Chapter V   ITS info-communications systems promotional measures

In the preceding sections, this report has presented examinations concerning the ideal future image of ITS info-communications systems, images of applications expected for ITS info-communications systems and the outlook for the ITS info-communications market.   These examinations are based on the objectives of ITS promotion as well as the role to be played by info-communications systems in ITS promotion.

ITS info-communications systems are seen evolving into comprehensive systems that will provide a wide variety of services to the public through networks.   In tandem with this, various applications will become available in the ITS info-communications market, prompting the market to grow into one of Japan's leading industries in the 21st century that contains a large workforce.

Nonetheless, this rosy picture can be realized only when very extensive R&D themes are to be worked out in a well-coordinated manner.   In particular, around the year 2005 is a crucial time for this ITS promotional plan in its entirety.   If the planned technologies are yet to be developed by this time around -- dubbed ITS info-communications systems' "development stage" -- this could exert a very negative impact on the relevant industries.   This would be much more serious than just not being able to realize ITS info-communications systems.   Therefore, utmost efforts must be made to work out these R&D themes and realize them at the earliest possible date.

Taking these points into due consideration, this report proposes measures that should be implemented in years to come for further promotion of ITS-related R&D activities and for diffusion of ITS info-communications systems, in the following pages.   It is vital for the government, industry and academia to join forces and implement the proposals of this report from global viewpoints.

1. Viewpoints of R&D on ITS info-communications systems

Research and development of ITS info-communications systems should be pursued from the following perspectives.

(1) R&D in accordance with user needs

ITS info-communications systems can greatly influence the Japanese people's daily life. Therefore, R&D work should be promoted from the standpoint of the users, taking into due consideration the impact of ITS info-communications systems on the users.

In addition, when carrying out R&D work in order to advance info-communications technologies and thus to improve the conventional services, system compatibility must be ensured. It is because users should be given wide service choices and these services should continue to be available as well as compatible on both conventional and newly developed systems.

It is also important to note that attractive applications can be developed only when the developers closely track what the users really want.

In developing ITS info-communications system, because of their public nature, considerations must also be made to ensure ease of use by those with disadvantages, including the elderly and disabled.

(2) R&D for the purpose of new industries creation

With ITS info-communications systems regarded as having high market potential based on the projection that the ITS market will grow into one of leading Japanese industries, R&D work on ITS should be geared to produce a wide variety of applications. At the same time, such efforts should also aim to induce creation of new businesses, so as to revitalize the economy and help create new industries.

(3) R&D in line with globalization trends

ITS is one of worldwide projects being promoted not only in Japan but also in other parts of the globe. Therefore, R&D on ITS info-communications systems in Japan should be carried out under the global mechanism, while attention is always being made to trends in international standardization work. Specifically, ITS info-communications systems' interoperability and interconnectivity in a global fashion must be ensured.

(4) R&D contributing to environment preservation

ITS info-communications systems are expected to improve traffic flow and efficiency in distribution, thereby contributing to the alleviation of environmental problems and to the construction of a socioeconomic system that is less burdensome on the global environment. Therefore, R&D activities should be carried out, through realization of an environment-friendly society.

(5) R&D with consideration to safety

It is a shame if R&D efforts do not achieve the goals of ITS -- realization of ITS info-communications systems ensuring driving comfort and safety.   Therefore, R&D work should be carried out, aiming to enhance safety as well as dramatically improve human-machine interface.

In addition, since ITS info-communications systems involve use of various radiowaves for roadside-vehicle/inter-vehicle communications among others, special attention should be paid in pursuing R&D work.   Specifically, EMC (electromagnetic compatibility) between ITS systems and other on-board mechanical units, as well as the radiowave usage environment and so forth should be considered, while keeping in mind the guidelines for protection of human bodies from radiowaves that might possibly cause harm.

2. Comprehensive ITS info-communications systems promotional measures

Summing up the examinations made in the preceding sections, the report presents a package of proposals that should be implemented immediately with invigorated efforts of all parties involved, so as to realize ITS info-communications systems at the earliest possible date.

(1) Promotion of R&D and standardization of ITS info-communications systems

(a) Earliest possible realization of R&D/standardization visions for ITS info-communications systems

In order to promote smooth and effective R&D work on ITS info-communications technologies, it is vital for representatives from government, industry and academia to work closely based on the R&D and standardization targets defined in this report, aiming at the realization of ITS info-communications systems at the earliest possible date.

