

ITS DEVELOPMENT DIRECTION IN KOREA

Hyeon Hong LEE
 Researcher
 Transport Planning & Traffic Eng.
 Seoul National University
 Sinlim-Dong, Kwanak-Gu, Seoul,
 151-742, Korea
 Tel: +82-2-880-7372
 Fax: +82-2-889-0032
 E-mail: traffici@chollian.net

Kyung Soo CHON
 Professor
 Department of Civil Engineering
 Seoul National University
 Sinlim-Dong, Kwanak-Gu, Seoul,
 151-742, Korea
 Tel: +82-2-880-7376
 Fax: +82-2-872-8845
 E-mail: chonks@snu.ac.kr

Sanghoon BAE
 Ph.D
 Head of ITS Research Team I,
 The Korea Transport Institute

Tel: +82-344-910-3113
 Fax: +82-344-910-3228
 E-mail: shbae@koti.re.kr

Sigon Kim
 Professor
 Department of Geoinformatics Engineering
 NAMSEOUL University
 21 Maeju-ri, Seonghwan-eup, Cheonan-city,
 Choongnam, 330-707, KOREA
 Tel: +82-41-580-2371
 Fax: +82-41-582-0955
 E-mail: sigonkim@nsu.ac.kr

Abstract: This paper will review the development process for the national strategic plan of 1997, and the needs for its revision for the coming century. Also newly defined service areas, timetable, and budget will be explained in this paper. In other words, this paper will be focusing on introducing direction of revision on the national ITS strategic plan in Korea. Also this paper will include other related issues such as Research and Development, Telecommunication Infrastructure, Education and Standard Activities.

Key Words: ITS Progress Direction, Service Area, Timetable, Budget

1. INTRODUCTION

Korea has adopted ITS since 1990 and has made efforts on building ITS to fit the needs of Korea. In 1997, the Master Plan for National ITS Development was established, and a great deal of effort has been provided towards the actual implementation of the program. Since then, ITS was enacted from the government level, and private sector actively took part 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.

In this background, this paper will review the development process for the national strategic plan of 1997, and the needs for its revision for the coming century. Also newly defined service areas, timetable, and budget will be explained in this paper. In other words, this paper will be focusing on introducing direction of revision on the national ITS strategic plan in Korea. Also this paper will include other related issues such as Research and Development, Telecommunication Infrastructure, Education and Standard Activities.

2. SCOPE OF THE NATIONAL ITS STRATEGIC PLAN FOR THE 21ST CENTURY

2.1 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. Following table shows newly defined user services and subservices.

Table 1. User Services for the National ITS Strategic Plan for the 21st Century

| SERVICE AREAS | SERVICES | SUBSERVICES |
|------------------------------------|--|---|
| 1. Optimal Traffic Management | 1. Traffic Management | 1) Real Time Traffic Control 2) Freeway Traffic Control 3) Wide area Traffic Control 4) Information for Traffic Control 5) Signal Integration for Rail Crossing |
| | 2. Incident Management | 6) Incident Detection 7) Incident Response Service 8) Emergency Vehicle Dispatch |
| | 3. Traffic Enforcement | 9) Speed Enforcing Service 10) Exclusive Bus Lane Enforcing Service 11) Lane Violation Enforcing Service 12) Signal Enforcing Service 13) Weigh In Motion |
| | 4. Air Pollution Control | 14) Air Pollution Management |
| | 5. Transportation Facility Management | 15) Transportation Facility Management and Operation |
| 2. Electronic Payment | 6. Electronic Toll Collection | 16) Electronic Toll Payment 17) Road Pricing |
| | 7. Electronic Fee Payment | 18) Electronic Transit Fare 19) Electronic Parking Payment |
| 3. Traffic Information Boosting | 8. Basic Information | 20) Basic Traffic Information |
| | 9. Information Integration | 21) Integrated Traffic Information |
| 4. Value Added Traffic Information | 10. Value Added Info. for Auto Drivers | 22) Traveler Information 23) Pre Trip Traveler Information 24) En Route Traveler Information 25) Dynamic Route Guidance 26) Parking Information |
| | 11. Value Added Info. for Non Auto Drivers | 27) Pedestrian Route Guidance 28) Bicycle Route Guidance 29) Handicapped Route Guidance 30) Other Information |
| | 12. Transit Information | 31) City Bus Information 32) Express Bus Information 33) Inter City Bus Information |

| | | |
|---|-----------------------------------|---|
| 5. Transit Boosting | 13. Transit Management | 34) City Bus Management 35) Express Bus Management 36) Inter City Bus Management 37) Automatic Reservation 38) Intermodal Fare Management 39) Transit Safety 40) Transit Facility Management |
| 6. Efficient Commercial Vehicle Operation | 14. Commercial Vehicle Management | 41) Commercial Vehicle Location 42) Commercial Vehicle Management 43) Commercial Vehicle Safety 44) Commercial Vehicle Route Guidance |
| | 15. Hazardous Material Management | 45) Accident Management 46) Hazardous Material Management 47) Hazardous Vehicle Route Guidance |
| | 16. Goods Management | 48) Electronic Goods Management 49) Electronic Paperwork |
| 7. Advanced Vehicle and Highway | 17. Assisted Safe Driving | 50) Automated Accident Alarm 51) Longitudinal Collision Avoidance 52) Lateral Collision Avoidance 53) Intersection Collision Avoidance 54) Rail Crossing Safety 55) Speed Reduction Zone Alarm 56) Vehicle Diagnosis 57) Pedestrian Safety 58) Handicapped Safety 59) Driver Vision Enhancement 60) Reckless Driving Prevention |
| | 18. Automated Driving | 61) Longitudinal Control 62) Lateral Control 63) Platoon Maneuvering |

2.2 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. Newly defined timetable is illustrated in Table 2.

