

# ITS Strategy in Japan

**Report of the ITS Strategy Committee  
ITS Japan  
Summary version**

**July 2003  
ITS Strategy Committee**

## Introduction

In the eyes of many players in the ITS industry today, the ITS project has reached a sharp bend in the road, and the way forward appears blocked. To clarify the original mission of ITS to contribute to society as well as Japan's international ITS strategy, and to break down the sense of impasse among many enterprises, in December 2002 ITS Japan established the ITS Strategy Committee.

With the vigorous support of the 15 private enterprises who approved the Committee's establishment, the ITS Strategy Committee spent six months examining the business fields expected to emerge through ITS development. Its findings are summarized herein.

The ITS Strategy Committee carried out its work through the efforts of the following three Working Groups:

- Planning Working Group
- Future Prospects Working Group
- International Comparisons Working Group

This report is a summary version of the full report, "ITS Strategy in Japan." This summary is divided broadly into four sections:

1. Japan's vision for ITS
2. Proposed fields of business for the near and medium terms
3. Recommendations to government ministries and agencies
4. Recommended role for ITS Japan

In consideration of the findings of the ITS Strategy Committee, it is vital to clarify how ITS activities are to continue and to offer a specific blueprint for deployment.

We hope that this report will prove useful as a handbook for everyone involved in the further deployment of ITS.

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## **1. Basic Philosophy and Vision for ITS**

### **1.1 Basic Philosophy of ITS**

The Intelligent Transport System (ITS) is a system that capitalizes on leading-edge IT to support the comfortable and efficient transportation of people and goods. Its aim is to achieve a quantum leap in the safety, transport efficiency and comfort of road traffic, contributing strongly to the solution of the problems of today's motorized society. These problems range from urban traffic problems, such as traffic accidents and congestions, to environmental and energy issues.

ITS supports comfortable and flexible movement in intermodal transportation systems (encompassing road, rail, air and marine transport). Its ultimate goal is to create a more livable society, as encapsulated in the phrase, "ITS for a livable society." Moreover, by delivering technologies and systems that add real value in response to user needs, ITS contributes to the creation of wholly new industries and market.

### **1.2 Present Status in Japan**

#### (1) Recent trends in Japanese society and their impact

Life styles have been impacted dramatically in Japan in recent years by remarkable advances in communications and fragmentation in the things people value. Today Japanese society is confronted by a number of changes in social conditions, as listed below.

- 1) Over a million traffic accidents per year
- 2) Traffic congestion
- 3) Growing concern about the environment
- 4) Rapid spread of mobile telephones and broadband Internet
- 5) A shift toward an older demographic profile
- 6) Need for protection of personal information
- 7) A protracted economic downturn

#### (2) Status of ITS (as of September 2003)

In the nine distinct fields that make up the overall ITS concept, a wide range of initiatives are under way, pressing ahead with the commercialization of ITS-related systems, programs of research and development and proving trials. In the road-traffic field in particular, progress in the following three areas has been especially rapid:

- 1) Car navigation systems: Today the number of systems shipped has topped the 12 million mark.
- 2) Vehicle information and communication system (VICS): Over 7 million of these systems have been sold.
- 3) Electronic toll collection (ETC) systems: A cumulative total of 1.5 million ETC in-car units have been installed.

### **1.3 ITS Vision and Targets**

In order to realize its vision for Japanese society, guided by the theme of "ITS for a livable society," ITS Japan has set three first-step targets, which are the realization of:

- (1) A zone with zero traffic fatalities
- (2) A zone with zero traffic congestion
- (3) A zone with a comfortable transportation experience

From a private-sector viewpoint, ITS is expected to achieve a number of objectives in the medium-term (by about 2010). By this time it is hoped that ITS will apply state-of-the-art technology in positioning and data communications to link people, roads and vehicles in a network, enabling quantum improvements in advanced modes of road usage, high-efficiency transport and comfortable road travel.

The expected advantages of ITS can be divided into three categories: safety and security; efficiency and environmental preservation; and convenience and comfort. The ITS goals for each of these categories are as follows.

