

Vision for ITS User Services and RS Application

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Abstract: This paper firstly focused on introducing the current status of ITS activities in Korea. Then, possibility of RS application within the surface transportation was studied. ITS in Korea was first introduced in early nineties, since then, Korean government puts lots of efforts for flourishing it. Topics for the paper are composed of the Korean ITS Strategic Plan, ITS R&D, Metropolitan Model Deployment Initiative Projects, and RS application in ITS. One of the main findings in the process of revision of the national strategic plan for the 21st century was that ITS should thoroughly reflect end users' needs in establishing its goals and objectives. For ITS R&D, Korean Government took initiatives, and drove it since 1997. In conclusion, authors suggest future application of RS within ITS in developing country.

Keywords: ITS, RS Application, GPS.

1. The National ITS Strategic Plan for the 21st Century

In 1993, Korean government understood needs for the national ITS strategic plan, and initiated research in 1994. Researchers from Korean Society of Transportation Engineers (KSTE) and government funded research institutes participated at the project. After two years of efforts, research result came out and ITS-related government bodies reviewed it. In 1997, it was officially approved by the government and finally opened to the public. Since then, ITS was enacted from the government level, and private sector actively involved in the ITS business. In 1998, however, Korean government faced currency crisis and recession. Due to these reasons, investment for ITS decreased abruptly. On the other hand, a group of ITS experts strongly suggested needs for changing goals of ITS strategic plan from the government point of view to that of end users. Thus, the government resolved to initiate revision of the national ITS strategic plan in 1999 in order to have more realistic and feasible plan. For the revision, the Korea Transport Institute (KOTI) and KSTE played key role.

1) Scope

User Services

Since strategic plan of 1997 adopted system oriented approach, it had limitation on propagation. Specifically, for the local governments that are unfamiliar with the definitions of ITS systems, it was not comfortable for them to abide by the plan. Therefore, the revised strategic plan focused on user services, and it contained the

detail descriptions of each user service areas. In addition, the revised strategic plan subdivided user services further into 63 subservices

Timetable

The national strategic plan of 1997 was 15-year-long plan. The first 5 year, i.e., 1996 to 2000 was defined as the short term, and focusing on development of initial infrastructure for ITS. The duration of the second phase was year 2001 to 2005, and it was the period for expansion of ITS infrastructure. The last phase of the plan was designated by the year 2006 to 2010 that emphasizing the enhancement of the system performance for practical use. However, time table was extended to the year 2020 for the new version of the national plan. Since we took the lessons of U.S DOT's MMDI that emphasized the importance of coordination between conventional transportation plan and ITS plan, time table for the ITS plan adopted the national road network development plan that established in 1999.

2) Other Related Issues

Research and Development

For the ITS R&D, Korean government established long term plan in 1997, and then it was revised in 2001. Main purpose of establishing the ITS R&D plan is to avoid overlapping its investment, and boost ITS strategically. Additionally, assisting private sector's effort for core technology development is another purpose.

Identification of role sharing between the public and the private is another subject in R&D plan. Ministry of Construction and Transportation (MOCT) takes the initiative in R&D. Among various subjects, MOCT focuses on standardization. Also, MOCT has main responsibility of R&D on express highways and arterial roads. Along with MOCT, Ministry of Information and Communication (MIC) is actively involved in telecommunication areas in ITS R&D. National Police Agency put a lot of efforts in adaptive signal control and management issues, and Ministry of Science and Technology is participating at developing fundamental technologies rather than applied ones. On the other hand, the private sector focuses on traveler information and commercial vehicle related issues. One of private firms called ROTIS Co. Ltd. has been conducted fundamental research on traveler information, and ROTIS installed RFID vehicle detectors throughout the capital region. The detector, Korean

brand covers every two lane or more roads, and the spacing between detectors are about 500 meter. In total, 15,000 detectors with information center are in operation. Korea Telecom and KL Net were designated as exclusive firms for commercial vehicle operation by the government. Thus, location and identification system for vehicle and goods were developed. In addition, various companies are involving in developing contents for traveler information services as well as commercial vehicle operation. Especially, recent trend in Korea, i.e., venture booming is giving impact on ITS R&D positively.

Telecommunication Infrastructure

It can be expected that new demand on communication would grow abruptly when ITS is evolving in the nation. Securing resources on both wired and wireless communications will be a crucial factor. In addition, adopting new telecommunication technologies that utilize satellite and conventional mobile phone network into ITS will be essential.

