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SUCCESSFUL APPROACHES TO DEPLOYING A METROPOLITAN INTELLIGENT TRANSPORTATION SYSTEM

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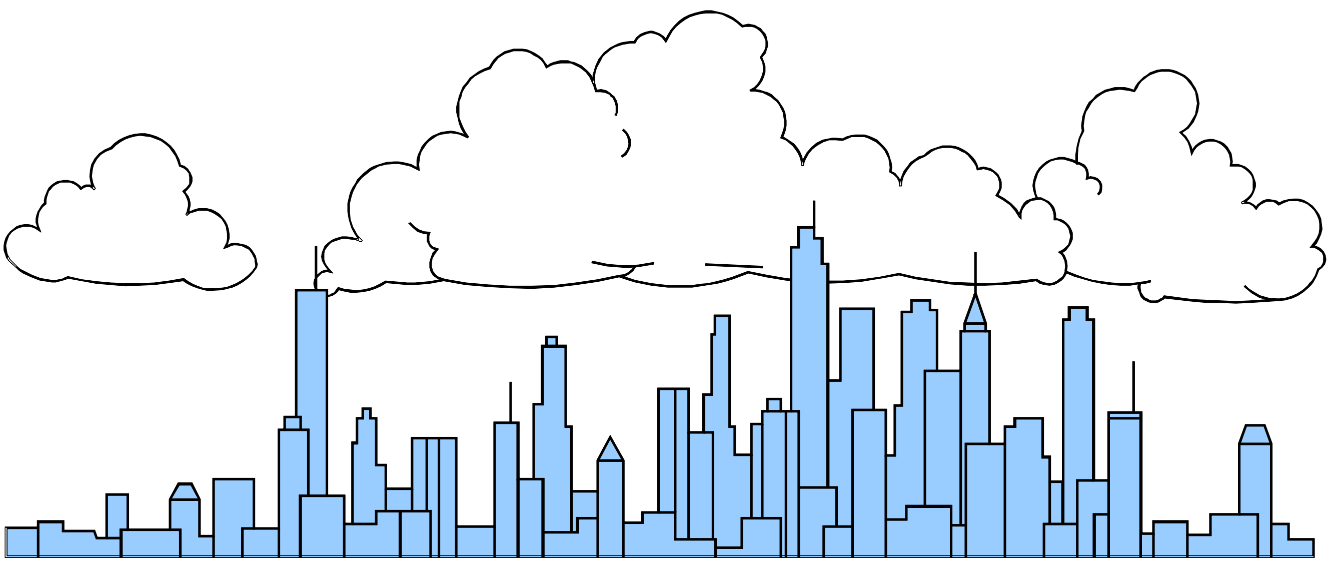
Final Report



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Cambridge, Massachusetts
March 1999

Overview

This report is one in a series of products written for individuals who want to make intelligent transportation systems (ITS) happen; those who want to use advanced technologies to deliver government services more effectively and more efficiently. It illuminates the insights and expertise of transportation professionals who are implementing ITS projects across the United States.

This report will help officials who currently are developing ITS in their location to accomplish their objectives by providing specific examples of what worked in other areas. The information that is presented also will allow officials who are considering deployment in their area to enter into the process from an informed perspective. This will enable them to make better, more knowledgeable decisions relative to their expectations, and consequently, their planning and development of ITS. By understanding what they may experience in later steps, project developers will have the opportunity to do things differently in earlier steps.

This report was designed to allow you to navigate through it easily and to facilitate the use of the information contained in it. Clicking on any blue text will link you to the referenced item. For example, if you are interested in a specific **topic**, then, from the *Table of Contents*, you can click on the *Approach* that discusses that topic, and that *Approach* will be brought to the screen. Similarly, when bookmarks are shown in the frame on the left of the screen, you can click on one to move to another location in the document.

This report contains several deployment aids. The **appendices** record material that has been developed and used successfully within ITS projects. These appendices are referenced throughout the text of the report. Whenever information contained in an appendix is discussed, the appendix number follows the discussion. The appendix can be viewed by clicking on the appendix number. An appendix can also be viewed by clicking on the Appendices Button on the Home Screen and then by clicking on the appendix number or name in the *List of Appendices*. Using the standard copy and paste functions, you can effortlessly move information from these appendices, such as specific contract wording, to any document that you are producing.

Also, there is a **table of questions** at the end of each section. These questions are presented to elicit consideration of steps that may expedite the development of ITS in your region. These tables are also grouped together at the end of this document so that all the tables may be printed at one time. Clicking the Tables of Questions button on the Home Screen or the bookmark will bring you to this grouping.

If you are not familiar with using Acrobat Reader, click the Help Button on the Adobe Toolbar at the top of the screen and then click on Reader Online Guide to receive help.

The authors and sponsors of this report hope that this information will prove helpful as you set out to plan, design, and deploy intelligent transportation systems in your community.

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13. ABSTRACT

On February 26, 1996, the United States Department of Transportation (U.S. DOT) issued a request for participation in the Intelligent Transportation Systems (ITS) Model Deployment Initiative (MDI). The MDIs were envisioned to be demonstrations and showcases of the measurable benefits resulting from the application of an integrated, region-wide approach to transportation management and the provision of traveler information services. The first model deployment initiative focused on metropolitan locations, and four metropolitan sites were selected: Phoenix, Arizona; San Antonio, Texas; Seattle Washington; and the New York-New Jersey-Connecticut Metropolitan Area.

Volpe Center analysts examined the institutional and other nontechnical impediments that public sector participants encountered in deploying ITS, changes made to address these impediments, benefits of making these pre-deployment changes, and the costs associated with them. They then analyzed this information with respect to its applicability to other metropolitan areas that are developing and deploying ITS. This led to the identification of nine approaches that were used successfully by the public sector participants at the MDI sites and other locations that representatives of other metropolitan areas may use to facilitate deployment.

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Foreword

This report was prepared by the U.S. Department of Transportation's (U.S. DOT) John A. Volpe National Transportation Systems Center (Volpe Center) for the U.S. DOT's Intelligent Transportation Systems Joint Program Office (JPO). The Volpe Center study team consists of John P. O'Donnell, Division Chief; Allan J. DeBlasio, project manager; and Deidre Waz from the Volpe Center's Economic Analysis Division and David W Jackson, Anne C. Tallon, Gerald M. Powers, and Dana Larkin from EG&G Services. Dr. Joseph I. Peters, the JPO's Program Assessment Coordinator, guided this review.

This report is intended as a tool to encourage dialogue among members of the ITS community that will further promote the deployment of ITS. The authors encourage feedback on this report and on the resources identified herein. They would appreciate learning of other examples of successful approaches taken to deploy ITS. Also, they acknowledge that the documents cited as references and resources and those included in the appendices are not the entire set of available material and, therefore, would appreciate receiving notice of other material that facilitated the deployment of ITS. Readers who want to contribute comments, additional examples, and other material should contact the Volpe Center:

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EXECUTIVE SUMMARY

Executive Summary

On February 26, 1996, the United States Department of Transportation (U.S. DOT) issued a request for participation in the Intelligent Transportation Systems (ITS) Model Deployment Initiative (MDI). The goal of the Initiative was to create "model deployments" of ITS that supported integrated transportation management systems and featured a strong, regional, multimodal traveler information services component. The MDIs were envisioned to be demonstrations and showcases of the measurable benefits resulting from the application of an integrated, region-wide approach to transportation management and the provision of traveler information services. The first model deployment initiative focused on metropolitan locations, and four metropolitan sites were selected: Phoenix, Arizona; San Antonio, Texas; Seattle Washington; and the New York-New Jersey-Connecticut Metropolitan Area.

The U.S. DOT's ITS Joint Program Office (JPO) is responsible for conducting the evaluation of these four metropolitan MDI sites. One study area of this evaluation is the Institutional Benefits Study, which is being conducted by analysts from the U.S. DOT's John A. Volpe National Transportation Systems Center (Volpe Center). The purpose of the MDI Institutional Benefits Study is fivefold:

- *Assess actions taken to overcome institutional constraints*
- *Identify the benefits of taking these actions and the investments needed to reap these benefits*
- *Document lessons learned*
- *Identify successful strategies that representatives of state and local governments can follow in planning and deploying ITS products*
- *Provide examples of legislation, policies, procedures, and structures that facilitated the deployment of ITS.*

Study Design

To identify and evaluate the institutional structures and working relationships associated with the deployment and integration of ITS products and services at the MDIs, the Volpe Center staff visited the *AZTech* (Phoenix), *iTravel* (New York-New Jersey-Connecticut), *Smart Trek* (Seattle), and *TransGuide* (San Antonio) MDI sites and interviewed 59 representatives of public sector agencies. These representatives were involved in various aspects of the MDIs from policy making to program management to technical and administrative support. They included agency managers, program and project administrators, engineers, planners, attorneys, contract specialists, and public safety officials. The information included in this report is based mainly upon the perspectives of the MDI participants but also includes other insights that were gained by the analysts from a review of documents from the MDI sites or through other work in assessing ITS deployments.

Volpe Center analysts examined the institutional and other nontechnical impediments that public sector participants encountered in deploying ITS, changes made to address these impediments, benefits of making these changes, and the costs associated with them. They then analyzed this information with respect to its applicability to other metropolitan areas that are developing and deploying ITS. This led to the identification of nine approaches that were used successfully by the public sector participants at the MDI sites and other locations that representatives of other metropolitan areas may use to facilitate deployment.

Target Audience

The audience for this report comprises the individuals who want to make ITS happen; those who want to use ITS technology to deliver government services more effectively and more efficiently. This audience includes representatives of public sector agencies in metropolitan areas who have begun deployment of ITS or who are considering deployment.

The information in this report will help officials in locations that are already developing ITS to accomplish their objectives by providing specific examples of what worked in other areas. The information in this report also will allow officials in areas that are considering deployment to enter into the process from an informed perspective and to make better, more informed decisions relative to their expectations and, consequently, their planning and development of ITS. By understanding what they may experience in later steps, project developers will have the opportunity to do things differently in the first step.

Because of the nature of ITS, this audience embraces both traditional and non-traditional players in the transportation arena. The traditional players include managers, transportation planners, traffic engineers, and transit operators in state, county, and municipal agencies and metropolitan planning organizations (MPOs). The non-traditional players include public safety officials, legal and administrative staffs, and others who can act as catalysts in the deployment of ITS. Representatives of the private sector who are interested in working with the public sector in deploying ITS will also benefit from the information contained in this report.

Findings

The examination of the institutional benefits of the *AZTech*, *iTravel*, *Smart Trek*, and *TransGuide* MDI programs illustrates that the successful approaches found in one of the programs may, in many cases, be found in the others as well. For example, participants in one of the MDI sites stressed the need for a strong regional perspective as an essential quality: “The application of a regional perspective to ITS projects allows project participants to cross jurisdictional boundaries, both geographic and modal.” However, upon closer examination it becomes clear that this approach applies to the other MDI sites as well. In fact, this characteristic — the presence of a regional perspective — is a facilitator of ITS among the MDI sites more than a distinctive quality of one particular site. In addition, representatives from three sites recognized the importance of involving operations and management staffs in the planning stages of the MDI program. While some participants came to this realization in retrospect and others while they were still in the planning stages of the programs, this positive approach was discussed repeatedly as essential to the smooth operation of the project. Finally, participants of each of the MDI sites identified the importance of developing a regional management structure. Within this, they recognized the value of assigning roles based upon the strengths of the participants as especially significant to the progress of the program, particularly in the early stages of program development.

