Development of ITS in Japan

— Focusing on DSRC —

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Key-points

- New applications require a platform.
- New applications offer a new platform.
- A new platform promotes further applications.
Two platforms in Japan

- Car navigation systems and ETC offer platforms.

1. Car navigation system : H M I

2. ETC : DSRC
Car navigation system (1)

- **Digital road maps**
  - Route guidance
  - Safety information
  - Information on tourist attractions, local communities, and facilities

- **VICS** (Vehicle Information and Communication System)
  
  Real time information,
  - Congestion, Road surface conditions
  - Accidents, Obstacles, Road Works, Restrictions
  - Parking lot vacancy
Car navigation system (2)

- Car navigation systems are becoming standard equipment for vehicles.

[Graph showing the number of car navigation systems and VICS units over time, with a forecast for future years.]
Car navigation system (3)

- The wide-spread use of car navigation systems has two meanings.

1. HMI as a platform in vehicles

   - Displays
   - Speakers
   - Microphones
   - Input devices, etc.

2. Relationship between driver and system
ETC (1)

- Launched in March 2001

Road-Vehicle Communication
- 5.8 GHz, active DSRC
- Nationwide system

On-board Unit
- Supply of OBUs was left to the market.
  - Lower prices
  - Wide selection of products
ETC (2)

- Variety of OBUs
  - On dashboard
  - Built-in
  - Integrated with car navigation system
  - Overhead

- Almost all of OBUs are compatible with car navigation systems.
ETC (3)

- 1.8M units are installed in only 2.5 year.
- Price has dropped to 1/3.
- 10M units by 2007.
- DSRC is becoming a platform in vehicles.
Vehicles are beginning to be equipped with two platforms.

Next processes are Evolution and Integration.
Ongoing preparations(1)

- Vehicle identification to open a gate
- Deployed into a parking-lot in Nagoya (Jan. 2003)
Ongoing preparations(2)

- Payment (Using IC card)
- Messaging
- Data transfer (Images, Music)
- Demonstrated at gas station in Atsugi (Jan. 2003)
Ongoing preparations(3)

- Internet access services
  - Congestion, Road conditions, Tourist info.
- Proving tests at SA on the Expressway (Jan. 2003)
Multi-application OBU

- Services are to be provided on a common platform.
- The goal is to realize ITS services with a common, multi-application OBU.
Evolution and Integration(2)

- Next-generation DRM and Information infrastructure will make message services advanced.

VICS
Car Navigation System

Information infrastructure
Sensing, processing and provision

Next-generation DRM
Detailed, accurate and dynamic

ETC

Messaging
Data transfer
Internet access

Vehicle identification
R/W of IC cards

Toll and payment

Advanced messaging
Support safe driving

-2005
Ongoing preparations(4)

- Proving tests on actual roads in 2002-2003.
  - Prevention of collisions with obstacles ahead
  - Prevention of Overshooting Curves
Smart cars in Japan

Smart cars with control functions are already on the market.

[ Lane-keeping ]
- In-vehicle - camera detects lane
- Assist the appropriate amount of steering
- Maintain the vehicle in the lane

[ Pre-crash safety ]
- Millimeter-wave radar detects vehicles and obstacles ahead
- Assist brake lowering the collision speed

[ Advanced cruise control ]
- Millimeter-wave radar detects vehicles ahead
- Control the throttle and brake
Evolution and Integration (3)

- Smart cars and advanced message services lead to road-vehicle cooperation systems.

- Smart car
  - Intelligent vehicles to ensure safety

- Advanced messaging
  - Support safe driving

- Information infrastructure
  - Sensing, processing and provision

- Next-generation DRM
  - Detailed, accurate and dynamic

- VICS
  - Car Navigation System

- ETC
  - Toll and payment

- Messaging
- Data transfer
- Internet access

- Vehicle identification
- R/W of IC cards

- Advanced Cruise-Assist Highway Systems (AHS)
- -2005
Conclusion

Smart car
- Intelligent vehicles to ensure safety

Information infrastructure
Sensing, processing and provision

Next-generation DRM
Detailed, accurate and dynamic

Advanced messaging
Support safe driving

VICS
Car Navigation System

ETC

-2005

Advanced Cruise-Assist Highway Systems (AHS)