- (1) In safety and security, ITS Japan aims first to achieve, in a model space, a zone where traffic accident fatalities are reduced to zero. This accomplishment is then to be deployed nationwide, contributing to a 50% reduction of total traffic accident fatalities on all roads by 2010.
- (2) As a target for efficiency and environmental preservation, ITS aims to provide a zone of zero traffic congestion. Achieving this objective is expected to contribute to reducing CO<sub>2</sub> emissions by road transport vehicles to the government's target of 1995 levels by 2010.
- (3) In terms of convenience and comfort, ITS Japan aims to upgrade the public infrastructure to create a comfortable transportation environment, to provide cities and spaces where transportation is an enjoyable and convenient experience, for pedestrians, drivers and users of public transport alike.

#### **1.4 How to Achieve the ITS goals**

The scenario ITS Japan envisions for transportation in the medium term is one in which:

- 1) Safe and secure "ITS zones" are constructed, with the goal of reducing traffic fatalities to zero
- 2) Improved logistical flow and development of automated driving systems of logistical vehicles on limited stretches of road, with the aim of reducing traffic congestion to zero on those sections
- 3) Commercialization of "Human navigation systems", to make the transportation experience more enjoyable in a "comfortable transportation zone"
- 4) A comprehensive ITS platform is in place.

#### **1.5 Financial Resources for the ITS Initiative**

In carrying out the ITS national project, it is essential to use the limited resources available from the national budget as effectively as possible. To accomplish this, the government should consider providing public-sector funds for use in upgrading and operation of ITS led by the private sector and to explore the possibility of tax concessions. ITS Japan recommends the use of schemes, systems and organizations that combine private-sector and public sector funding, such as private finance initiatives (PFI).

## **1.6 The ITS Contribution to a Livable Society**

Achieving the “livable society” will require a comprehensive review of transportation systems and urban and road infrastructure. In some cases, an ongoing program of road-building must figure in this examination. In Tokyo, for example, a part of that city’s traffic problems will be solved by the construction of new roads—the Gaikando outer ring road, the central Ken-odo and the Shinagawa Line of the Shuto Expressway—to reduce the volume of traffic flowing into Tokyo. By combining this improvement of Japan’s social capital with the implementation of ITS technologies, ITS can enhance the efficient use of social capital and value-added use of limited space.

## **2. Emerging Areas of Operation in the ITS Project**

### **2.1 Safety and Security**

#### **2.1.1 Creating a Model Zone of Zero Traffic Fatalities**

In its bid to halve the number of traffic fatalities in Japan by 2010, Japan has designated several areas where such deaths are especially frequent for transformation into areas of zero traffic fatalities. In these “ITS promotion zones”, various measures will be tackled in collaboration with local governments and road-management authorities to assure safe passage for both vehicles and pedestrians, thereby dramatically reducing the incidence of traffic fatalities within the model zone.

##### (1) Significance of the project

- 1) Lowering the nation’s rate of traffic fatalities will have an extremely beneficial impact on Japanese society.
- 2) Realizing highly efficient and effective investment in the infrastructure that will use ITS technologies and contributing to achieving the government’s goal of dramatically reducing traffic deaths over the next 10 years.
- 3) The results of proving tests of the ITS promotion zones will be deployed nationwide, accelerating the reduction of traffic fatalities throughout Japan.

##### (2) Approach to realization of ITS promotion zones

- 1) Role of private-sector operators  
Private-sector operators will obtain from the National Police Agency data on areas in which traffic accidents are especially common. These operators will then draft ITS proposals and submit them to local governments, selecting and proposing areas of high traffic fatality rates to transform into zones where traffic fatalities are reduced to zero using ITS. The operators will then move to achieve zero traffic fatalities within those ITS model zones.
- 2) Role of ITS Japan  
ITS Japan will serve as the central liaison body for the overall ITS effort, setting up contact meetings among industry, government and academia. In the overall project for zones of zero traffic fatalities through ITS, ITS Japan tables the overall proposal and oversees its execution.
- 3) Liaison among industry, government and academia
  - (a) Research and development of the component technologies used in the project will be carried out through liaison among industry, government and academia.

(b) This liaison process will establish and implement nationwide the methods used to evaluate the ITS promotion zones.

4) Role of ministries and agencies

(a) Ministries and agencies will construct infrastructure, creating a communication environment linking roads, vehicles and pedestrians.

(b) These bodies will also introduce the systems that support safe, smooth transportation through harmonization of infrastructure and vehicles.