This similarity of the approaches among the MDI programs suggests that such characteristics are highly facilitative, if not requisite, of successful ITS programs. The fact that the same approaches are found in each of these metropolitan areas, which have each successfully implemented an ITS program, indicates that these approaches have contributed to the success of these programs.

There were benefits and costs associated with each of the nine approaches. Usually discussed in qualitative terms, these benefits and costs were consistent across the four MDI sites. Not surprisingly, one cost, **staff time**, was associated with all nine approaches. The benefits and costs of taking specific actions are presented in the discussion of the approaches. (To avoid repetition, the cost of staff time is not mentioned in the discussion of all of the actions with which it is associated.)

Deployment Aids

The Institutional Benefits Study makes these approaches available to other metropolitan areas. This Study makes it possible for metropolitan areas who are considering deployment of ITS to take advantage of steps that have been proven to work in the MDI sites. In the full report, there is a **table of questions** at the end of each section. These questions suggest actions that were identified from the analyses of ITS development processes as well as from interviews with representatives of public sector agencies deploying ITS. These representatives have described these actions as facilitating their projects. They are presented in the form of questions to elicit consideration of steps that may expedite the development of ITS in your organization. The questions are not intended as blanket recommendations. Rather, they are acknowledgments of actions that have proven useful to existing ITS projects which may assist you as you plan for ITS.

Not every action described in the questions has been adopted by every organization active in deploying ITS; nor will each question be relevant to every organization preparing to implement ITS. In some cases, agency representatives identified these actions in retrospect, as steps that *would have aided* the process of deploying an ITS in their jurisdiction. In these cases, the organizations that are considering deploying ITS are able to benefit from the experience of those who have gone before them. By learning what others wished they had done differently, you may apply the lessons learned in other areas to your own organization and projects.

When applicable, the **references** used by the analysts in writing the section follow the table. A list of **resources** pertinent to the topic of the section comes after the references. The information contained in the publications listed as references and resources furnish a wealth of knowledge already accumulated within the ITS Program.

Appendices relevant to the topic of the section are referenced within the text of each section. The documents and other material included in the appendices are examples of instruments that have been developed and used successfully within ITS projects.

Successful Approaches

Based on the information gathered during the Institutional Benefits Study, the study team identified nine approaches, or categories of actions, which facilitated the deployment of ITS products and services. These approaches are not mutually exclusive; in many cases, an action described in one approach is mentioned in another. These actions are so fully embedded into the organizational arrangements and relationships that support the successful progress of the MDI programs that identifying the actions as specific and distinct pieces was not practicable.

The actions described in these approaches have been used at the MDI sites and other locations and allowed for the successful deployment, operations, and management of ITS. Identifying and applying these actions are important steps in advancing the deployment of ITS in other metropolitan areas.

The nine approaches are listed in an approximate chronological order. The first four address planning and gaining support for ITS activities. The next two speak to developing a process to manage and staff the ITS activities. The final three apply to the actual implementation of the ITS.

1. Develop a Regional Perspective

Each of the four MDI sites has successfully adopted a regional perspective for the use of intelligent transportation systems. A regional perspective means that project participants view projects from the standpoint of the other project participants as well as their own. This outlook, which fosters a more cohesive outlook on the project from all involved, is the element that best facilitates the development of the ITS products and services. Developing a regional perspective encompasses taking specific actions, and each of these actions carries distinct benefits and costs that are associated with the creation of a regional perspective.

- **Build on Existing Relationships**

  The benefits of using existing institutional relationships in ITS projects include reduced time to develop trusting relationships, use of institutional memory and knowledge gained in previous projects, reduced time to overcome institutional barriers, and the ability of partnerships to grow quickly.

- **Involve Non-traditional Players**

  The use of non-traditional organizations as participants in ITS projects allows the project to obtain the fresh perspectives and insight, as well as the knowledge, expertise and information of those participants. In addition, the inclusion of non-traditional participants, such as private providers of transportation and information service providers, increases the availability of transportation information in the region as well as an organization's ability to distribute information to customers. These players also increase the comprehension of the activities of non-traditional participants.

Another aspect of involving non-traditional players is the fostering of coordination between public works and public safety agencies. A benefit of this action is that participants become more aware of each other's concerns and responsibilities. This coordination also increases consideration of others' concerns when making incident management decisions and helps to identify and respond to incidents more quickly.

- **Develop a Shared Vision**

  Articulating a shared vision increases the probability of the project's achieving success, facilitates long-range support from current and potential participants, increases interest in a coordinated management of the transportation systems, and eases the transition from the development to the operations and management of the system. This vision may also provide the traveling public with a seamless multi-modal system, more accessible and better traveler information, increased safety, managed and improved traffic flow, reduced congestion and emissions, and reduced emergency response time. The costs of articulating such a vision include the management and staff time to attend numerous meetings required to develop vision.

- **Augment Existing Systems**

  The participants at the MDI sites built on the existing infrastructure and enhanced it. They recognized that by expanding existing systems to the fullest extent possible and integrating these systems, better and more accessible traffic and transit data would be provided, which in turn, would promote a better transportation system.

2. Make ITS Visible

Explicit public awareness and support for ITS must be garnered in order for ITS programs to achieve widespread acceptance. Essential to this support is visibility, which contributes to the support of ITS among the general public, policy makers, public sector representatives, and ITS participants. Specific actions that facilitate this visibility are inherent in the process of making ITS visible. Each of these actions carries distinct benefits and costs that are associated with increasing the visibility of ITS.

- **Reach Out to the General Public**

  Viewing the traveling public as the customer is a key function and assures that the ITS program will focus on providing a good product for the public and that individuals of all income levels will have access to information provided by the product. In addition, the public's positive reaction to ITS projects, as identified in focus groups, bolsters management support of ITS projects. The costs of reaching out to the general public include the time and effort to promote inclusion to management and staff and the cost of conducting focus groups and surveys.

Another component of reaching out to the general public is ensuring that traveler information is accessible, easy to use, and accurate. The benefits of this affirmation include positive visibility and public support. The costs of providing ITS information to the general public include the possibility that inaccessible ITS information during an incident may damage public support.

Facilitating a public relations campaign to reach the general public increases public support through heightened visibility and understanding of ITS and support from policy makers and upper management. Additional benefits of a public relations campaign include the ability to manage public expectations and privacy concerns, free exposure on local radio and television media, and the ability to use video images, which exert immense influence on the public. The costs of such a campaign include costs of various media and the system or functions required to deliver information to news outlets by reports or video feeds.

- **Gain Support from Policy Makers and Upper Management**

Educating management to ensure buy-in over time is elemental to gaining support from policy makers and upper management. It results in the facilitation of future changes to transportation policy, the "mainstreaming" of ITS, which leads to greater visibility and support, and the creation of an acceptance level for ITS, which eliminates the need for continual management buy-in once support is in place. The costs of this education include the materials used to promote ITS accomplishments.

The use of interagency groups and committees, which are inherent to the effort to gain upper management support, provides the benefits of contact, coordination, and visibility among partners, as well as facilitation of attracting additional partners.

An underlying effort in gaining support from policy makers and upper management is participation in national scanning reviews and conducting tours of local facilities. The benefits of participation in these reviews include increased visibility and support for ITS. The costs of these tours include management time in participating in scanning tours and staff time in conducting tours.

Developing an ITS champion or strong group of believers also provides significant benefits. They include increased and persistent visibility through the education and selling of ITS to directorate-level management, potential new partners, and legislators.

- **Involve Metropolitan Planning Organizations**

Involving the MPO in ITS is an important aspect of making ITS visible. The benefits of this involvement include the ability of the MPO to use ITS in meeting its objectives, due to the similar purposes of metropolitan planning and ITS. Additional benefits are increased visibility of ITS through exposure of the MPO's diverse membership, incorporation of ITS into the MPO's metropolitan planning process, and coordination between public and private sectors. Providing the MPO policy board with ITS information, which is inherent to involving the MPO in ITS, allows the board and committees to make more informed decisions and members to gain an understanding of ITS and its uses at local and regional levels.

Making staff knowledgeable about ITS assures the consideration of ITS solutions in the metropolitan planning process, identification of ITS strategies appropriate to the region, and assistance to state and local planning agencies. The costs of this action include training costs.

Taking advantage of MPO forums increases visibility of ITS within the general public by allowing ITS projects access to the outreach and public participatory structure of the MPO. Another benefit of taking advantage of these forums is the access they provide to private transportation providers and other private firms.

- **Encourage Staff Involvement**

  Public sector staff must be shown how ITS will help them to do their jobs more effectively. This action bolsters their support of new technologies, encourages staff to identify improvements to systems and organizations, ensures long-term success, and helps overcome some employees' reluctance to change. The costs associated with demonstrating how ITS can assist staff members include management and staff time and training costs.

  Involving operations and maintenance staff and system users in ITS development, purchase, and deployment is elemental to creating a sense of ownership among the staff. This action ensures that systems will be used as intended, the successful upgrade and expansion of systems, and the reduction of staff concerns involving various issues, such as increased workload and union issues. The costs of such involvement include facility costs.

  Encouraging staff from different functions to work together allows each group to provide insight into system design, sharing of knowledge, and improvement of public safety and inter-agency media relations. The costs associated with different staffs working together include facility costs.

3. Understand the Nuances of Partnering

ITS program proponents have long recognized the wide-ranging benefits of partnering. Through experience gleaned during operational tests and other ITS projects, they have also recognized the challenges and non-technical constraints that often arise when assembling and working within a partnership. Entering into a partnering relationship with the knowledge and understanding of the possible hindrances that may arise contributes to the neutralization of those hindrances. Included in the process of understanding the nuances of partnering are actions that foster that knowledge. Each of these actions carries specific benefits and costs that are associated with understanding the nuances of partnering.

- **Recognize that Participants Have Differing Objectives**

  Cultivating an understanding of the missions of the organizations involved in ITS is an important element to recognizing the different objectives of those participants. This understanding enhances the partnership, furthers the goals of the participants, illuminates that the project is a natural reflection of the missions of the participants, and leads to a mutually accepted working relationship.

- **Realize it Takes Time to Develop Trusting Relationships**

  Allowing new relationships time to develop permits trust to grow among the participants. It also encourages parties to feel that they will benefit from the integration of ITS and the sharing of data.

- **Define Explicitly the Roles and Responsibilities of the Parties**

  Making explicit determination of the roles and responsibilities early in the life of the project enables project managers to assign work to participants that is consistent with their basic missions and allows the project to benefit from the strengths of individual participants. These determinations also address sensitivity over leadership versus supporting roles and highlight how risks will be shared.

  The benefits of identifying which functions will remain with the public and private sector, which is inherent in the definition of roles and responsibilities of the parties, enables private sector representatives to plan their involvement in functions that will satisfy their business objectives.

- **Provide Incentives for Participating**

  Illustrating the benefits of ITS to participants enables public sector representatives to recognize how the project will improve their operations and service to their constituents and realize that achieving a regional goal will provide benefits to individual jurisdictions. It will also enable the private sector to understand how the project will advance their business objectives.

  The development of a market for ITS products and services is an incentive that will encourage private sector participation. Greater involvement of the private sector means more traveler information will be provided to the traveling public, which will lead to an improved transportation system. The costs of developing a market for the private sector include management and staff time, the potential requirement of support from consultants, and the potential loss of revenues for the public sector.

Establishing policies and procedures that allow partnering arrangements that are developed at the proposal stage to be continued in the design and development stage eliminates the time required to develop new, trusting relationships and the encouragement of private sector participation. In addition, the risks assumed by the private sector are reduced, and the continuity of processes is assured.

