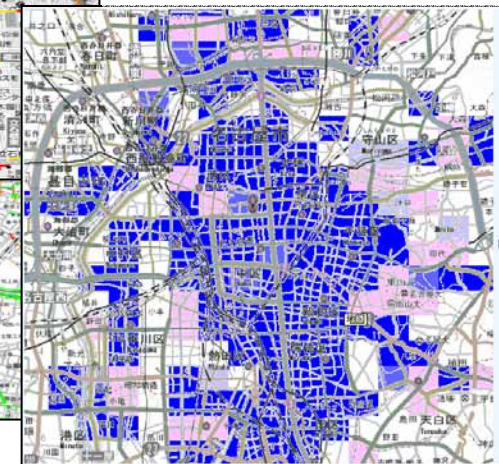
Analysis of time lost due to congestion per kilometer in each prefecture

Road congestion information (real-time information and past records)



Test using probe data

Rainfall information based on windshield wiper activation data



Sources: Internet ITS Consortium and private company information

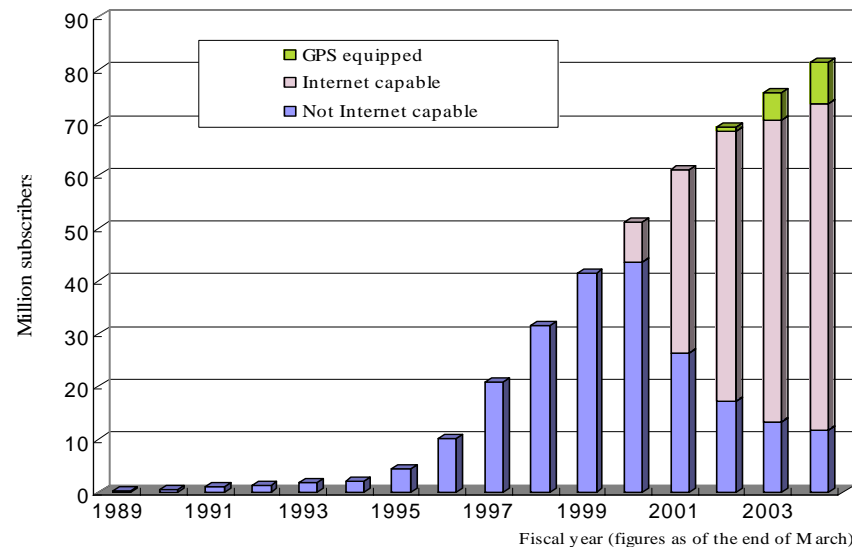
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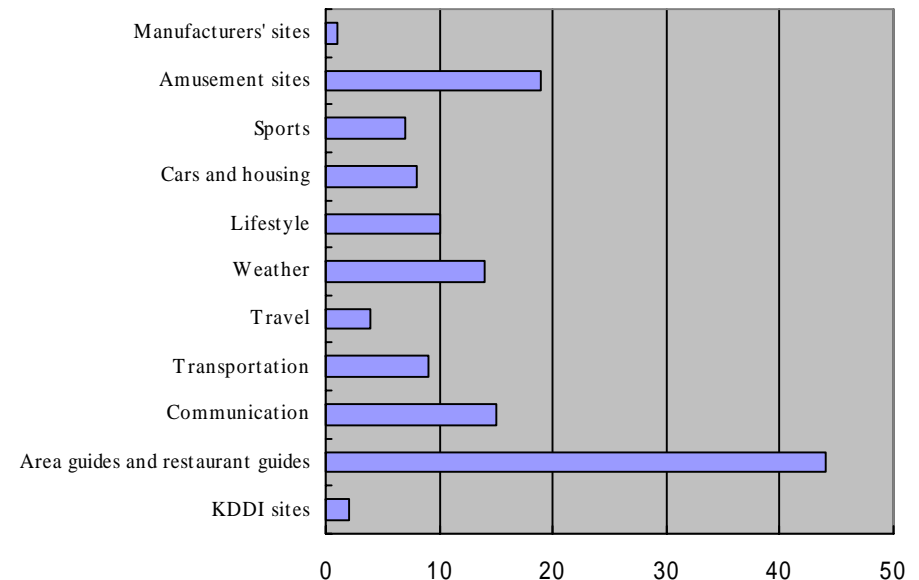
[Spread and enhancement of cell phones]

- Cell phones began to be widespread about 1996, and by 2004 the number of subscribers had topped the 80 million mark.
- Advanced functions, including cameras and GPS, have been available since 2001.



Source: Data from the Telecommunications Carriers Association

The number of cell phone subscribers



Source: Based on data posted on the web site of AU (KDDI).

Number of sites using GPS functions

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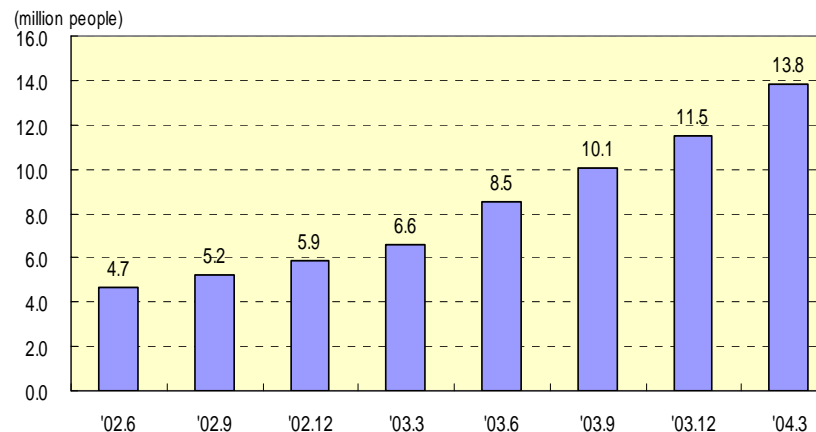


[Spread of electronic money]

- Test of electronic money was in 1998 and 1999.
- Services began in 2001 at railroads and retail stores, and have gradually come to be accepted.
- In April 2004, 14 million IC cards were circulating in Japan as electronic money.



Cashless transactions using contactless IC cards



The number of contactless IC cards issued



Use of contactless IC cards in retail stores and vending machines

1. Development of ITS

(2) Current State of Markets Related to ITS



- The total ITS-related market scale has already grown to ¥12 trillion.



(Current ITS market)

[Information: About ¥6 trillion]

Car navigation systems, etc.
VICS and ETC
Message signs

[Infrastructure: About ¥5 trillion]

Roadside sensors and cameras
Networks

[Services: About ¥1 trillion]

Map software
Content

Total: About ¥12 trillion