(c) Ministries and agencies will offer the necessary deregulation.

### **2.1.2 Promoting Global Harmonization Toward Greater Traffic Safety**

All of the world's developed nations have taken their own initiatives to reduce traffic accidents, with each country approaching the problem according to its own unique set of circumstances. Nonetheless some features of traffic accidents, and the measures taken to reduce them, are similar around the world. It makes sense for authorities in each nation to share information about these approaches and to bring effective new approaches rapidly to market. To promote both collaboration and competition in finding lasting solutions, ITS Japan recommends the following international cooperative activities.

- 1) Safety forums can be jointly formed by Europe, the US and Japan at the ITS World Congress.
- 2) These forums can serve as an opportunity to enlighten the general public about traffic safety technology and to demonstrate the safety technologies developed in Europe, the US and Japan.

## **2.2 Efficiency and the Environment**

### **2.2.1 Creating a Model Zone of Zero Traffic Congestion**

The problem of urban traffic congestion has a grave impact in terms of both economic loss and environmental damage (through the emission of carbon dioxide).

A wide range of measures are under consideration to reduce traffic congestion, including:

- Building more advanced traffic control systems and traffic signals
- Normalization of traffic demand by informing drivers of traffic congestion
- Maximization of the transportation efficiency of road (introducing new concepts of cost, incorporating environmental factors)
  - Driving costs (road pricing)
  - Parking costs (on-road and off-road)
- Increase in freight handling efficiency
- Enhancement of intermodal solutions such as park-and-ride facilities

The steps taken in Tokyo and other major cities in Japan to recover their international competitiveness in terms of urban traffic are widely viewed to represent examples of effective measures in road policy and transport of goods.

Tokyo and Japan's other major cities face numerous traffic problems associated with mechanisms for the transport of goods. The transport of freight occupies an important place in Japan's transportation landscape. Accordingly, a significant portion of the

“New Comprehensive Program of Logistics Policies” promoted by the Japanese government deals with improvements such as measures to prevent entry of freight-carrying vehicles into city centers and efforts to improve logistical systems. ITS Japan has examined a number of specific measures in which ITS can be used to achieve efficient and effective transport of goods.

(1) Specific measures and their significance

- 1) Improvement of the efficiency in transporting goods
  - (a) Reduced occupancy of roads for door-to-door collection and delivery, transport to and from convenience stores, etc., to eliminate traffic congestion caused by transport vehicles
  - (b) Support of advanced IT for transport contractors, especially partial release of advanced traffic management systems for use by small and medium-sized operators
  - (c) Stronger management of shipment of hazardous materials
- 2) Automated cruising of transport tracks and vehicles in dedicated road zones
  - (d) To eliminate traffic congestion, the productivity of roads is to be maximized, to obtain maximum effectiveness of this important community asset.
  - (e) Given the rising average age of drivers in the transport industry, the work environment for people driving at night will be improved.
  - (f) Transport costs can be reduced to boost the international competitiveness of the Japanese economy.
  - (g) Major improvements in the safety of automated driving and automated cruising can be used to reduce the attention load on drivers.

(2) The roles of the private sector and the public sector

- 1) Role of private-sector operators
  - (a) Development and commercialization of ITS technologies to optimize parking, load management etc. of transport vehicles
  - (b) Deployment and expansion of parking-facility systems in transport-vehicle load management
  - (c) Development and marketing of technologies for automated driving systems
- 2) Role of the public sector
  - (a) Upgrading of public infrastructure
  - (b) Partial release of public traffic-management system functions for the use of the private sector

## **2.3 Convenience and Comfort**

### **2.3.1 Creating a Model Zone of Comfort in Transportation**

The Japanese government’s e-Japan strategy calls for Japan to be transformed into the world’s leading nation in IT by 2005. This IT advantage is envisioned to create a country where anyone can live safely and comfortably anytime, anywhere, and can choose from a selection of comfortable, convenient transportation modes.

Focusing on transportation for individuals, the government is examining the creation of intermodal transportation zones as a form of Human navigation for the handicapped and non-handicapped alike. These intermodal zones will provide citizens with a wide range of information that will enable them to travel with comfort and convenience.