Table 2. Comparison of Time Table

| PLAN | PERIOD | TIME TABLE | GOAL |
|---|------------|--------------|---|
| Plan for 1997 | Short Term | 1996 to 2000 | Initiating ITS Infrastructure Development |
| | Mid Term | 2001 to 2005 | Expanding ITS Infrastructure |
| | Long Term | 2006 to 2010 | Enhancing System Performance |
| Revised Plan for the 21 st Century | Short Term | 2001 to 2005 | Establishing ITS Infrastructure |
| | Mid Term | 2006 to 2010 | Expanding ITS Infrastructure |
| | Long Term | 2011 to 2020 | Providing Full System Benefit |

2.3 Budget

Due to the expansion of user services, budget was estimated approximately 3 times more than the previous plan. Considering the fluctuating trend of ITS system cost, only the budget of the short term that was estimated as 1.2 billion U.S dollars would be meaningful. Table 3 revealed the budget for the plan.

Table 3. Comparison of Budget

Unit: Million U.S Dollar

| PLAN | PERIOD | TIME TABLE | BUDGET | TOTAL |
|---|------------|--------------|--------|-------|
| Plan for 1997 | Short Term | 1996 to 2000 | 695 | 3,015 |
| | Mid Term | 2001 to 2005 | 1,020 | |
| | Long Term | 2006 to 2010 | 1,300 | |
| Revised Plan for the 21 st Century | Short Term | 2001 to 2005 | 1,200 | 8,700 |
| | Mid Term | 2006 to 2010 | 3,700 | |
| | Long Term | 2011 to 2020 | 3,800 | |

3. OTHER RELATED ISSUES

3.1 Research and Development

For the ITS R&D, we established long term plan in 1997. 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. We identified 4 subject areas in R&D – core technology, advanced algorithm, system integration, policy, and government driving R&D was initiated in 1998. Timetable and objectives for R&D are shown in Table 4.

Table 4. Timetable for ITS R&D

| PHASE 1 (2001 – 2005) | PHASE 2 (2006 – 2010) | PHASE 3 (2011 – 2020) |
|--|---|--|
| <ul style="list-style-type: none"> - Developing core technology and algorithm - Conducting initial R&D on AHS and automated vehicle - Standardization in 14 subject areas | <ul style="list-style-type: none"> - Developing system integration - Conducting advanced R&D on AHS and automated vehicle - Expanding standardization areas - Revising R&D plan | <ul style="list-style-type: none"> - Developing AHS and automated vehicle - Establishing Future Plan |

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 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.

3.2 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. Time table for new communication infrastructure development for ITS is shown in Table 5.

Table 5. Time Table for New Communication Infrastructure

| | FIRST PHASE (2001 - 2005) | SECOND PHASE (2006 - 2010) | THIRD PHASE (2011 - 2020) |
|------------|---|--|--|
| Goal | Constructing ITS Communication Infrastructure | Constructing Unified ITS Communication Infrastructure | Intensifying ITS Communication Infrastructure |
| Objectives | - Constructing DSRC Network - Constructing Networks among system - Maximum Utilizing Conventional Network | - Designing and Constructing Integrated Wired and Wireless Communication Network | - Constructing High Powered Communication Infrastructure |
| Region | Metropolitan Areas | Entire Nation | Entire Nation |

3.3 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.

3.4 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.

3.5 Standardization Activities

To make fundamental framework to obtain the compatibility and interoperability among systems or services provided by National ITS Master Plan, 『National ITS Technology Standardization – Phase 1, 2』 has been implemented through 2 years('98, '99). After these projects a yearly plan has been announced and the first standardization work items has been developed (See Table 6).

Ministry of Construction and Transportation(MOCT) has a plan to promote 『National ITS Technology Standardization – Phase 3』 steadily and participate in international standard activities efficiently.

ITS Korea has been selecting international standardization experts per each Working Group(WG) from the ITS experts among industry, academy and research to implement 『ITS International Standardization Activities and Utilization Method』

Table 6. Standardization Work Items in the Second Phase

| CLASSIFICATION | STANDARDIZATION WORK ITEMS |
|--------------------|--|
| Enabling Standards | National ITS Architecture ITS Glossary Location Reference Specification ITS Digital Road Map Framework D/B Standard for AVI/AEI |
| Data Dictionary | Data Dictionary for ATMS Data Dictionary for ATIS Data Dictionary for APTS Data Dictionary for CVO |
| Message Set | Message Set for Traffic Information Exchange Message Set for Incident Management Message Set for Traveler Information Provision Message Set for Electronic Toll Collection Message Set for Automatic Traffic Surveillance Message Set for Traffic Control |

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.

5. ACKNOWLEDGEMENT

The authors would like to express their sincere gratitude to BK21(Brain Korea 21) by which they are supported, for giving them the opportunity to carry out this paper.

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