Japan’s Organizational Framework for the Promotion of ITS

The Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society (IT Strategic Headquarters) (Headed by the Prime Minister)

Four-Ministry Liaison Conference

- National Police Agency (NPA)
  Traffic Bureau
- Ministry of Internal Affairs and Communications (MIC)
  Telecommunications Bureau
- Ministry of Economy, Trade and Industry (METI)
  Manufacturing Industries Bureau
- Ministry of Land, Infrastructure and Transportation (MLIT)
  Road Bureau, Road Transport Bureau

- Japan ITS Promotional Conference (held in September 2004)
- Joint effort by industry, academia, and government to develop the “ITS Promotional Guideline,” taking ITS World Congress 2004 as an opportunity to develop the guideline.
February 1995 — The Advanced Information and Telecommunication Society Promotion Headquarters formulated "Basic Guidelines on the Promotion of an Advanced Information and Telecommunications Society."
⇒ ITS was clearly defined as a key priority to promote.

July 1996 — The five ITS-related ministries and agencies of the time (the National Police Agency, the Ministry of International Trade and Industry, the Ministry of Transport, the Ministry of Post and Telecommunications, and the Ministry of Construction) formulated "Comprehensive Plan for Intelligent Transport Systems (ITS) in Japan."
⇒ Compilation of plans including development of ITS, activities towards its implementation, and schedules

March 2001 — The Strategic Headquarters for the Promotion of an Advanced Information and Telecommunications Network Society (IT Strategic Headquarters) formulated the "e-Japan Priority Policy Program." 電子政府戦略「e-Japan Strategy."
⇒ ITS was positioned as a priority IT policy to focus on.

- July 2003 — "e-Japan Strategy II."
- February 2005 — "IT Policy Package 2005."
- January 2006 — "New IT Reform Strategy."

- Formulated by IT Strategic Headquarters

September 2004 — Japan ITS Promotional Conference formulated "ITS Promotional Guideline."

October 2004 — “11th ITS World Congress Nagoya, Aichi 2004.”

July 2005 — ITS EXPO in conjunction with the EXPO 2005 Aichi, Japan
“New IT Reform Strategy” (excerpts)

IT Policy Key Category 1

Fostering IT Structural Reform
- Resolution of IT-related issues encompassing Japanese society -

Healthcare structural reform through IT
IT-driven environmentally friendly society
World-renowned safe and secure society

World’s safest road transport society
- Prevent proactively traffic accidents with ITS

World’s most convenient and efficient e-administration

Strengthen corporate competitiveness through establishment of IT management
Meaningful existence throughout one’s life

IT Policy Key Category 2

Establishment of IT Infrastructure
- Support the IT structural reform in providing an infrastructure for the ubiquitous network society -

IT society stemming from universal design
Establishment of a digital divide-free infrastructure free
World’s safest IT society
Capacity building in anticipation of next-generation need
Development of advanced world-class IT personnel
Promotion of R&D that will form the basis of the next-generation IT society

To the rest of the World
- Sharing Japan's ICT structural reform efforts with the rest of the World and making international contributions -

Boast Japan’s presence in the international competitive society
International contributions by providing problem-solving models
The world’s safest road traffic environment

Targets:
Cut the number of traffic fatalities and serious injuries by creating safe driving support systems that cooperate with traffic infrastructure.

Policies:
1. **Form a collaborative committee in early fiscal 2006** to work towards the realization of safe driving support systems.

2. **Conduct large-scale verification testing of safe driving support systems on some regional public roads by fiscal 2008.**

3. **Start deployment of safe driving support systems throughout the country** with a focus on sites where traffic accidents occur frequently and **promote the widespread use of On Board Units that are compatible with those systems from fiscal 2010.**

4. **Develop the technologies necessary for interactive communications systems for pedestrians, roads, and vehicles by fiscal 2010.**
(1) Implementation of safe driving support systems
Reduce the number of traffic accident fatalities and traffic accidents through the implementation of safe driving support systems that cooperate with infrastructure.