(1) Significance of specific measures (Human navigation)

- (a) The measures will contribute to the improvement of commuters' experience, offering smoother and more convenient transfer between modes of public transit and providing assistance with Japan's complicated street-address system.
- (b) In response to the needs of an aging society, the measures aim to provide a safe, secure, pleasant and convenient transportation experience.
- (c) People hitherto confined indoors will experience the joy of getting around on their own.

(2) Roles shared by the private and public sectors

1) Role of private-sector operators

- (a) Capitalizing on the ITS technology assets accumulated in car-mounted navigations systems, navigational support systems for pedestrians will be developed, enabling people to determine their current positions and the directions they need to take, quickly and accurately. Such systems may be incorporated in camera-equipped mobile phones, PDAs or the like.
- (b) Close cooperation and liaison will be maintained with the Internet ITS consortium.

2) Role of the public sector

- (a) Initial setup of public infrastructure

**2.3.2 Nationwide Deployment of "Smart Towns" (short-term)**

(1) Positioning of Smart Towns

ITS Japan has proposed the spread and development of Smart Towns, as presented at the 11th World Congress on ITS, Nagoya - Aichi, 2004, in every part of the nation, according to the unique characteristics of each region.

In the United States, ITS America is promoting a program called Rural ITS, an ITS system rooted in the climate, culture and ways of life of rural communities. In Europe a version of ITS is being promoted that emphasizes regional character to promote tourism. Here in Japan, transfer of financial resources from the national government to the regions needs to be examined, so that each region can propose its own plans and appropriate the necessary budgets.

(2) Allocation of roles in the deployment of Smart Towns

1) Role expected of ITS Japan

- (a) Support for regional and local governments in nationwide deployment

2) Items to be addressed by ministries and agencies

- (a) Adjustment between the Smart Town concept and regional needs
  - (b) Development of technology to be applied
  - (c) Promotion of standardization
- 2) Role expected of ministries and agencies
- (a) Favorable budgeting for the Smart Towns, complementary measures and deregulation (including business improvement districts)

### **2.3.3 Promoting Multipurpose Use of ETC (short-term)**

From about March 2003, sales of ETC vehicle-mounted units have been brisk. In addition to the further promotion of sales of these units themselves, new business opportunities are expected to arise from the study of new business applications for ETC and the development of DSRC applications in a number of fields.

#### (1) Expansion of adoption of current ETC technology

##### 1) Businesses with strong prospects

- (a) Further expansion of adoption of ETC vehicle-mounted units
- (b) Multipurpose application of ETC (including DSRC applications)

##### 2) Role of private enterprise

Provision of vehicle-mounted units as a set with car navigation systems; examination of DSRC businesses that an expanded ETC base would make possible

##### 3) Role of the public sector

- (a) Effective use of public infrastructure, such as raising the efficiency of expressway sections
- (b) Establishment of dedicated ETC facilities (such as gates and interchanges)
- (c) Measures to eliminate congestion at toll booths where ETC alone cannot provide a full solution

#### (2) DSRC applications

##### 1) Businesses with strong prospects

- (a) Complex businesses using DSRC applications, focusing on freight transport operators
- (b) Provision and upgrading/maintenance of low-cost DSRC roadside infrastructure and systems for the private sector

##### 2) Roles of private enterprises

- (a) Promotion of development of DSRC applications
- (b) Development and manufacture of low-cost roadside systems

##### 3) Roles of the public sector

- (a) Release of security codes for security access modules (SAMs) and related fee settlement systems
- (b) Further promotion of joint chip development

### **2.3.4 Provision of Traffic Congestion Information**

Transport management systems, traffic volume surveys and the like present new business opportunities. Other opportunities exist in supplementing the partial traffic-report information gathered by services such as VICS.