The role to be played by government, industry and academia respectively should also be clarified in order to deal appropriately with the wide-ranging R&D themes and to expedite the procedures toward the realization of the systems.

In some cases, the government must take a strong and strategic initiative; for instance, upon implementation of large-scale and long-term R&D projects, or development of common technologies that can serve as the social infrastructure. Specifically, these cases include themes that, due to their high-risk nature, cannot be pursued by private companies alone; themes of a public nature; themes having many things in common over a variety of fields; and, urgent themes with great impact.

Moreover, in order to promote R&D on cutting-edge technologies upon considering future developments in ITS info-communications systems as well as in industries, the government should invest vigorously, focusing on technologies that can serve as the technological basis and can trigger further technological advances. Specifically, promotion of investments by the government should focus on the following items, which are listed as R&D themes on ITS that should be promoted comprehensively in the preceding section.

Realization of Smart Gateway technology

Realization of ITS info-communications platform (info-communications infrastructure) technology

Realization of technologies for improving versatility and advancing ITS applications

Realization of human-friendly ITS terminal advancement technology

(b) Promotion of R&D and standardization, with consideration to international competition as well as harmonization

When conducting R&D activities, it is very important to always keep standardization in mind against the backdrop of ever-intensifying international competition. In particular, at the present time when the market is dominated by de facto standards, tight-knit collaboration of the government and industries is vital for promoting R&D efforts geared towards the creation of global standards originating from Japan.

In addition, in order for Japan to be able to take the initiative in international standardization activities, there is a need for experts as well as training of experts who can coordinate and promote well efforts being made in international standardization and R&D activities. It is expected that a growing amount of time and effort will be spent for standardization activities as ITS info-communications systems advance. The government, therefore, should secure enough human resources to cover the increase in such activities. In order to promote very focused R&D activities while helping to maintain the morale of the R&D promoters, it is vital for the government to support these R&D efforts under its strong leadership.

Currently, global ITS standards are set by ITU, ISO, ASTAP and other standardization

bodies.　With the aim of increasing Japanese contribution to ITU's standardization activities, TTC's Mobile Services Expert Group (???) has been conducting deliberations on radiocommunications issues related to TICS (Transport Information and Control Systems), undergoing examination at ITU-R (Radiocommunication Sector)'s SG 8 WP8A.　For ISO, TC204 Domestic Committee in Japan established subcommittees to take part in ISO's standardization activities.　In addition, for ASTAP, which was formed in November 1997 to promote standardization activities in the Asia-Pacific region, the ITS Expert Group Meeting and various activities aimed at the promotion of ITS have been conducted.

While the ITS field's coverage continues to expand, thereby prompting advances in related technologies amid intensifying international competition, the time span from the start of R&D to realization of technologies will be shortened considerably.　Under the circumstances, in order to promote standardization activities that can flexibly respond to progress in ITS, cooperation and collaboration must be sought both at home and aboard.　It is important to promote cooperation not only with other countries, but also with other standardization organizations in Japan in charge of various other fields.

(c) Improvement and reinforcement of ITS research by universities and other institutions

Because of ITS's interdisciplinary nature, researchers on ITS technologies are required to have a broad knowledge that not only covers telecommunications but also mechanics and civil engineering to economics, sociology, law and psychology.

Therefore, universities and other research institutions should take a new approach in working on ITS info-communications technologies, for instance, by regarding ITS technologies as comprising a new field of discipline that cannot be confined by the conventional definition of telecommunications.　These research institutions should also cooperate closely with academic societies and other relevant organizations.

In the U.S. and European countries, governments have been subsidizing research institutions including universities for expenses incurred by their ITS-related research projects.　In order for Japan to continue promoting R&D on ITS info-communications systems through the combined intelligence of all parties involved, it is vital for public support to be provided to universities and other research institutions in order to promote R&D activities even more.

(2) Preparation of R&D scheme for ITS info-communications technologies

(a) Preparation of a center for comprehensive R&D activities

As mentioned above, government initiative is vital for securing funds for expenses and promoting R&D projects, aimed at realization of ITS info-communications systems. At the same time, the construction of a comprehensive R&D center is also very important in conducting R&D activities very efficiently via info-communications networks through collaboration of research institutions, because ITS-related R&D activities cover a very broad area over a variety of fields. Specifically, R&D work should be promoted from global points of view through frequent information exchanges among researchers and engineers, while taking trends in international standardization activities into due consideration.