[Concrete policies]

(1) Promotion of comprehensive approach to implementing the safe driving support system
(Cabinet Secretariat (CS), NPA, Ministry of Internal Affairs and Communications (MIC), METI, MLIT)
Promote the following approach, which will contribute to the establishment of the elements and system in 2006, for realizing the implementation of safe driving support systems
(i) Promotion of a Driving Safety Support System (DSSS) using communications between road infrastructure and vehicles (NPA)
(ii) Promotion of Advanced Cruise-Assist Highway System (AHS) (MLIT)
(iii) Promote development and spread of Advanced Safety Vehicle (ASV) (MLIT)
(iv) Promote development and spread of telecommunications systems (MIC)

(2) Promote technical development of Safe Driving Support Systems
(NPA, MIC, METI, MLIT)
(3) Smooth transportation through use of ITS

Bring about smooth transportation through provision of accurate road traffic information to drivers and optimization of traffic demand, reducing both the environmental burden and risk of traffic accidents.

(1) Promoting provision of road transport information

(i) Promote provision of advanced road transport information (NPA, MIC, METI, MLIT)

In 2006, industry, academia and the government join forces to study a service for providing road and transport information that collects and uses data (probe data) from cars using VICS devices to provide more advanced road and transport information.

A probe for collecting data from cars is also studied using various media such as mobile telephones, etc.

(2) Promotion of optimized transport demand

Promote spread of ETC
Promotion of “New IT Reform Strategy” and “Priority Policy Program—2006”

[New Council]

- April 2006 - Based on the “New IT Reform Strategy”, the **ITS Promotion Council** was established to plan large-scale verification tests and to discuss direction of future safe driving support systems.

- The participating members are:
  - 4 ITS-related agencies/ministries (NPA, MIC, METI, MLIT), Cabinet Secretariat
  - Nippon Keidanren (Japan Business Federation), ITS Japan

- Working group set up to develop concrete testing plans, etc.

  [members] 4 ITS-related agencies/ministries (NPA, MIC, METI, MLIT), Cabinet Secretariat,
  Nippon Keidanren (Japan Business Federation),
  ITS Japan,
  ITS Japan’s “J-safety Committee” steering members (Toyota Motors, Nissan Motors, Honda, Hitachi, OKI Electric Industry)

[Research Schedule]

2007 : Pilot testing
2008 : Large-scale verification testing of safe driving support systems on some regional public roads
2010 ~: Start deployment of safe driving support systems nationwide and promote diffusion of On Board Units
ITS Initiatives taken by MIC

- **Research and Development**
  - Ubiquitous ITS R&D project, launched FY2005, funded by NICT operating expenses grants, expected to run for a period of three years
  - Vehicle-to-vehicle and vehicle-to-road communication technology, ITS application of terrestrial digital broadcasting, ¥700 million in 2005/ ¥680 million in 2006
  - ITS applications of RFID systems

- **Standardization Activities**
  - Locally developed ITS technology submitted to ITU for consideration. Several ITU recommendations (including VICS, DSRC and millimeter wave on-board radar) have already been formulated. Focus now shifts to standardization of next-generation millimeter-wave ITS telecommunications technology.

- **Legislation and Regulation**
  - VICS (FM multiplex broadcasting and radio beacons) --> enacted 1994
  - ETC --> enacted 1997       DSRC --> enacted 2001
  - 60 GHz low-power millimeter-wave radar --> enacted 1995
  - 76 GHz low-power millimeter-wave radar --> enacted 1997

- **Support for Private-Sector Initiatives**
  - Support for ITS Info-Communications Forum (Secretariat = ARIB)

- **Others**
  - ITS discussion in Study Group for Wireless Broadband Promotion (final report December 2005)
  - Study by the Information and Communications Council on Efficient Radio Spectrum Usage in the VHF/UHF bands
"Ubiquitous ITS" where anyone can enjoy any information, anytime, anywhere and without any special operation, will realize a safe and secure transportation society where anyone can move comfortably and freely.