4. Plan for Long-term Operations and Management

Planning for long-term operations and management of ITS projects and systems ensures the continued success of these activities beyond the life span of the project. The inclusion of long-term maintenance into ITS project plans requires participants to take initial steps with foresight and care. Inherent in the process of planning for long-term operations and management are actions that contribute to that planning. Each of these actions carries specific benefits and costs that are associated with this planning.

- **Maintain the Support of Participants**

  Demonstrating that projects further the goals of participants, which is elemental to maintaining the support of participants, provides an incentive for participants to remain involved. It also ensures that the investment made to ITS projects continues to reap benefits long after it is made.

  Another element of planning for long-term operations and management is ensuring that benefits and costs are distributed equitably. A benefit of this assurance is that it provides an incentive for participants to remain involved in the project. The development of an appropriate business plan was one method cited to help maintain the support of participants. The benefits of a business plan include the explicit presentation of commitments, goals, and expectations of the project and the recognition of key issues before they become barriers.

- **Build Support of Field Staff, Users, and Operators**

  Involving employees as much as possible as part of building support among staff, users, and operators instills a sense of ownership for these representatives. Involvement also develops staff appreciation and a sense of pride and ensures acceptance, use, and long-term maintenance of systems. The costs of this involvement include staff time to work with other staff and to train other users, training for tutors, maintenance training, and possible missed opportunities for staff to work on other projects.

  Including operations and maintenance staffs in the design, build, and implementation stages develops a close relationship between design and build staffs and operations and maintenance staffs. This inclusion also allows a smooth transition from the design and build stages to the system operations stage and allows for more accurate reporting and quicker resolution of problems.

- **Facilitate Private Sector Involvement**

  The benefits of developing specific opportunities for private sector involvement include the ability to take advantage of the unique strengths of the private sector, such as public relations and outreach, marketing, systems integration, provision of information, and the potential assurance of the long-range success of the project. The costs associated with developing these opportunities include staff time to engage the private sector, identification of incentives for the private sector, development of a market for ITS products and services, and potential loss of revenue by public sector agencies.

5. Develop a Regional Management Structure

Regional management structures are often achieved through an evolutionary, as opposed to a negotiated, process and are often based on the demands of previous interagency projects, existing relationships, and the needs of the partners. Where parties have built on existing organizational models, regional ITS management structures have come about rapidly, allowing for projects to develop without time delays and institutional impediments. Inherent in the process of identifying a regional management structure are actions that contribute to the creation of such a structure. Each of these actions carries distinct benefits and costs that are associated with identifying this structure.

- **Assign Roles Based on the Strengths of the Participants**

  Evaluating the existing capabilities within the partner agencies allows the proper assignment of roles within an ITS program. It also ensures that agencies fill roles that are compatible with their primary missions.

  Determining the lead agency or agencies, another element of the assignment of roles, ensures efficient procurement and guarantees that compatible technologies are employed. The determination of lead agencies also avoids duplication of effort and allows for additional projects to be easily incorporated into existing management structures.

  Establishing technical and executive committees to evaluate agency roles is another element of assigning roles based on the strengths of participants. The benefits of these committees are that they establish political feasibility with buy-in from various agencies and jurisdictions, lead to cooperative efforts with the proper division of activities, and enhance long-term commitments to keep ITS maintained and operational.

- **Identify a Full-time Project Manager and Give the Manager Authority**

  The benefits of dedicating a full-time project manager are numerous: this person manages the increasing ITS project load, brings a vision that moves projects from conception to implementation, and provides a point of contact for the project development team and contractors. A full-time project manager also advances institutional relationships with other agencies and may identify additional resources and opportunities for ITS. The costs of a full-time project manager include the staffing cost for a high-level administrator, a potential upper management vacancy, staff reorganization costs, and possible new staff.

- **Dedicate Other Support as Required**

  Dedicating additional staff as needed ensures coordination and efficiency, which leads to successful ITS programs. Additional staff also provide supplementary operators, administrative support, and programmers, who facilitate successful project implementation, as well as specialists who help bring technical tasks to fruition. The costs of dedicating staff include taking management and staff time away from other programs, adding consultant costs for some project management functions, and creating potential vacancies in existing staffs or adding responsibilities to other staff workloads.

- **Develop an Appropriate Committee Structure**

  An effective committee structure allows for specific troublesome issues to be addressed and solved, aids the management and direction of ITS projects, and facilitates defined lines of authority that are critical with the numerous agencies and diverse technologies involved. A committee structure also ensures the development and on-going coordination of ITS programs and encourages cooperation, which lead to seamless, regional, easy-access, multimodal traveler and traffic information. Finally, a proper committee structure increases communications among agencies which could lead to the creation of additional projects through the blending of existing projects and technology transfer.

6. Facilitate ITS within Your Organization

Facilitating the planning and development of ITS in a region often means making changes within the organizations that are pursuing ITS. These changes allow the agencies to adapt to the requirements of ITS projects, both relative to workload and dedication of staff. Once achieved, however, reorganizations inevitably result in improvements to the participating agencies as they develop ITS projects. Inherent in the process of facilitating ITS within an organization are actions that contribute to that facilitation. Each of these actions carries distinct benefits and costs that are associated with this facilitation.

- **Consider Organizational Changes**

  The management of some public sector agencies created an ITS Coordinator position which increased visibility of ITS in the region and agency. The costs of this position include upper management approval to create new positions and funding to maintain them.

  Defining roles and dedication of staff to the project results in functional improvements in the agency; creates momentum, visibility, and institutional memory; and allows experience and lessons learned to be applied to later projects. The costs of defining roles and dedicating staff to the project include the potential for expenditures to be limited for non-ITS activities, the requirement for approval by upper management, potential for the need for additional positions, and the possibility that standard operating procedures may have to be modified.

The management of some agencies also decided to incorporate ITS activity into current staffing levels. This action meant that no additional staffing costs arose and staff knowledge regarding ITS equipment and applications was added. The costs associated with incorporating ITS into current staffing levels include an increase in work load to staff assigned to ITS, missed opportunity for staff to be working on other projects, the possible requirement for staff training to gain skills that are required for ITS projects, and the need for additional staff time as ITS projects move from planning to operations.

- **Assess Skills and Staffing Requirements**

  The benefits of taking an inventory of skills and staffing include an appraisal of the impact of the ITS project on current staffing levels and identification of current gaps in skills required to implement the project, which leads to a plan to obtain these skills. Additional benefits of this assessment include the determination as to which agencies can best fill the staffing and skill needs without depleting the resources from one single agency and identification of skills that may be required in the future as ITS products and services are implemented.

  Adjusting staffing, a potential element of assessing skills and staffing, facilitates successful implementation of the project. The costs of adjusting staffing include those to fill additional staff positions or hire outside support and those associated with re-deployment or re-scheduling of staff. Cross-training staffs, another element of assessing skills and staffing, allows staff in one discipline to gain knowledge of another discipline and experience improved communications. The costs of cross-training staffs include training costs and staff time as well as possible movement of public sector staff to the private sector.

- **Address Training Needs**

  The benefits of taking an inventory of training needs include the identification of current training requirements, the most appropriate methods of training, and training that may be required in the future. Additional benefits of a training inventory include the creation of a plan to obtain training and a determination of whether multiple agencies may share the training costs.

  Providing training is the outcome of addressing training needs. Benefits of providing training needs include development of required skills, maintenance of staff confidence, ability of employees to use the system to the fullest possible extent, additionally integrated working relationships, and an enhanced exchange of information. The costs of providing training include training costs, possible movement of public sector staff to the private sector, and potential alienation of staff who are not included in training. The benefits of providing internal training include that trainers are familiar with the procedures of the agency and can relate that knowledge during training. The costs of internal training include staff time, possible overtime, and potential redeployment costs of staff and equipment, i.e., emergency response vehicles.

Including a training requirement within a contract is a potential element of addressing training needs. The benefits of including such a requirement include the identification of a strategy to circumvent reduced training budgets, ability to train a larger number of staff, reduced travel costs, and the elimination of the need for additional procurement to acquire training.

Involving operations and maintenance staff in acceptance testing reduces training costs. The costs of involving operations and maintenance staff are staff time and possible overtime. Visiting other sites give staff the value of viewing the manner in which other systems are performing; costs include staff time and travel costs.

7. Identify Appropriate Procurement Mechanisms

ITS participants have found that the traditional approach to procurement is often too restrictive when contracting for the rapidly evolving technologies and systems that make up ITS. They indicate that changes to legislation, policies, or procedures may be necessary to allow the parties flexibility to use the most appropriate procurement method, as determined by the needs of the project. For those who are in the beginning stages of an ITS project, it is useful to recognize the actions that enable participants to identify and employ appropriate procurement mechanisms. Each of these actions carries distinct benefits and costs that are associated with the identification of appropriate procurement mechanisms.

- **Be Flexible in Selecting Lead Procurement Agencies**

  Determining the agency or agencies to lead the procurement process, based on the flexibility of the agency's procurement process and the capabilities of the staff to procure the products and services required for an ITS project, facilitates the progress of the project. This action ensures that products are compatible, decreases the duplication of effort, and may minimize costs due to quantity discounts.

  Determining which agencies should procure specific technologies, another element of a flexible procurement process, leverages the expertise of agency staffs and allows for the use of existing contracts. The costs of this determination include staff time, the potential need for increased coordination, and possible project delays due to staff unfamiliarity with development-type contracts.

  Involving operators in writing system specifications and maintenance contracts saves time and makes use of staff knowledge in the systems. Involving public safety agencies in designing and procuring incident management and emergency management systems also saves time. This involvement also helps to ensure buy-in from agencies and utilizes staff knowledge of operating procedures.

- **Be Flexible in Determining Contracting Mechanisms**

  Determining the most effective procurement mechanisms shortens the time required to complete procurements. Approximately ten different contracting mechanisms were used at the MDI sites. When procuring a specific product or service, the pros and cons of each method should be weighed to determine which method should be used This action also reduces staff expenditures, ensures compatibility of system components, avoids duplication of effort, and allows for possible lower prices on procured items.

- **Develop Flexibility within the Contract**

  Accounting for interdependencies among systems provides parties with a clear perspective of the project, aids in overcoming uncertainty, and promotes better adherence to project schedules. The costs associated with accounting for interdependencies among systems include the potential to lengthen the time required to develop contracts.

  Maintaining flexibility in defining task functions and costs provides an easy method to handle ambiguity within the project, better task oversight, and increased control of funding. The costs of maintaining this flexibility include the possibility that parties may be uncomfortable with an open-ended scope of services at the time of contract execution.

  Including in the contract an appropriate procedure to transition the product or service from the developer to the user is another element of contract flexibility. The benefits of detailing an appropriate transition procedure are that it provides gradual transfer of control from the vendor and allows deficiencies and problems to be addressed before system hand-off. Also, taking advantage of previous ITS procurement experience helps to shorten contract negotiation processes and eliminate the need to develop new contract language.

8. Address Intellectual Property Rights Issues Early

Applications of ITS raise challenging new questions regarding intellectual property, which refer to patentable inventions, copyrights, and trade secrets, as well as compilations of data derived from the operation of ITS technologies. The private sector, in particular, has a vested interest in maintaining intellectual property rights to those technologies and services that they participated in developing. Indeed, the allocation of sufficient intellectual property rights to enable the private sector to make a profit is critical. Addressing these issues early in the life of an ITS project will promote involvement of representatives of the private sector. Inherent in the process of addressing intellectual property rights issues are actions that contribute to the full appreciation of these issues. Each of these actions carries distinct benefits and costs that are associated with addressing intellectual property rights early in the process.