(b) Preparation of ITS R&D/standardization facilities

As mentioned before, ITS info-communications systems should be promoted, with in mind the possibility of recommending the outcome of domestic R&D activities for global standards, even from the R&D stage. Creation of facilities aimed at both R&D on and standardization of ITS technologies can greatly contribute to this goal. These facilities are seen enabling the implementation of comprehensive analyses and evaluations of proposed technologies/methods, followed by the feedback of said analysis/evaluation results, while at the same time attempting to ensure interoperability and interconnectivity of these technologies on a global scale. This enables ITS promotion that focuses equally on research and on standardization.

Simultaneously, in order to promote both R&D and standardization strategically, systems for handling ITS-related information should be prepared, such as databases that facilitate the gathering and analysis of relevant ITS information overseas.

(3) Development of pilot ITS info-communications systems in local communities

(a) Promotion of pilot projects on ITS info-communications systems

ITS info-communications systems could be regarded as a social infrastructure having a potential impact on the Japanese people's life.   ITS info-communications systems are also considered to be high-risk items in the process for their realization, because ITS info-communications systems will encompass cutting-edge info-communications technologies. Therefore, development of ITS info-communications systems should be pursued, taking various factors into due consideration such as the expected scale of impact of ITS systems installation on the community, opinions from locals and their specific needs.

It is anticipated that development of pilot ITS info-communications systems based on the specific needs of communities will become more prevalent.   In order to install the systems at the earliest possible date, it is important to conduct pilot projects based on the anticipated ITS systems' influence over the society as well as the user need.

Since the outcome of these experiments is associated with a wide-range of technical issues, the outcome is expected to contribute not only to the community, but also to the earliest possible realization of various ITS info-communications systems throughout the Japan. Moreover, by dispatching information on this outcome overseas, the diffusion of ITS info-communications systems as well as international standardization work on ITS will be promoted.

(b) Improvements in experimental data evaluation/analysis functions

Pilot projects on ITS info-communications systems will enable the gathering of a variety of data, such as user needs for ITS systems.   To fully reflect such data in the process towards the realization of ITS systems, the methods for sorting out the data, then evaluating and analyzing them must be developed.

In particular, the honing of evaluation/analysis methods is expected to expedite systems diffusion and promote further standardization activities.

(4) Promotion of ITS infrastructure development and terminals diffusion

(a) Development of infrastructure, with consideration to expansion of ITS info-communications systems and to their standardization

ITS technology has its base in the interconnected networks, on which road traffic/transportation information is distributed. Thus, the crux lies in the advancement of info-communications infrastructure as well as the development of other relevant social infrastructures.

As these infrastructures are very public-natured, which constitute the basis for ITS technologies, government initiatives are required for the infrastructure development. Specifically, the government should promote the development of ITS-related infrastructures, and formulate clear infrastructure development plans for the development/deployment of new ITS systems. Such work by government should include the promotion of systems advancement and the increase in information available through VICS services (which have been implemented in some parts of Japan), in order to further the expansion of VICS services nationwide at the earliest possible date.

Once infrastructures are constructed, systems will be up and running thereon for a long period of time. For this reason, infrastructures should be developed by taking ITS systems' expansion as well as standardization trends into due consideration.

(b) Promotion of R&D with consideration to the earliest possible diffusion of ITS terminals and to people with disadvantages upon use of road traffic/transportation system

The relationship between ITS terminals and infrastructure can be compared to that of "the chicken and the egg." To realize the widespread use of ITS terminals as soon as possible will also greatly contribute to the progress of ITS info-communications systems as a whole. Based on this view, measures aimed at the earliest diffusion of ITS terminals should be implemented. For instance, efforts should be made to realize the sharing and integration of various terminals so as to lower terminal prices, and to standardize terminal interfaces, among other things.

Moreover, efforts should also be made to develop human-friendly ITS terminals, which will ease the problems faced by people (including the elderly and disabled) with disadvantages upon their use of the road traffic/transportation system.