Education

Ensuring multiple numbers of ITS experts will give positive impact on shortening the expansion time period of ITS. Training and education plays an important role in this point of view. Since ITS is combined technologies of information, communication, control, and transportation, detail and effective planning is required in establishing the program. Training program consists of regular seminar, workshop, short courses, and university education program. Training program should cover potential experts groups, such as student, private sector employee, and government officers. Fundamental theory, telecommunication, applied technology, ITS architecture, standardization, legal issues are main subjects of courses. Currently, the training and education committee in ITS Korea is preparing both course material and detail plan.

International Cooperation

International cooperation is an essential factor to exchange experiences and ideas of ITS. Active participation at international workshop, seminar, and exposition is a way of promoting international cooperation. Constructing English version of ITS Korea's homepage that introduces past, present, and future ITS activities in Korea is another idea of boosting international cooperation.

2. Status of ITS Deployment

1) ITS Model Deployment Initiatives in Kwachon

As shown in Figure 2, 8 different systems are in operation in Kwachon area. Among these systems, some of the unique systems are as follows. 14 signalized intersections were equipped with 159 loop detectors and 13 image detectors so that these intersections operate in real-time traffic responding mode. Two VMS's were also included in the systems, and these were located at strategic locations. Thus, drivers are able to make selection on

alternative route.

Four license-capturing systems were installed to identify over-speeding drivers. As it adopts infrared light, 24-hour operation is feasible. Currently, on-line connection to identify the owner of vehicle with the National Police Department is completed. For car navigation, 8 vehicles, including 3 autos and 5 buses, are tracking in certain period of time. These are GPS based so that the location of each vehicle can be monitored and real-time information such as congestion, incident information can be transmitted into the vehicle. Both Wireless Data Network and Pager Network are testing

For the bus passengers in Kwachon area, arrival time information is provided at 11 bus stops. GPS and beacon based system is in operation. At two bus stops, that are adjacent to subway stations, interactive information kiosks are in operation.

2) ITS Model City Projects

Goals of the ITS Model City Project were to provide better services for both road users and visitors for the 2002 FIFA World Cup in Korea/Japan. In order to fulfill the goal, the MOCT identified the objectives of the project as providing real time traffic information for road users, and disseminating bus arrival time information for transit users. 10 cities in Korea were selected as host cities for games. Among cities, Daejeon, Jeonju, Cheju were chosen as model cities for ITS applications. Each model city has its own characteristics. Daejeon, Jeonju, Cheju represent metropolitan city, small city, tour city, respectively.

As user services, we defined Adaptive Signal Control Service, Automatic Enforcing Service, Bus Information Service, CCTV, VMS, Traffic Management Service, and Traveler Information Service. 40 Million U.S \$ was invested for three cities, and the projects were completed in December 2002.

3. RS Application in ITS

RS technologies can be easily applied to ITS by adopting a source of location identification methods. Real time location information is a crucial factors to process valuable information. Specifically, identifying the location of moving vehicle is a start point to provide that vehicle various information, such as location based real time point of interest (POI) information, the shortest path, etc. To enable location identification, GPS is the most powerful way.

Another potential area to utilizing RS technology is the field of monitoring a traffic flow. A picture produced by satellite can be utilized by identifying traffic condition on road network. Measuring precise traffic density on transportation network was not feasible. But, using pictures taken from satellite and advanced analysis technologies made it feasible. Thus, it will save infrastructure cost in detecting density of transportation network.

4. Conclusions

The national ITS strategic plan for the 21st century will help boosting ITS in Korea. Since it was amended for end user's perspectives, it is easy to understand, and to go into effect. In fact, some of local governments already reflected it to their own master plan establishment. Additionally, it will dedicate for the advancement of ITS in the transitional countries in many aspects. On the other hand, although the research period and project fund were limited, all the R&D projects were evaluated as successful. Since the first ITS R&D was planned for considering the priority for the ITS model deployment, i.e., developing core technologies and algorithm, these results will give good impact on upcoming ITS deployment. Also, series of R&D is planned to boost ITS technologies in Korea. In terms of ITS deployment, R&D gives a good influence, and verified technology is a crucial issues in deployment. Especially, R&D on RS will be an important area that we should focus in the near future.

References

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