- 1) Business with strong prospects
  - (a) Services providing government agencies with probe data on road traffic in real time
  - (b) Provision of local traffic volume surveying packages (equipment, personnel, etc.)
- 2) Role of private enterprise
  - (a) Spread of logistical management systems
  - (b) Development of terminal technologies and devices that can be selected to avert communication of personal information
  - (c) Expansion of terminal sales, assuming existence of plans to build out low-cost infrastructure for DSRC
  - (d) Application of features made available through Internet-based ITS projects
- 3) Role of the public sector
  - (a) Establishment of a system for purchase of road-traffic probe reports using PFI
  - (b) Publication of the cost-benefit advantages of the policy using probe data
  - (c) Establishment of a system to train the private sector in processing and editing traffic data
  - (d) Widespread installation of short-range communication facilities specialized for automobile use
  - (e) Presentation of DSRC infrastructure building plans, assuming realization of general services based on DSRC applications

## **2.4 Common Fields (Establishment of a Common Platform)**

### **2.4.1 Proposal for an ITS Platform**

In this section we examine the ITS platform to be developed nationwide, with a summary of the required features. The proposal is based on a combination of the importance of providing two key functions simultaneously: communications and positioning.

Note: The ITS platform is also a subject at the ITS Info-communication Forum, which focuses on telecommunication technology.

#### (1) Basic approach to platform design

To ensure that the platform can be used effectively and continuously over the long term, the platform must be designed on the assumption that modes of living, standard

equipment in devices and items carried by individuals can be expected to change significantly over time.

(2) Organization of required system features

The ITS Japan Urban ITS Committee has recognized a total of 55 services, including 50 ITS user needs and a further five services for cargo transport. The Committee also organized the functions and the level of performance required for each. Virtually all of these services were grouped as relying on one of two basic functions: communications and positioning.

(3) Definition of the ITS platform

The ITS platform consists of the IT sub-platform, the positioning sub-platform and a variety of other sub-platforms.

ITS AP 1	ITS AP 2	ITS AP 3	ITS AP 4	ITS AP 5	.....	ITS AP 55	...						
ITS platform													
IT sub-platform							Positioning sub-platform		Miscellaneous sub-platform (HMI sub-platform, vehicle control data sub-platform, time data sub-platform, etc.)				
Mobile telephones	PHS	Wireless LAN	DSRC	Digital broadcasting	IP network	Dedicated network	Other	GPS		Markers	PHS	Mobile telephones	Cameras

(4) ITS service road map provided by the platform

At ITS Japan, we have prepared a roadmap to realize the 55 ITS applications we used to compile the functions the ITS platform requires. Also, as a means to achieve its targets, ITS Japan has determined the deployment initiatives that will be needed to make the ITS platform-based services available.

(5) Roles of the private and public sectors

1) Role of private-sector operators

R&D in the component technologies for constructing the ITS platform

2) Role of ITS Japan

Examination and launch of the organizational framework needed to bring the ITS platform into concrete form

3) Role of the public sector

Implementation of the ITS platform infrastructure (wireless LAN, DSRC, markers, etc.)

Deregulation regarding the Road Traffic Act, road laws, etc.

Promotion of the ITS platform and provision of the necessary environment

### 3. Proposals to the public sector

#### 3.1 A New Comprehensive Plan for ITS in Japan

The period following the proposal of the comprehensive plan for ITS in July 1996 may be called the introductory phase. Today ITS is in an expansion phase, in which ITS Japan is working to encourage broader use of the platform. Fully 60% of the

services proposed in Mobility 2010 are new subservices, additional to the 172 subservices listed in the comprehensive plan. Extraordinary progress in IT over recent years has made easily available services that were scarcely imaginable at the outset of ITS. This is the cause of the disparity between the comprehensive plan for ITS and the current status of ITS.

For this reason a proposal for a new ITS comprehensive plan was tabled in the 2003 version of e-Japan, the Japanese government's new strategy for application of IT.

### **3.2 Proposals to the Public Sector for the Development of Anticipated Businesses**

The ITS Strategy Committee proposes the following measures as means of bringing the expected business opportunities in ITS to fruition.