- **Develop a Clear Policy Early**

  The early development and dissemination of a clear policy regarding intellectual property rights improves the contract negotiation process, saves time by helping to resolve the concerns of both public and private parties, and aids in avoiding protracted negotiations that result from contractual misunderstandings. The costs of developing such a policy include staff time in authoring policy and potential objections of private partners, which may lead to delays.

- **Understand the Possible Areas of Concern**

  Staff in some areas created multiple licensing agreements to address possible intellectual property concerns. This action satisfied all parties by treating products differently, based on when and with what funds they were created. Developing an appropriate business plan is one method used to address issues in assigning intellectual property rights as well as issues relating to ownership and use of data.

9. Develop Written Policies

ITS project participants recognize that there are some areas within ITS project deployments and system operations in which specific policies and procedures should be clearly laid out. These policies aid in avoiding lengthy negotiations related to project management and activities. Inherent in the process of developing written policies are actions that contribute to these policies. Each of these actions carries distinct benefits and costs that are associated with developing written policies.

- **Address Equipment Issues**

  Developing guidelines on the use of changeable message signs ensures that messages will convey information that is consistent and easily understood and that the public will tend to pay more attention when a message appears. The costs of developing guidelines on the use of changeable message signs include the potential lost opportunity to use these message signs for purposes other than traffic.

  Establishing guidelines on the use of closed circuit television cameras assuage the public concerns of video surveillance and privacy, aid in gaining public support for ITS technologies, and reduce the operating agency's concerns over liability. The costs associated with establishing guidelines for the cameras include the potential lost opportunity to use cameras for law enforcement or other purposes.

  Developing guidelines on ownership and replacement of equipment is another aspect of addressing equipment issues. The benefits of these guidelines include elimination of confusion among participants, and assurance that funding will be available to maintain and replace equipment.

  Establishing guidelines on kiosk placement encourage requesting agencies to take ownership of kiosks. It also ensures that kiosks are placed in areas where they provide the highest possible public benefit and have maximum visibility. Also, developing distribution plans ensure the proper dispersion of equipment, such as tags used for automated vehicle identification (AVI).

- **Delimit the Use and Distribution of Data**

  Developing guidelines for the retention, use, and distribution of data ensures that timely information is provided to the traveling public. It also reduces privacy and liability concerns, protects confidential and employee information and provides information service providers with clear direction.

- **Address Legal Concerns**

  The development of guidelines on indemnification properly distributes responsibility for inappropriate actions and clearly defines the limitation of claims. Establishing guidelines for the control and modification of traffic signal systems reduces liability concerns, ensures that agencies take only appropriate actions when modifying signal timing, and demonstrates that approved engineering principles have been followed. Developing guidelines regarding intellectual property rights aid in avoiding lengthy negotiations related to contractual misunderstandings.

- **Define Roles and Responsibilities**

  Guidelines that determine the roles and responsibilities within ITS projects clarify what each agency will do relative to the project. They also inform staff members of their particular duties, and avoid overlapping of roles.

The full report, which documents the findings of the Institutional Benefits Study Area, is intended as a tool to encourage dialogue among members of the ITS community that will further promote the deployment of ITS. The authors of this report encourage feedback on these guidelines and on the resources identified within the guidelines. They would appreciate learning of other examples of successful approaches taken to deploy ITS. Also, they acknowledge that the documents cited as references and resources and those included in the appendices are not the entire set of available material and, therefore, would appreciate receiving notice of other material used to facilitate the deployment of ITS.

SUCCESSFUL APPROACHES

Introduction

On February 26, 1996, the United States Department of Transportation (U.S. DOT) issued a request for participation in the Intelligent Transportation Systems (ITS) Model Deployment Initiative (MDI). The goal of the Initiative was to create “model deployments” of ITS that supported integrated transportation management systems and featured a strong, regional, multimodal traveler information services component. The MDIs were envisioned to be demonstrations and showcases of the measurable benefits resulting from the application of an integrated, region-wide approach to transportation management and the provision of traveler information services. The first model deployment initiative focused on metropolitan locations, and four metropolitan sites were selected: Phoenix, Arizona; San Antonio, Texas; Seattle Washington; and the New York-New Jersey-Connecticut Metropolitan Area.

The U.S. DOT’s ITS Joint Program Office (JPO) is responsible for conducting the evaluation of these four metropolitan MDI sites. One study area of this evaluation is the Institutional Benefits Study, which is being conducted by analysts from the U.S. DOT’s John A. Volpe National Transportation Systems Center (Volpe Center). The purpose of the MDI Institutional Benefits Study is fivefold:

- *Assess actions taken to overcome institutional constraints*
- *Identify the benefits of taking these actions and the investments needed to reap these benefits*
- *Document lessons learned*
- *Identify successful strategies that representatives of state and local governments can follow in planning and deploying ITS products*
- *Provide examples of legislation, policies, procedures, and structures that facilitated the deployment of ITS.*

Study Design

To identify and evaluate the institutional structures and working relationships associated with the deployment and integration of ITS products and services at the MDIs, the Volpe Center staff visited the *AZTech* (Phoenix), *iTravel* (New York-New Jersey-Connecticut), *Smart Trek* (Seattle), and *TransGuide* (San Antonio) MDI sites and interviewed 59 representatives of public sector agencies. These representatives were involved in various aspects of the MDIs from policy making to program management to technical and administrative support. They included agency managers, program and project administrators, engineers, planners, attorneys, contract specialists, and public safety officials. The information included in this report is based mainly upon the perspectives of the MDI participants but also includes other insights that were gained by the analysts from a review of documents from the MDI sites or through other work in assessing ITS deployments.

Volpe Center analysts examined the institutional and other nontechnical impediments that public sector participants encountered in deploying ITS, changes made to address these impediments, benefits of making these changes, and the costs associated with them. They then analyzed this information with respect to its applicability to other metropolitan areas that are developing and deploying ITS. This led to the identification of nine approaches that were used successfully by the public sector participants at the MDI sites and other locations that representatives of other metropolitan areas may use to facilitate deployment.

Target Audience

The audience for this report comprises the individuals who want to make ITS happen; those who want to use ITS technology to deliver government services more effectively and more efficiently. This audience includes representatives of public sector agencies in metropolitan areas who have begun deployment of ITS or who are considering deployment.

The information in this report will help officials in locations that are already developing ITS to accomplish their objectives by providing specific examples of what worked in other areas. The information in this report also will allow officials in areas that are considering deployment to enter into the process from an informed perspective and to make better, more informed decisions relative to their expectations and, consequently, their planning and development of ITS. By understanding what they may experience in later steps, project developers will have the opportunity to do things differently in the first step.

Because of the nature of ITS, this audience embraces both traditional and non-traditional players in the transportation arena. The traditional players include managers, transportation planners, traffic engineers, and transit operators in state, county, and municipal agencies and metropolitan planning organizations (MPOs). The non-traditional players include public safety officials, legal and administrative staffs, and others who can act as catalysts in the deployment of ITS. Representatives of the private sector who are interested in working with the public sector in deploying ITS will also benefit from the information contained in this report.

Findings

The examination of the institutional benefits of the *AZTech*, *iTravel*, *Smart Trek*, and *TransGuide* MDI programs illustrates that the successful actions found in one of the programs may, in many cases, be found in the others as well. For example, participants in one of the MDI sites stressed the need for a strong regional perspective as an essential quality: “The application of a regional perspective to ITS projects allows project participants to cross jurisdictional boundaries, both geographic and modal.” However, upon closer examination it becomes clear that this approach applies to the other MDI sites as well. In fact, this characteristic of an MDI site — the presence of a regional perspective — is a facilitator of ITS among the MDI sites more than a distinctive quality of one particular site. In addition, representatives from three sites recognized the importance of involving operations and management staffs in the planning stages of the MDI program. While some participants came to this realization in retrospect and others while they were still in the planning stages of the programs, this positive approach was discussed repeatedly as essential to the smooth operation of the project. Finally, participants of each of the MDI sites identified the importance of developing a regional management structure. Within this, they recognized the value of assigning roles based upon the strengths of the participants as especially significant to the progress of the program, particularly in the early stages of program development.

This similarity of the approaches among the MDI programs suggests that such characteristics are highly facilitative, if not requisite, of successful ITS programs. The fact that the same approaches are found in each of these metropolitan areas, which have each successfully implemented an ITS program, indicates that these approaches have contributed to the success of these programs.

Based on the information gathered during the Institutional Benefits Study, the study team identified nine approaches, or categories of actions, which facilitated the deployment of ITS products and services:

1. *Develop a Regional Perspective*
2. *Make ITS Visible*
3. *Understand the Nuances of Partnering*
4. *Plan for Long-term Operations and Management*
5. *Develop a Regional Management Structure*
6. *Facilitate ITS Within Your Organization*
7. *Identify Appropriate Procurement Mechanisms*
8. *Address Intellectual Property Rights Early*
9. *Develop Written Policies.*

These approaches are not mutually exclusive; in many cases, an action described in one approach is mentioned in another. These actions are so fully embedded into the organizational arrangements and relationships that support the successful progress of the MDI programs that identifying the actions as specific and distinct pieces was not practicable.

These approaches are listed in an approximate chronological order. The first four address planning and gaining support for ITS activities. The next two speak to developing a process to manage and staff the ITS activities. The final three apply to the actual implementation of the ITS.

As mentioned previously, the actions described in this report are the approaches used at the MDI sites and other locations that allow for the successful deployment, operations, and management of ITS. Identifying and applying these actions are important steps in advancing the deployment of ITS in other metropolitan areas.

Deployment Aids

The Institutional Benefits Study makes these approaches available to other metropolitan areas. This Study makes it possible for metropolitan areas who are considering deployment of ITS to take advantage of steps that have been proven to work in the MDI sites. At the end of each section, there is a **table of questions**. These questions suggest actions that were identified from the analyses of ITS development processes as well as from interviews with representatives of public sector agencies deploying ITS. These representatives have described these actions as facilitating their projects. They are presented here in the form of questions to elicit consideration of steps that may expedite the development of ITS in your organization. The questions are not intended as blanket recommendations. Rather, they are acknowledgments of actions that have proven useful to existing ITS projects which may assist you as you plan for ITS.

Not every action described in the questions has been adopted by every organization active in deploying ITS; nor will each question be relevant to every organization preparing to implement ITS. In some cases, agency representatives identified these actions in retrospect, as steps that *would have aided* the process of deploying an ITS in their jurisdiction. In these cases, the organizations that are considering deploying ITS are able to benefit from the experience of those who have gone before them. By learning what others wished they had done differently, you may apply the lessons learned in other areas to your own organization and projects.

When applicable, the **references** used by the analysts in writing the section follow the table. A list of **resources** pertinent to the topic of the section comes after the references. The information contained in the publications listed as references and resources furnish a wealth of knowledge already accumulated within the ITS Program.

Appendices relevant to the topic of the section are referenced within the text of each section. The documents and other material included in the appendices are examples of instruments that have been developed and used successfully within ITS projects.

1. Develop a Regional Perspective

The application of a regional perspective to intelligent transportation systems (ITS) projects allows project participants to cross jurisdictional boundaries, both geographic and modal. Such a perspective has been successfully adopted at all four metropolitan model deployment initiative (MDI) sites and is an element that best facilitates the development of the MDI products and services at those sites.

- *Build on Existing Relationships*
- *Involve Non-traditional Players*
- *Develop a Shared Vision*
- *Augment Existing Systems*

A well-defined strategy should be outlined before pursuing an ITS program. This strategy must include a good realization of what will be accomplished, the limitations and issues that may arise, and the steps required to implement the strategy. It is important that personnel from each agency involved in the project are aware of what is expected of their agency's involvement in the project.