Joint R&D Members:
NICT, KDDI, TOYOTA, FUJITSU, DENSO, NHK, ATR

Budget: 0.7 billion Yen (FY05)
Year: 2005-2007 (3 years)
International Standardization of ITS Radiocommunications

ITU-R SG8 Working Party 8A(WG2)

Elements of ITS
Overall objectives of ITS
Radio-based ITS service
Spectrum requirements
Interconnect requirements
Technical specifications
Definition of “telematics”

Automatic determination of location and guidance

ITU Recommendations on ITS

<table>
<thead>
<tr>
<th>Year</th>
<th>Recommendation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1998</td>
<td>M.1310</td>
<td>Objectives and Requirements</td>
</tr>
<tr>
<td>2000</td>
<td>M.1451</td>
<td>Functionalities</td>
</tr>
<tr>
<td>2000</td>
<td>M.1452</td>
<td>Short Range Radar (60/76GHz)</td>
</tr>
<tr>
<td>2000</td>
<td>M.1453</td>
<td>5.8GHz DSRC</td>
</tr>
<tr>
<td>2002</td>
<td>M.1453-1</td>
<td>5.8GHz DSRC Revised</td>
</tr>
<tr>
<td>2005</td>
<td>M.1453-2</td>
<td>5.8GHz DSRC Application Sub Layer</td>
</tr>
</tbody>
</table>
New Services using DSRC System

Expressway Tollgate (ETC system)
- The charge from XX Interchange is 3,000 yen.

Parking-lot control system
Automated gate operations/vehicle guidance

Charging settlement system
- On-board device
- IC card
- Filling station
- 60 liters 5,500 yen.

Cargo physical distribution (PD) management system
- Distribution center
- IC card

Security/certification authority
Credit company
Post office/bank

VICS by DSRC
- Latest traffic information was received.

AHS-i
- Oncoming car approach information
- The oncoming car is approaching!!

AHS: Advanced Cruise-Assist Highway Systems

VICS by DSRC

AHS: Advanced Cruise-Assist Highway Systems

VICS by DSRC
- Oncoming car approach information
- The oncoming car is approaching!!

AHS: Advanced Cruise-Assist Highway Systems
## Technical Specifications of DSRC in Japan

<table>
<thead>
<tr>
<th></th>
<th>DSRC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency band</td>
<td>5.8GHz band</td>
</tr>
<tr>
<td>System</td>
<td>Active system</td>
</tr>
<tr>
<td>Occupied bandwidth</td>
<td>4.4MHz</td>
</tr>
<tr>
<td>Channel –Downlink</td>
<td>7</td>
</tr>
<tr>
<td>– Uplink</td>
<td>7</td>
</tr>
<tr>
<td>Modulation</td>
<td>ASK, QPSK (ETC; ASK only)</td>
</tr>
<tr>
<td>Data rate</td>
<td>1Mbps/ASK 4Mbps/QPSK (ETC; 1Mbps only)</td>
</tr>
<tr>
<td>Communication</td>
<td>TDMA/FDD</td>
</tr>
<tr>
<td>Maximum Power supplied to Antenna</td>
<td>Base Station</td>
</tr>
<tr>
<td></td>
<td>300mW 10mW</td>
</tr>
</tbody>
</table>

### Characteristics of DSRC
- High data rate
- Suitable for rapid movement
- Suitable for multiple lanes

![DSRC Frequency Spectrum](image)
This study group mainly aimed at developing the world’s most advanced wireless broadband services environment and providing concrete measures for frequency reallocation. We discussed the following issues openly, as well as at an industry-wide level.