- (1) Continued investment in the necessary roads
  - Upgrading of ring expressways and the like to obviate the need to drive through central urban areas
- (2) Deregulation and other systematic improvements to nurture industry
  - Establishment of a definition for "heavy users" (cargo transporters, etc.) and creation of a preferential treatment system for road tolls
  - Establishment of systems to release some public traffic management systems for private use (such as release or transfer to private-sector use of radio beacons and optical beacons)
  - Publication of information held by the public sector on road traffic safety and traffic flow
  - Establishment of systems for private-sector use of existing infrastructure such as optical fiber
  - Deregulation to promote ETC (release of SAM, etc.)
  - Release of data on 4,000 locations with high incidence or danger of accidents, with a view to creating zero-traffic-accident-fatality zones
  - Provision of budgetary measures amenable to the formation of Smart Towns throughout Japan
  - Promotion of transparency in the policymaking and approval procedures of the public sector
- (3) Development and construction of infrastructure according to the requirements of each road
  - Expansion and construction of ETC gates at toll booths
  - Construction of dedicated ETC lanes
  - Construction of dedicated ETC interchanges
  - Construction of automobile-specific wireless communication systems for probes and other applications
  - Promotion and construction of Internet-based ITS
  - Construction of the ITS platform (wireless LAN, DSRC, markers, etc.)
  - Construction of the roads necessary to commercialize ITS services to eliminate traffic congestion
  - Construction of road spaces such as parking lots and joint freight-handling spaces

- Construction and implementation of automatic driving of cargo transport vehicles on limited road spaces
  - Strong promotion of systems for the support of safe driving through harmonization of vehicles and infrastructure
- (4) Securing of funding for ITS upgrading from both the private and public sectors
- Establishment of schemes and systems for the introduction of public-sector funds
- (5) Promotion of better liaison among the four ITS-related agencies and ministries
- Data standardization and formation of data distribution mechanisms that supercede the framework of the public sector
  - Standardization of pedestrian navigation services
  - Creation of a ministry for ITS and social infrastructure
- (6) Support for overseas business
- Support for deployment of business overseas based on world-leading Japanese ITS technologies such as VICS
- (7) Execution of measures to reduce traffic fatalities by half
- Realization of the “ITS promotion zone concept” aiming to achieve zero traffic fatalities
  - Coordination with various overseas agencies on a definition for “traffic fatality”

#### **4. Proposal on the Role of ITS Japan**

Based on the results of a survey comparing ITS promotional organizations in the three key ITS markets of Europe, the United States and Japan, ITS Strategy Committee outlined the role it must fulfill to spur renewed promotion of ITS operations in Japan. The main points of the new role performed by ITS Japan are outlined below. ITS Japan has been asked to examine all of these items in the near future.

##### **4.1 Role expected of ITS Japan (issues examined)**

- (1) Tabling of proposals to the government and support for their promotion
- Active role in proposing national traffic policy and safety policy
  - Submission of proposals to the public sector with reference to traffic policy and traffic safety policy in the US and Europe
  - International proposals, such as a common global framework for the ITS field
- (2) Liaison and cooperation functions
- Gathering of opinion from the private sector and promotion of collaboration and liaison among private-sector players
  - Promotion of collaboration and liaison between the public and private sectors and between industry and academia
  - Enhancement of regional ITS Japan offices and proposal of new roles to promote regional ITS
  - Sponsorship of ITS seminars and exhibitions in collaboration with the ITS promotion agencies of each ministry and agency
- (3) Functions to promote standardization
- Standardization activities and participation in system architecture development
- (4) Independent research functions
- Promotion of independent research and development activities

- (5) International strategic functions
  - Support deployment of operations in the Asia-Pacific region by Japan's industrial sector
- (6) Personnel training functions
  - Personnel training (for domestic enterprises and foreign exchange students) and liaison with universities
  - Development of system engineers for ITS
- (7) Strategic data center functions for promotion of ITS in the Asia-Pacific rim
  - Liaison with the ITS promotion organizations of various Asian countries to strengthen services and construct databases

## **4.2 Organization of ITS Japan**

- (1) Incorporation
  - Examination of the merits of incorporating foundations, associations, NPOs etc. to work on ITS projects  
Examination of the advantages and disadvantages of incorporation, learning from the models of ERTICO (corporate structure) and ITS America (NPO)
- (2) Clarification of mission
  - Clear declaration of the mission statement and slogans of ITS Japan  
Clarification of ITS Japan's mission in connection with national traffic policy
- (3) Restructuring of the functional committees
  - If judged necessary to promote the role expected of ITS Japan, the existing functional committees can be restructured.

## **4.3 Composition of ITS Japan Membership**

- (1) Expansion of the fields of business from which members are drawn
  - ITS Japan's membership is more closely focused on roads and automobiles than those of its counterparts overseas. Expansion of membership to include local government, cargo transport operators, communication carriers and construction enterprises needs to be considered.