Build on Existing Relationships

Existing relationships serve as a starting point from which to develop a regional ITS perspective. If agency representatives are already comfortable working with one another, then the time to develop a trusting relationship and to overcome other institutional impediments will be reduced. Also, parties involved in these existing relationships have an institutional memory which will expedite the progress of a project. In each of the four MDI sites, existing relationships served as a framework around which the MDI projects were structured.

Within the Phoenix Metropolitan Area, there has been a great deal of transportation and ITS-related interaction among officials at the transportation agencies. Interaction generally takes place either through memberships in transportation groups and coalitions, or based on individual or agency relationships. Representatives from the state, county, and municipalities all cited the interaction required to coordinate traffic signal control systems as instrumental in teaching the transportation agencies how to build up interagency and cross-border cooperation. In some instances, control of a signal in one jurisdiction was passed to the neighboring jurisdiction. Automatic aid agreements among the fire departments, which ignore municipal boundaries in favor of quick response by emergency management crews and fire fighters, also fostered inter-jurisdictional cooperation.

In 1993, the Metropolitan Area Governments Information Center (MAGIC) study was initiated in the Phoenix area and was the first effort to bring transportation agencies within the metropolitan area together. The MAGIC coalition investigated regional traffic signal control and helped to build up inter-agency and cross-border cooperation. MAGIC membership included the Arizona Department of Transportation (ADOT), the Maricopa County Department of Transportation (MCDOT), the Regional Public Transportation Authority (RPTA), the Maricopa Association of Governments (MAG), and the cities of Phoenix, Chandler, Glendale, Gilbert, Mesa, Paradise Valley, Peoria, Scottsdale, and Tempe.

Table 1.1 Benefits and Costs Associated with Building on Existing Relationships

ACTION	BENEFITS	COSTS
Use existing institutional relationships	• Reduces time to develop trusting relationships. • Leverages institutional memory and knowledge gained during previous activities. • Reduces time to overcome other institutional barriers. • Allows partnerships the opportunity to grow quickly.	• Staff time to coordinate efforts among institutions.

In 1995, the Phoenix Metropolitan Area received funding for an ITS early deployment planning study. The relationships developed in the MAGIC program were carried forth into the ITS planning study and expanded. The ITS study shifted to a more regional focus and included additional ITS activities. The early deployment planning process gave the participants a forum for discussing ITS issues and allowed additional coalitions to be built among the members.

In addition to the MAGIC and early deployment planning studies, there have been other opportunities for multiple agencies to interact on transportation activities involving new technologies in the Phoenix Metropolitan Area. For ten years, ADOT has been working on its Trailmaster Freeway Management System and traffic operations center. Deployment of many of the freeway management components has required coordinated efforts between the ADOT and other jurisdictions. Also, while serving as the ADOT District Engineer, the *AZTech* Chief Administrator developed close working relationships when implementing ADOT construction programs.

In the San Antonio area, a committee was formed in the 1960s that included representatives of the public works and public safety agencies within the region. The Corridor Management Team was organized to deal with current transportation issues and coordinate activities related to construction projects and special events. The Texas Department of Transportation (TxDOT) District Traffic Engineer serves as the Chairman of the Team which consists of operations staff from VIA Metropolitan Transit Authority (VIA), the San Antonio Public Works Department, the Alamo Dome, San Antonio Police Department (PD), the Bexar County Sheriff's Department, emergency medical services, and the County health agency. The Corridor Management Team has always bolstered interagency communication in San Antonio. The coordination of traffic signals along the freeway frontage roads also afforded the opportunity for interaction between the TxDOT District and the San Antonio Public Works Department.

A District ITS Committee, made up of TxDOT staff, various City agencies, and VIA, was formed in 1988 to promote and coordinate ITS and was a precursor to *TransGuide*. Staff from most of these agencies now reside at *TransGuide* and benefit from increased interaction.

The concept of building on existing relationships is particularly relevant to representatives of the Seattle *Smart Trek* project. The relationships that had been established during field operational tests, which include the North Seattle Advanced Traffic Management System (NSATMS) TravelAid, PuSHMe (Puget Sound Help Me mayday system), and SWIFT (Seattle Wide-area Information For Travelers), facilitated the development of the MDI. Many individuals and organizations involved in the MDI are the same as those who were participants of the Seattle-area operational tests.

Within the public sector, the Washington State Department of Transportation (WSDOT) developed a good relationship with the Puget Sound Regional Council (PSRC), the metropolitan planning organization (MPO), and with the King County Department of Transportation, Transit Division (Metro Transit), the area’s largest transit provider. Also, staff from the WSDOT Northwest Region previously spoke with representatives of public agencies in the east and south sides of the Seattle area about connecting to the NSATMS. In addition, coordination was established among the regional transit agencies to coordinate funding provided under the Intermodal Surface Transportation Efficiency Act of 1991.

An additional organizational structure that facilitated ITS in Seattle was the Community Task Force, which was begun five years ago to identify ways to communicate with customers. The task force included representatives from the Washington State Ferries and both the Olympic and Northwest Regions of the WSDOT. This task force looked for ways to communicate with customers and identified the need for a system-wide signage project. After fulfilling its mission, this task force disbanded, but the groundwork established by this group was a building block on which the MDI has grown.

In the New York-New Jersey-Connecticut Metropolitan Area, the *iTravel* MDI developed under the umbrella of the TRANSCOM (the Transportation Operations Coordinating Committee) coalition. TRANSCOM is an existing institutional infrastructure that provides for multi-modal, regional coordination among 15 public sector agencies. Members cooperate on a daily basis in the exchange of multi-modal transportation management and traveler information. At the time the MDI request for participation was announced, four member agencies, the New York State Department of Transportation, the New York City Department of Transportation, the Port Authority of New York and New Jersey and the Metropolitan Transportation Authority, were working together on the development of an early deployment plan.

In the *AZTech* and *Smart Trek* MDI sites, the staff of the state departments of transportation benefited from their existing relationship with the staff of the state’s attorney general office. The legal staff gained knowledge during previous ITS activities and applied this knowledge to issues related to the MDI.

Building on existing institutional relationships allows partnerships the opportunity to grow. Expanding these alliances provides the participants the benefit of not having to reforge relationships as new opportunities arise.

Involve Non-traditional Players

Non-traditional players can by defined as representatives from agencies and organizations that are not normally involved in the planning and development of highway and transit systems but affect or are affected by them or responsible to operate them. These players often bring fresh perspectives and valuable insight to ITS projects. In addition, these representatives are able to provide knowledge, expertise, and information that may otherwise had not been included in the projects.

Table 1.2 Benefits and Costs Associated with Involving Non-traditional Players

ACTION	BENEFITS	COSTS
Embrace non-traditional organizations as participants in the project	• Obtains fresh perspective and new insight. • Provides knowledge, expertise, and information not otherwise available to project. • Increases the availability of transportation information in the region. • Increases an organization's ability to disseminate information to customers. • Increases the understanding of the activities of non-traditional participants. • Sets the stage for seamless intermodal transfers	• Staff time to engage non-traditional players. • Staff time to coordinate activities.
Foster coordination between public works and public safety agencies	• More awareness of each other's concerns and responsibilities. • Increases consideration of the other's concerns when making incident management decisions. • Faster identification of accidents.	• Staff time to coordinate activities. • Training of public safety staff in ITS usage.

The San Antonio Police and Fire Departments were involved in the development of *TransGuide*. In addition, three major trauma centers were invited to participate in the MDI. As the surveillance coverage of *TransGuide* expands into the non-municipal areas, the County Sheriff's Department and the State Patrol will be approached to participate in the project. One official suggested that transportation directors of the area's school districts may be another group to include, especially if major arterial streets are monitored as part of *TransGuide*.

Non-traditional partners in the *AZTech* MDI include the Arizona Department of Public Safety (the Highway Patrol); the Phoenix Fire Department (FD), which dispatches all Valley fire agencies with the exception of Mesa and Scottsdale; the Mesa FD; Rural Metro, which provides emergency management services within Scottsdale and other jurisdictions within the county; emergency medical services; and the Maricopa County Sheriff's Department.

The *Smart Trek* project has also included participants who are not typical players in ITS projects. The Washington State Ferries and the Port of Seattle's Seattle-Tacoma International Airport are partners in the MDI project. Under the MDI, the entry and dissemination of dispatch information from the Washington State Patrol will be automated. Also, representatives from the Puget Sound Regional Council have taken an active role in the MDI.

In a review that assessed the development and deployment of ITS products and services in seven metropolitan areas, analysts found several additional parties that were involved in ITS projects. These players included air travel and airport-related service providers, private busing and transit organizations, academic institutions, major employers, the tourism and resort industry, and operators of special event facilities (Volpe Center, 1995). In the MDIs, non-traditional players included the hospital community, non-profit research centers, and universities.

Representatives from the private sector were also involved in all four MDIs. Their organizations represented a broad range of organizations, such as wire-line and wireless communications providers, paper and electronic media, information service providers, system integrators, software and database developers, equipment manufacturers and providers, public relations and marketing firms, automobile manufacturers and part suppliers, and Internet and cable television service providers.

Each of the non-traditional public sector agencies, like the other partnering agencies in the MDI, is participating in a portion of the project that benefits the organization's ability to disseminate organization-related information to its respective customers. While the private sector players also have the opportunity to fulfill their business objectives, the involvement of non-traditional players from both sectors adds to the overall availability of transportation information in the region.

Including agencies representing different transportation modes provides the benefit of making intermodal transfers easier and, eventually, seamless. Specific benefits from involving public safety agencies are the faster identification of accidents and the ability of officers to view the impacts of an accident over a larger area. A benefit of the coordination between public works and public safety agencies is that each side becomes more aware of the other side's concerns and responsibilities and will consider them when making incident management decisions.

Develop a Shared Vision

Projects have the greatest chance for success when they promote a shared vision or approach. Having a clearly articulated vision aids in building long-range support from the present partners and those that may wish to contribute at a later time. A shared vision has many facets and should encompass several areas, such as the overall goal for the region, the expected outcomes, the time frame and milestones, and the functional and organizational responsibilities for implementation, operations, and management.

Table 1.3 Benefits and Costs Associated with Developing a Shared Vision

ACTION	BENEFITS	COSTS
Articulate a regional vision	• Increases the probability of success. • Develops long-range support from current and potential participants. • Increases interest in a coordinated management of the transportation systems. • Eases the transition from the development to the operations and management of the system. • Provides the traveling public with a seamless multi-modal transportation system. • Provides the traveling public with more accessible and better traveler information. • Provides the traveling public with increased safety, managed and improved traffic flow, reduced congestion and emissions, and reduced emergency response time.	• Management and staff time to attend numerous meetings required to develop vision.

A shared vision of the *Smart Trek* MDI program grew early in the program's development. WSDOT staff and other private and public sector partners worked on the proposal for over a year to develop their vision. The proposal developers wanted the MDI to be a regional program, to cover all modes, to mirror regional policies, and to ensure that benefits of the MDI would cover a broad area. They wanted to establish a regional partnership among transit agencies, the central city, the MPO, and the private sector. They emphasized providing traveler information and de-emphasized moving more cars. Partners wanted to give commuters more options to get out of their cars.

The *Smart Trek* proposal development process was inclusive of all agencies in the region. The initial group of partners looked at all the gaps in the existing traveler information systems and identified who needed to be involved. The team that put together the proposal represented different agencies, functional areas, and the private sector. The project partners met monthly for a year to coordinate project elements. They determined the MDI projects by developing functional areas and building on what was already in place or soon to be in place in the region. This process involved several iterations of cost and budget estimates.