- Study of developments in both domestic and international wireless broadband services
- Identification of future wireless broadband usage and market
- Identification of challenges in wireless broadband promotion, examination of measures for promotion, etc.
## Summary of New Systems and Proposed Frequency Bands

### Next-generation mobile radio communication systems, Mobile offices/homes

- Radio communications that enable users to communicate wherever they are, without awakening to where the service is available.
- Radio communications that ensure the required quality of communications.

**Example systems:** Cellular phones (Enhanced 3G, 4G offering 100Mbps transfer rates even when on the move)

**Proposed frequency bands:**
- Enhanced 3G: 800Mhz band, 1.5, 1.7, 2.0 and 2.5GHz bands
- 4G: 3.4-4.2GHz band, 4.4-4.9GHz band

*Proposed by "the Action Plan for Spectrum Reallocation"*

### Alternative systems to wired broadband

- Radio communications that can provide network at lower costs within areas not suitable for wired broadband such as rural area.
- Radio communications that use the systems based on international standards or those used in urban areas will be deployed in rural areas, with respect for costs.

**Example systems:** FWA that can be used under the Non-Line-of-Sight (WiMAX (IEEE 802.16-2004), iBurst, Advanced DS-CDMA, etc.)

**Proposed frequency bands:**
- 1.5 and 2.5GHz bands (rural use of frequency bands used by mobile radio communication systems in urban areas)
- 4.9-5.0GHz band (frequency band available for registration) etc.

### ITS (Intelligent Transport System)

- Radio communications that can establish ad-hoc radio communications instantly.

**Example systems:** Advanced ITS that reduce the road accidents

**Proposed frequency bands:**
- Vehicle-to-Vehicle communications: VHF and UHF bands, etc.
- Road-to-Vehicle communications: 5.8GHz band (expand the current frequency band) etc.
- Millimeter-wave radar to identify obstructions on the road: 78-81GHz band

### Next-generation intelligent home appliances, Home networks

- Short-range radio communications that can establish interconnection more easily than wired communications

**Example system:** Next-generation intelligent home appliances

**Proposed frequency band:** 5GHz band (joint use with wireless LANs, enhanced WiFi system, etc.)
Efforts for ITS for Safety and Security

Overview

- Vehicle-to-Vehicle communication system and road-to-Vehicle communication system.
- Millimeter wave radar system to sense the distance between vehicles or vehicle and obstacles.

Proposed Frequency band

- VHF/UHF bands for vehicle to vehicle communication
- 5.8GHz bands for road to vehicle communication
- 78-81GHZ bands for millimeter-wave radar using 79GHz band

Future Efforts

- Execute a ubiquitous ITS R&D that organically connects vehicles, roads, and people so that information can be used without any special operations anytime, anywhere, by anyone and with anything.
- Execute a large scale demonstration experiment on a support system for safe driving under the cooperation of public and private sectors. (FY08)
- Promote efforts to realize a safe driving support system (FY10)
Consideration on strategies for efficient radio spectrum usage in the VHF/UHF bands

Currently, terrestrial TV broadcasting uses radio spectrum from channel 1 to 62 in the VHF/UHF bands, which amounts to a bandwidth of 370MHz. Digital TV broadcasting is deployed in the UHF band among these bands.

[Present] 370MHz

March 2006 · MIC consulted for Information and Communications Council for "technical conditions for efficient radio spectrum use"
April 2006 · Invite proposals from the public on radio systems that can be introduced in the VHF/UHF bands (March 27 to April 27)
   ☐ MIC received as many as 181 proposals from 100 institutions and individuals.
   · Based on the proposals, consider technical conditions for efficient radio spectrum use, including conditions for sharing radio spectrum between different services, such as mobile service and broadcast auxiliary service
June 2007 · A partial report is expected on "technical conditions for efficient radio spectrum use in the VHF/UHF bands"

Issue to be considered: Develop specific plans for the use of radio spectrum amounting to 130MHz which will be open for reallocation by digitalization of terrestrial TV broadcasting.