(c) Preparation of an environment aimed at the smooth introduction of ITS info-communications systems

In introducing ITS info-communications systems, it is necessary to deal appropriately with various legal and social issues. Among these are the enabling of the smooth flow of ITS information, ensuring of security for use of various systems, and the handling of intellectual property rights issues. In line with these needs, the government should carry out environmental preparation such as the development of legal and social frameworks towards the smooth introduction of ITS info-communications systems, while paying attention to relevant legal and social issues upon promoting R&D activities on ITS.

(5) Preparation of the promotional structure towards realization of ITS info-communications systems

(a) Establishment of an ITS info-communications systems forum

For the realization of various ITS info-communications systems, cooperation and collaboration must be sought not only from the info-communications sector, but also from various other sectors that deal with road, traffic, transportation and vehicles. It is also important that all parties involved play their part in the efforts for R&D promotion. As such efforts are also to be contributing to the creation of new industries, collaboration of all parties involved (including various service providers) in an interdisciplinary approach is also a must.

In fact, the technological development themes aimed at realization of ITS info-communications systems are relevant to several industries and research institutes in the industries. Moreover, as today's stand-alone ITS info-communications systems will be integrated into comprehensive system interconnected by networks, it is very important to ensure the systems' interoperability, interconnectivity and future expansion, while closely following international trends in standardization work, as well as attempts to increase the versatility of system functions and to share these functions among many different systems.

To this end, tight-knit collaboration of the government, industry and academia as well as their relevant entities is crucial to the promotion of R&D work, while frequently exchanging R&D information among them and responding to the needs of users. In addition, a wide ranging ITS-related technological information should be gathered and analyzed smoothly and effectively so as to appropriately promote R&D and standardization work.
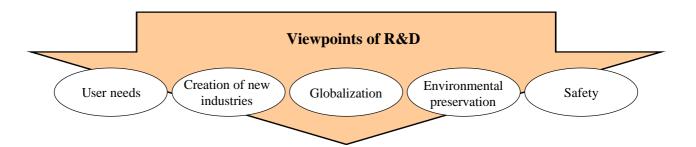
From these perspectives, an ITS info-communications forum shall be established so as to facilitate smooth promotion of R&D work on ITS from an interdisciplinary approach.

(b) Improving public awareness for ITS info-communications systems

Realization of ITS info-communications systems is anticipated to exert a great impact on the Japanese society. Among anticipated effects are improved quality of life of the Japanese public, revitalization of local communities, creation of new industries and so forth. In order to continue promoting R&D on ITS info-communications systems, efforts must be made not only for accommodating varied user needs, but also for helping the public gain consensus on the objectives as well as necessity of ITS introduction.

To this end, measures shall be taken for heightening understanding of ITS info-communications systems among the public; for instance, by widely publicizing features of ITS systems in a clear manner through various media. The aforementioned pilot experiments also should provide good opportunities for Japanese people to experience positive effects of ITS info-communications systems.

Fig. 5-1   Comprehensive ITS info-communications systems promotional measures

Viewpoints of R&D

- User needs
- Creation of new industries
- Globalization
- Environmental preservation
- Safety

Promotion of R&D and standardization of ITS info-communications systems

1. Earliest possible realization of R&D/standardization visions for ITS info-communications systems
   R&D themes on ITS that should be promoted comprehensively:
   - Realization of Smart Gateway technology
   - Realization of ITS info-communications platform technology
   - Realization of technologies for improving versatility and advancing ITS applications
   - Realization of human-friendly ITS terminal advancement technology
2. Promotion of R&D and standardization, with consideration to international competition as well as harmonization
3. Improvement and reinforcement of ITS research by universities and other institutions
   (ITS technologies regarded as comprising a new field of discipline: cooperation with academic societies)

Preparation of R&D scheme for ITS info-communications technologies

Preparation of a center for comprehensive R&D activities
Preparation of ITS R&D/standardization facilities

Establishment of an ITS info-communications forum

Information exchanges among industries from an interdisciplinary approach; contribution to promotion of R&D and standardization
Improving public awareness for ITS info-communications systems

Development of pilot ITS info-communications systems in local communities

Promotion of pilot projects on ITS info-communications systems
Improvements in experimental data evaluation/analysis functions

Promotion of ITS infrastructure development and terminals diffusion

Development of infrastructure, with consideration to expansion of ITS info-communications systems and to their standardization
Promotion of R&D with consideration to the earliest possible diffusion of ITS terminals and to people with disadvantages upon use of road traffic/transportation system
Preparation of an environment aimed at the smooth introduction of ITS info-communications systems