The benefits of this shared vision in the Seattle area include a growing interest by the various agencies in managing the transportation elements of a region together. This will lead to an integrated transportation management system for the region that includes transit and other modes, which will lead to easier intermodal transfers. Other benefits will be more access to traffic flow and bus location information, more and better data available to the MPO for regional planning, and an increased understanding of the activities of the non-traditional participants, such as the WSF and the Seattle-Tacoma Airport.

Participants in the *AZTech* MDI used the results of the MAGIC and early deployment planning studies to develop their vision. The previously established coordination aided the public partners' ability to think regionally in setting priorities for the MDI project. During the discussions that preceded the writing of the MDI proposal, participants determined what technologies and project components needed to be included within the project by accentuating regional, rather than parochial, goals.

The *AZTech* vision centered around providing improved safety and regional mobility through expanding the existing Trailmaster Freeway Management System, interconnecting the traffic signal systems of the major cities, and developing a regional, multi-modal traveler information center. Because officials of the Phoenix Street Transportation Department shared this vision, they modified the schedule of their traffic signal system upgrade to accommodate the MDI schedule.

The *AZTech* partners are also developing a long-range vision. They are investigating how to obtain long-term commitments from both the public and private sectors. They are also examining how each *AZTech* component will be transferred from the entity installing the system to the entity operating the system.

Many *AZTech* participants, as well as the *AZTech* proposal itself, discussed expanding the system beyond that which is currently being funded. They see the long-term viability of the *AZTech* system tied to the expansion of the system, first within Maricopa County and the Phoenix Metropolitan Area, then to the Tucson Metropolitan Area, and finally statewide. This expansion will require the inclusion and interaction with additional partners, both public and private. The participants see the smaller and outlying jurisdictions that are not participating at this time joining in as *AZTech* expands in the post-MDI phases. In the meantime, many participants saw the MPO as the organization that should keep these agencies informed of what is occurring with *AZTech*.

The shared vision in the Phoenix area will provide the traveling public with a seamless multi-modal system that cuts across jurisdictional boundaries. It will also provide the traveling public with readily available traffic and transit information.

In 1988, the San Antonio TxDOT District Engineer charged his staff to get a traffic operations center on line that would be the best in the nation. The TxDOT, various agencies within the City of San Antonio, and VIA Metropolitan Transit formed a partnership, and the result was the development of the *TransGuide*, the Transportation Guidance System. *TransGuide* is a network of road sensors, changeable message signs, computers, cameras, and people teamed to benefit the overall San Antonio area transportation system.

The San Antonio MDI participants have taken advantage of *TransGuide* and of the shared vision that resulted in *TransGuide* to enhance the overall transportation system. A working group was formed to develop the MDI proposal. TxDOT staff held several meeting with individual agencies and the larger group in the 60-day period after the release of the MDI Request for Proposals. During these meetings, projects were proposed and a consensus was reached. The MDI proposal stressed public safety, traffic operations, and transit.

This shared vision has directly benefited the traveling public through increased safety, managed and improved flow of traffic, reduced congestion and resulting emissions, and reduced emergency response time. *TransGuide* has been successful in bringing several public sector partners together for the united benefit of the entire community. Benefits have resulted from the operations and design personnel from various agencies interacting with real, as opposed to perceived, requirements. This interaction has come as a result of the various personnel working together at *TransGuide* and has been integral to the success of *TransGuide*.

There are several issues that affect the development of a shared vision. Public sector managers are still wrestling with the role of the public sector vis-à-vis the private sector in disseminating traveler information. Some feel that there should be free access to data collected with public funds, which causes others to say that this might limit creating a market for the private sector. Others are concerned about equity of access by the public. Only a small percentage of the general population have computers at home. Nevertheless, officials want to ensure that individuals in all income categories, not just those who have access to advanced technologies can receive information.

Another issue that influences the development of a shared vision is determining the market value of data, products, and services. Because such systems are not in widespread use, the market value of data, products, and services cannot be adequately estimated. These unknown factors may lead to differing views of the vision or differing approaches to achieving the vision.

Augment Existing Systems

The approach used by the participants of the MDI sites is to build on the existing infrastructure and enhance it under the MDI project. The *AZTech* MDI is incorporating several existing and planned systems: the freeway management system, transit management systems, the traffic signal control systems, and a parking management system in development at the airport separate from the MDI. The participants are using the existing traffic operations center as the central hub for data collection, fusion, and dissemination. The MDI is integrating systems of traffic management, incident management and transit agencies which previously were isolated systems.

Partners in *Smart Trek* designed the MDI around the existing infrastructure and on what could be implemented in a short time frame. For example, the MDI will enhance the NSATMS and extend the framework to the rest of the region. Also, the ITS backbone, the key communications component of the project, was being developed by the University of Washington prior to the MDI.

The San Antonio MDI effort is building on the *TransGuide* facility and the services it provides. The advanced traffic management system (ATMS) includes surveillance cameras, variable message signs, and lane control signals. The operations center supports the ATMS, transit dispatch, police traffic dispatch, and the San Antonio Public Works Deparment traffic operations. It also houses alternate dispatch centers for the San Antonio Police and Fire Departments. The MDI is also building on the area-wide multi-modal database, the Internet Web site, and the existing advanced traveler information system that includes a low-power television station.

To develop a regional, multi-modal traveler information system, the participants in the *iTravel* MDI are building on several systems. The first is the Operations Information Center that collects and disseminates real-time incident and construction information. The second is the Regional Architecture that will integrate all member agencies' ITS through a common framework to allow direct information transfer and usage those individually operated systems. The third is TRANSMIT, the TRANSCOM System for Managing Incidents and Traffic. This system uses vehicles with electronic toll collection tags as probes in heavily traveled corridors to obtain traffic speeds and travel times and to detect incidents.

Table 1.4 on this and the next two pages lists questions that should be addressed when developing a regional perspective.

Table 1.4 Questions to Consider when Developing a Regional Perspective

QUESTION	RESPONSE
BUILD ON EXISTING RELATIONSHIPS	
• Have existing working relationships that can be used to facilitate the deployment of ITS been identified?	
◊ Have forums for transportation officials been identified?	
◊ Have forums for public safety officials been identified?	
◊ Have any activities that bring operators of transportation facilities been identified?	
• Have members of these groups been approached to solicit their involvement in planning and developing ITS?	
• Are there any other actions that need to be taken to ensure that you are building on existing relationships?	

Table 1.4 Questions to Consider when Developing a Regional Perspective (continued)

QUESTION	RESPONSE
INVOLVE NON-TRADITIONAL PLAYERS	
• Have non-traditional public and private organizations been approached to participate in ITS activities?	
◊ public safety agencies?	
◊ air travel and airport-related service providers?	
◊ private busing and transit organizations?	
◊ universities and other academic institutions?	
◊ major employers?	
◊ the tourism and resort industry?	
◊ operators of special event facilities?	
◊ hospitals and other emergency medical providers?	
◊ non-profit research centers?	
◊ school districts?	
• Have private sector firms been approached to participate in ITS activities?	
◊ wire-line and wireless communications providers?	
◊ paper and electronic media?	
◊ information service providers?	
◊ software developers?	
◊ system integrators?	
◊ equipment manufacturers and providers?	
◊ public relations and marketing firms?	
◊ automobile manufacturers and part suppliers?	
◊ Internet and cable television service providers?	
• Are there other actions that need to be taken to ensure that non-traditional players are involved?	

Table 1.4 Questions to Consider when Developing a Regional Perspective (continued)

QUESTION	RESPONSE
DEVELOP A SHARED VISION	
• Have previous ITS and other transportation studies been identified?	
• Have representatives from the appropriate transportation agencies, private sector firms, non-traditional organizations, and the general public been consulted?	
• Have the overall ITS goal for the region, the expected outcomes, the time frame and milestones, and the functional and organizational responsibilities for implementation, operations, and management been explicitly stated?	
• Has this ITS vision been communicated to policy makers, upper management, and the public?	
• Are there other actions that need to be taken to ensure that a shared ITS vision is developed?	
AUGMENT EXISTING SYSTEMS	
• Has an inventory been made of existing ITS and other transportation, communications, and information systems?	
• Has a plan be developed to integrate these systems as appropriate?	
• Are there other actions that need to be taken to ensure that existing systems will be integrated into the region's ITS?	

Reference:

Volpe National Transportation Systems Center analysts conducted "A Review of Seven Metropolitan Areas" to assess the development and deployment of ITS products and services in which a broad cross-section of state and local transportation officials who represented various positions and levels within their organizations were interviewed, 1995.

Resources:

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U.S. Department of Transportation, *ITS and the Transportation Planning Process*, a Professional Capacity Building course sponsored by the Federal Highway Administration and the Federal Transit Administration.

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U.S. Department of Transportation, *ITS Public/Private Partnerships*, a Professional Capacity Building course sponsored by the Federal Highway Administration and the Federal Transit Administration.

Volpe National Transportation Systems Center, *Intelligent Transportation Systems, Assessment of ITS Deployment, Review of Metropolitan Areas, Discussion of Crosscutting Issues*, FHWA-JPO-96-0035, prepared for the U.S. DOT ITS Joint Program Office, Cambridge, Massachusetts, July 1996. (EDL number: 426.)

Note:
EDL stands for the Electronic Data Library that is located at the U.S. DOT ITS Web site at www.its.dot.gov.

2. Make ITS Visible

Everyday the traveling public is exposed to many aspects of intelligent transportation systems (ITS) but may not be aware that they are part of a larger vision and program. Hence, the seeds of public support are present through the public's use of the system. A well-coordinated public relations program facilitates visibility and understanding of ITS and solidifies direct and informed support from the public already aware of ITS through their use of the system.

- *Reach Out to the General Public*
- *Gain Support from Decision Makers*
- *Involve Metropolitan Planning Organizations*
- *Encourage Staff Involvement*

The demand for increased ITS capabilities and services grows as the public becomes educated as to the benefits of ITS (Appendix G.1). Those benefits include faster emergency response time to incidents, access to real-time traffic conditions, reduced congestion and associated time savings, and access to activities and other information for the metropolitan area. These all lead to a general improvement in the quality of life and safety for the average commuter. These benefits make ITS attractive and a relatively easy program to sell to the general public. Effective public relations programs build public support that also leads to both upper management and political support.

Upper management and policy makers have to be incrementally educated and sold on ITS in order to secure gradual buy-in. ITS successes must be quantified, exposed, and used as building blocks on which to base further efforts. It is imperative to convey the benefits of new technologies, show how the technologies relate to the goals of the agency, and then show a "larger picture" which includes inter-agency benefits.

The metropolitan planning organization (MPO) is the forum for cooperative transportation decision making. The activities of the MPO result in plans and programs which lead to an integrated, intermodal transportation system that facilitates the efficient, economic movement of people and goods. (23 CFR §450.300.) Because the MPO touches policy makers, upper management, staff, and the general public, the MPO is an important asset in increasing the visibility of ITS. Consequently, it is imperative that MPO members and staff are comfortable with ITS products and services and the benefits that they can accrue.

Agency staffs must be shown how ITS will help them perform their jobs and should be consulted before the purchase of new technologies in order to gain their support. Where ITS visibility occurs before ITS deployment, staff support is virtually guaranteed resulting in improvements to the system and the organization.

Reach Out to the General Public

It is imperative to have a good product for the traveling public. Traffic engineering and ITS staffs must view the general public as the customer. ITS programs have to be focused on and sold to this customer. ITS information that is readily available, easy-to-use, current and accurate must be made accessible to all citizens. In San Antonio, it was noted that a changeable message sign that is not working during an incident could hurt public support. Thus, a redundant system designed to avoid outages is critical to establishing positive visibility and public support. At all the metropolitan model deployment initiative (MDI) sites, real-time traffic and traveler information is made accessible to individuals in all income levels through the use of kiosks, the Internet, and the media.

The public will not support what they do not understand. Therefore, public support must be gained through a public relations campaign designed to facilitate visibility and understanding of ITS and its benefits (Appendix G.1), and assuage the public's privacy concerns. The public relations campaign should employ as many media as possible in an effort to get the public to understand ITS functionality and realize the benefits. It is important to build public support but not generate expectations that are too great.

The Texas Department of Transportation (TxDOT) San Antonio District believes the public needs to be educated early to tout the benefits of ITS and to diffuse privacy concerns. TxDOT public relations staff have and continue to address these issues through a public relations program (Appendix E.1) which includes radio and television commercials, printed pamphlets and newsletters, and real-time video images and traffic information on local radio and television news. It has been noted that a picture or video image of an icy freeway or traffic incident has a greater impact on the public than the simple reporting of it from the electronic media.

The activities of the Seattle *Smart Trek* project are organized into project "bundles." One of these, the "Public Involvement, Outreach and Marketing" bundle, is responsible for conducting public relations functions (Appendix E.3) in order to communicate the project developments of *Smart Trek* to the general public, policy makers, and upper management. In Phoenix, *AZTech* efforts (Appendix E.2) to make ITS visible are focused primarily on public agency partners, policy makers, and staff. Public outreach is seen as an on-going, but not a primary, effort.

The cost of ITS visibility is primarily in staffing. The TxDOT San Antonio district has dedicated one-and-one-half staff positions to public awareness and outreach. *TransGuide* has a Public Information Officer and an assistant assigned specifically to the MDI. In Seattle, a private public relations consultant was included as a partner in the MDI proposal. There is also a national, joint publicity campaign for all the MDI sites.

Table 2.1 Benefits and Costs Associated with Reaching Out to the General Public

ACTION	BENEFITS	COSTS
View the traveling public as the customer	• Ensures ITS program is focused on providing a good product for the public. • Ensures individuals of all income levels will have access to information. • Positive results of focus groups have bolstered management support.	• Time and effort to promote this concept to management and staff. • Cost of conducting focus groups.
Ensure that ITS information is accessible, easy to use, and accurate	• Establishes positive visibility and public support.	• Inaccessible ITS information during an incident can damage public support.
Develop a public relations campaign	• Public support is gained with increased visibility and understanding of ITS. • Public support leads to support from policy makers and upper management. • Manages public expectations and privacy concerns. • Free exposure on local radio and television media. • Video images have a tremendous impact on the public.	• Staff time • Cost of various media, such as radio and television commercials, and printed materials. • Systems or functions for delivering information to news outlets by reports or video feeds.

Gain Support from Policy Makers and Upper Management

Major transportation policy and philosophical changes will not happen as a matter of course. Rather, buy-in occurs over time and involves continuous education and salesmanship. This continuous process creates a “snowball” effect wherein ITS visibility leads to management support, which leads to ITS becoming more mainstream and, in turn, leads to even greater visibility and support.

Table 2.2 Benefits and Costs Associated with Gaining Support from Policy Makers and Upper Management

ACTION	BENEFITS	COSTS
Educate management to ensure buy-in over time	• Eases major transportation policy changes. • ITS becomes more mainstream leading to even greater visibility and support. • Additional ITS activities do not require another management buy-in effort once support is in place.	• Staff time. • Materials used to promote ITS accomplishments.
Form interagency groups and committees	• Establishes and continues guaranteed contact, coordination, and visibility among partners. • Instrumental in gaining additional needed partners.	• Staff time.
Participate in national scanning reviews and conduct tours of local facilities	• Provides visibility and builds support for ITS.	• Management time in participating in scanning reviews. • Staff time in conducting tours.
Develop an ITS champion or strong group of believers	• Increased visibility through the education and selling of ITS to management, potential new partners, and legislators.	• Staff time.

Sponsored by the United States Department of Transportation (U.S. DOT), scanning reviews (Appendix F.2) of working ITS deployments for selected key management and policy makers have proven effective in providing visibility and building support for ITS and related coordination efforts. Interagency groups and committees made up of ITS program partners and directorate-level management are important in establishing and guaranteeing continued contact and ITS visibility among the partners. To promote a different approach to transportation in an area, a champion or a strong group of believers is also essential to educate and sell ITS to upper management, potential new partners, and the policy makers. In addition, strong public support is helpful to ensuring upper management and legislative support.

In Arizona, political and administrative buy-in has occurred gradually throughout the 1990s. Support for each ITS built on support achieved for a previous ITS effort. As a result, individual ITS efforts do not require additional processes to secure management buy-in. Indicative of management support was the creation of the Statewide Technology Advisory Group and the appointment of an ITS Coordinator within the Arizona Department of Transportation (ADOT) to direct the ITS deployment and operations throughout the state. The high level of the ITS and *AZTech* positions within ADOT provides extensive exposure of the MDI project to other ADOT management and simplifies coordination efforts between ADOT divisions and districts.

During the inception of ITS, the Arizona elected officials were perceived to be neutral on the topic of ITS because they did not thoroughly understand it. However, ADOT officials knew that their support was critical to the success of ITS and therefore, promoted ADOT's ITS accomplishments in a positive light and worked closely with the media to provide information deemed important to the state and the public. One project participant suggested that state officials are very concerned with air quality problems, and if transportation agencies could show that ITS will improve air quality, state officials would support it (Volpe Center, 1996).

Local officials support ITS to some extent based on their history of funding ITS projects. They tend to support efforts that are cost efficient and benefit their constituents, and ITS falls into that category. Local officials were supportive of ITS because they had more control of funds than state officials, and therefore were more involved and concerned with the details of how the funds were used, and were willing to examine ITS components more closely. Local officials are involved with ITS because they sit on various MPO committees on transportation (Volpe Center, 1996).

In the *AZTech* MDI, a particular town that should have been included in the project team because two smart corridors pass through its jurisdiction was not a participant. The town did not employ a traffic engineer nor had other technical staff available to attend *AZTech* meetings. Therefore, town administrators were not aware of the benefits of coordinating their traffic signals with neighboring jurisdictions. *AZTech* staff approached the Town Council to inform them of impacts on and benefits for the town, as well as to obtain support and funding agreements. As a result, town administrators have signed an intergovernmental agreement (IGA) (Appendix C.3).

TxDOT San Antonio District management championed ITS in the San Antonio area and made presentations to the Texas Transportation Commission convincing the members that ITS was a good investment. They continue to promote ITS and the MDI, which was built on the success of previous ITS programs, to the Commission Chairman to engender continued support. As a result of this visibility, an ITS strategy has been accepted by the Transportation Commission, which provides even more visibility to ITS. The District and their contractor also briefed the Commission on the MDI specifically, and they hope that MDI will provide the quantitative benefits required by TxDOT management and the Commission.

Support for ITS among TxDOT management has grown as it has become apparent that ITS has and will continue to help the efficiency of the roadway system. This has placed ITS more in the transportation mainstream. TxDOT staff created arguments and justification for ITS projects. They educated management on what ITS means to them and helped them understand the principles and acronyms of ITS.

The TxDOT San Antonio District takes any and all opportunities to promote and tout ITS to all levels of government including the offices of the Texas Senators. Meetings and product demonstrations are also periodically hosted at the *TransGuide* facility for local state legislators.

Seattle's public agency ITS visibility efforts are varied. When the components of the *Smart Trek* MDI were up and running, the Department of Information Services had planned to put a subset of the MDI-related accomplishments on their web site to describe them to representatives from other states and regions. Seattle's Metro Transit has conducted focus groups on ITS in which the public has shown enthusiasm for the program. The results are being used to bolster staff and management support.

Costs associated with obtaining upper management and political support have been negligible in Phoenix because the base support has been developed for years. The initial effort concentrated on getting the lead administrators and political entities to appreciate the use of new technologies. Continuous education was the key to obtaining management support. Statewide, this continues to be the role of the ITS Coordinator.

Involve Metropolitan Planning Organizations

The metropolitan planning organization (MPO) is the forum for cooperative transportation decision making for the metropolitan planning area. (23 CFR §450.104.) This agency is responsible for the continuing, cooperative, and comprehensive transportation planning process that results in plans and programs that consider all transportation modes and supports metropolitan community development and social goals. These plans and programs shall lead to the development and operation of an integrated, intermodal transportation system that facilitates the efficient, economic movement of people and goods (23 CFR §450.300). The purpose of the ITS Program strongly resembles these objectives, and ITS products and services can be used to achieve these ends.

Most MPOs have similar organizational structures: a policy board, technical and citizen advisory committees, and staff. The MPO touches policy makers, upper management, staff, and the general public. This makes the MPO an important asset in increasing the visibility of ITS. Furthermore, in the future, more ITS projects will be funded through traditional federal-aid sources rather than through specific ITS funding. This will require that these projects be integrated within the metropolitan transportation planning process. It is imperative that MPO members and staff are comfortable with ITS products and services and the benefits that they can accrue.

Policy Makers and Upper Management

The MPO policy board may include representation of local elected officials, officials of agencies that administer or operate major modes of transportation, e.g., transit, major local airports, maritime ports, rail operators, and appropriate state officials (23 CFR §450.304). These are the same agencies that would benefit from ITS.

Table 2.3 Benefits and Costs Associated with Involving Metropolitan Planning Organizations

ACTION	BENEFITS	COSTS
Involve the MPO in the development of ITS	• Similar purposes of metropolitan transportation planning and ITS allow the MPO to use ITS in meeting its objectives. • The MPO's diverse membership is exposed to ITS, which increases ITS visibility. • Allows ITS to be incorporated into the metropolitan transportation planning process. • Increases coordination between public and private sectors.	• Staff time.
Provide MPO policy board with ITS information	• Policy board and committees can make more informed decisions. • Members gain understanding of ITS and how ITS can be used at the local and regional levels.	• Staff time.
Make staff knowledgeable on ITS	• Ensures consideration of ITS solutions in the metropolitan transportation planning process. • Identification of ITS strategies appropriate to the region. • Assistance to state and local planning agencies.	• Staff time. • Training costs.
Take advantage of MPO forums	• Outreach and public participatory structure of the MPO increases ITS visibility within the general public. • Reaches private transportation providers and other private sector firms. • City, county, and state governments become more involved and supportive of ITS	• Staff time.

In order to develop a comprehensive multi-modal system, officials must see the "big picture" and know how ITS fits into the broader transportation system. Through the MPO, officials can gain an understanding of ITS and how these systems can be used at the local and regional level. This knowledge would give these officials a broader base from which they can make decisions. The mayor of Glendale, Arizona, for example, serves on the Maricopa Association of Governments (MAG) Policy Committee. Through her participation, she became aware of ITS and specifically the *AZTech* MDI project and was comfortable with her city staff participating in the MDI project.

The MPOs within three MDI sites address officials and management in differing ways. To ensure that ITS would not get "lost in the shuffle," the MAG Policy Board decided to institute a separate ITS committee rather than to add an ITS role to an existing MPO committee. The ITS Committee (Appendix D.4) will investigate ITS funding opportunities, function as a legislative liaison, and provide assistance with public relations. It will also encourage ITS educational programs, facilitate the collection and reporting of ITS information, ensure coordination of ITS projects among modes and jurisdictions, and recommend and set priorities for ITS projects for federal funds and inclusion within the regional transportation improvement program and MAG's Long Range Plan.

MAG officials also felt that the ITS Committee would provide a good opportunity to keep municipalities not participating in the MDI aware of both the MDI and other ITS activities occurring in the Phoenix area. They hope that, by keeping the non-MDI agencies informed, these agencies will feel comfortable joining at a later stage. Therefore, the Committee includes officials from cities that are and are not a part of the MDI.

In San Antonio, ITS is considered as part of the overall planning process. The San Antonio MPO has a working group that oversees major investment studies; these studies consider transportation demand management, transportation systems management, and ITS alternatives.

At the time the *Smart Trek* project started, there was no ITS committee in the Seattle region. However, the ITS Regional Strategy Advisory Panel has since been formed. This panel will provide guidance to the Puget Sound Regional Council (PSRC) staff as they develop the ITS regional strategy (Appendix E.5). This panel comprises many *Smart Trek* project managers and other members of ITS Washington.

Staff

A staff knowledgeable of ITS activities is a benefit to making ITS visible. Staff can provide to the policy boards and technical committees information on ITS which is needed to make informed decisions, identify ITS strategies appropriate to the region, and document how ITS can fit into local and state agency plans.

MPO staff in three MDI sites approach their involvement in ITS activities differently. MAG staff are responsible for coordinating with all MAG members and incorporating ITS and MDI efforts into the regional planning process and their associated planning documents, including the transportation improvement program and the long range transportation plan. To accommodate the increasing ITS efforts, the MAG is funding one-third of a staff position to serve as an ITS liaison. This staff member is responsible for the coordination of and communication within the ITS Committee, attendance at *AZTech* meetings, and the tracking and monitoring of MDI activities to ensure that integrated planning occurs.

Staff at the PSRC are actively involved in the *Smart Trek* MDI. They assisted in the development of the MDI proposal, serve as manager for the congestion management system automated data collection project, and sit on the MDI Policy Support Group. Staff are also actively involved in the MDI Outreach Bundle and work on various public relations, outreach, and marketing activities, including conducting two surveys. Internally, one staff person is dedicated to refining the ITS element of the metropolitan transportation plan (Appendix E.4) and conducting surveys of transit agencies and small localities to gauge their use of ITS.

The San Antonio MPO incorporates ITS into the day-to-day activities of the agency. Staff comprises eight members all of whom work on ITS activities within their daily workload. The staff endorses ITS and will consider ITS solutions when conducting studies. ITS and *TransGuide* must be considered in the base case of all planning studies, whether conducted by MPO staff or by consultants, as evidenced when the MPO conducted major investment studies for I-410 and I-35.

The General Public

The MPOs can also reach the general public through their citizen committees and outreach programs. In the San Antonio Metropolitan Area, the MPO convenes groups from small geographic areas to discuss the 20-year plan, especially how it relates to an area or corridor. These discussions may include ITS. Also, the region is divided into 19 areas or corridors, and citizen task forces are established in each. ITS and other alternatives are discussed during area or corridor meetings. In addition, the MPO conducts four public meetings for each transportation improvement program cycle. The meetings include not only the general public but also local elected officials and staff members from other transportation agencies. The PSRC staff view the metropolitan transportation plan as a public information document that will show how ITS fits within the region.

Future Role

The need to coordinate the development of ITS between different agencies and between public and private sectors, to promote a multi-modal approach, and to implement transportation demand management techniques are reasons to increase the MPO's role in coordinating a region's ITS activities. MPOs are consensus building organizations where transportation planning originates and where decisions on the development of transportation systems, including ITS, can benefit from outreach and public participatory structures that have been incorporated into the planning process. (U.S. DOT, 1997.)

Because major transportation organizations in a region are usually participants in the transportation planning process through the MPO structure, the MPO is being viewed as an effective mechanism to facilitate and coordinate ITS planning across modes, across political and functional boundaries, and between public and private sector organizations. Some MPOs have already incorporated private transportation providers into the regional planning process and are in a position to expand private sector involvement to include private providers of ITS transportation, communications, and information technologies. (Zavattero, 1996)

In particular, PSRC staff views their future role as identifying systems that are most beneficial to the region, corridors in which ITS strategies can be used, and public and private sector roles. They also want to provide better information on the effectiveness of ITS strategies and get city and county governments more aware of ITS and how it can affect transportation in their jurisdictions. They would like to encourage the state to be more proactive in supporting the development of the ITS infrastructure and to provide financing and to present ideas to local jurisdictions about how they can get financing for ITS.

Encourage Staff Involvement

Staff must be shown how ITS will help them perform their jobs more effectively in order to gain their support. Involving staff members early in the development of new areas will tend to bolster staff support and empower the staff in identifying potential improvements to the transportation system and the organization. If projects or technologies are thrust upon staff, staff will not support them.

The degree of staff support varies among the different types of agencies. The smaller the staff, such as a municipal traffic department, or the more defined the section, such as a traffic engineering section in a state DOT, the greater the enthusiasm. The managers of several of these organizations mentioned that most of their staff members are eager to work with new technologies and gaining their support is not a problem. In fact, in some agencies, more staff would have been involved if funding had been available. The managers build on the staff's enthusiasm. Some managers stated, however, that sometimes staff may express a healthy skepticism, but usually this does not adversely affect acceptance of the project or technology.

Managers will brief staff as new technologies emerge. They ask staff to look at the technology from different angles and suggest ways it can be used. When a skepticism surfaces, managers will show the relevance of the technology and the advantages it will provide. It is important to show how new technologies will benefit the staff, the agency, and the public. To maintain support, managers will regularly brief all staff on the progress of a project.

Public agency managers at three sites believe it is extremely important to involve operations and maintenance personnel during the development, purchase, and deployment phases of new projects. In one location, the maintenance supervisor sat on the product selection committee. In other areas, operations and maintenance staff evaluated maintainability and compatibility of technologies and assisted in writing maintenance contracts.

Input from staff who will be users of the new systems is also important to ensure that the systems will be used as intended. In San Antonio, the Ambulance Committee solicited feedback from personnel concerning the placement of video equipment, and VIA Metropolitan Transit

Authority bus drivers were asked to provide input on the placement of cameras. Operators of the traffic management centers are involved in the upgrade and expansion of the centers.

Table 2.4 Benefits and Costs Associated with Encouraging Staff Involvement

ACTION	BENEFITS	COSTS
Demonstrate how ITS will help staff do their job more effectively	• Bolsters staff support for new technologies. • Staff empowered to identify improvements to systems and organization. • Support ensures long-term success. • Overcomes reluctance to change.	• Management time. • Training costs. • Increased staff time in meetings.
Involve staff in ITS development, purchase, and deployment	• Engenders staff ownership that ensures that systems will be used as intended. • Successful upgrade and expansion of systems. • Assuages staff concerns involving increased workload, union issues, video monitoring, etc.	• More frequent meetings involve increased staff time.
Encourage staff from different functions to work together	• Each group provides insight into system design. • Knowledge is shared openly. • Public safety and inter-agency and media relations are improved.	• Staff time. • Facility costs.

Some agencies did report some staff support problems that they encountered regarding the introduction of new technologies and the MDI project. One traffic department manager recognized that often the initial staff response is to be resistant to change. However, this reluctance is overcome by holding biweekly staff briefings on the technologies being considered.

State DOTs, which are large organizations, seem to have a greater percentage of skeptics. Officials from state DOTs identified gaining support from construction and maintenance staff as an issue. These employees have had less experience with ITS, and some feel that ITS projects are not “real” engineering projects. To address this issue, management stresses the traveling public as the customer and ITS as another element to help the customer. They also show how ITS can positively affect the jobs of the staff. Management at one site is providing training to eradicate this skepticism and make staff knowledgeable in ITS.

One transit agency is currently experiencing reluctance by the union members to accept the installation of automatic vehicle location systems on the bus fleet. There is fear that the introduction of this technology may reduce the level of inspectors, limiting the promotional opportunities for the bus operators. At another transit agency, bus drivers were concerned that the cameras installed in the buses would be used to monitor drivers. Transit management involved drivers in the system's design in order to diffuse staff resistance and stressed that only the drivers would activate the cameras.

At a third transit agency, front-line staff (drivers and phone operators) want access to the same information that the public can access. They want to see what the public sees in order to be able to respond to inquiries and comments; they also want access to a display with real-time information. Staff are also concerned that the MDI project will increase interaction between the public and the front-line staff and increase the workload for an already overworked staff. Management is working with staff to address these concerns. These issues show the importance of keeping union management and members informed as projects are developed and deployed.

Most public sector partners did not incur additional costs to gain and maintain staff support. Project participants did, however, express several benefits from their efforts. Involving staff allows them to take ownership of and have a personal interest in the new system, which ensures that the system will be used and used properly. Gaining and maintaining staff support also ensures the long-term success of a project.

Staff from different functions now work more closely together. Operations personnel are working more closely with the design and maintenance staff. Each group provides much insight, and real needs are addressed. Design, maintenance, and construction staffs work together when equipment is installed and share their knowledge openly. In San Antonio, staffs with different expertise are housed in one building, which encourages and facilitates interaction. The *AZTech* incident management coordinator added that the benefits of having staff support for the new technologies include a direct benefit to public safety, a more professional approach to incident management, a better relationship with public safety agencies, and a better relationship with the media.

Table 2.5 on the next four pages lists questions that should be addressed when making ITS visible.

Table 2.5 Questions to Consider when Making ITS Visible

QUESTION	RESPONSE
REACH OUT TO THE GENERAL PUBLIC	
• Have you adopted the philosophy that the traveling public is your customer?	
• Has a public relations campaign been designed to increase public awareness and understanding of ITS?	
◊ Have the most effective media been identified?	
◊ Should focus groups be used to determine the public's awareness of ITS?	
◊ Have expectations for ITS been properly defined and not exaggerated?	
◊ Have the benefits of ITS specific to your area been conveyed?	
• Does the project provide readily available and easy-to-use ITS information to the public?	
◊ Is ITS information made accessible to individuals in all income levels?	
◊ Is ITS information made accessible to users of different modes of transportation?	
• Are there any other actions that need to be taken to ensure that you reach out to the general public?	

Table 2.5 Questions to Consider when Making ITS Visible (continued)

QUESTION	RESPONSE
GAIN SUPPORT FROM DECISION MAKERS	
• Have policy makers and upper management who are key to the success of ITS been identified?	
◊ Have key committees within governmental jurisdictions and state DOTs that can provide visibility to ITS been identified?	
◊ Should an ITS committee comprising upper management be established?	
• Should a program to educate key decision makers on ITS be established?	
◊ Have decision makers been invited to tour existing facilities in the area and attend product demonstrations?	
◊ Have the benefits of ITS specific to your area been conveyed?	
• Have the officials who would benefit from ITS scanning reviews been identified?	
• Have ITS champions in your area been identified?	
• Are there other actions that need to be taken to ensure that support is gained from policy makers and upper management?	

Table 2.5 Questions to Consider when Making ITS Visible (continued)

QUESTION	RESPONSE
INVOLVE MPOs	
• Has the MPO policy board members been briefed on ITS activities and encouraged to participate?	
• Should the MPO structure be modified to accommodate ITS?	
◊ Should an ITS Coordinator position be established?	
◊ Should an ITS Committee be created?	
◊ Has an existing committee that would promote ITS been identified?	
• Have MPO staff been encouraged to participate in ITS activities?	
◊ Should a training program on ITS for the MPO staff be developed?	
• Have the public forums and outreach programs conducted by the MPO been used to promote ITS?	
• Has the role of the MPO in future ITS activities been established?	
• Are there other actions that need to be taken to ensure that MPO policy board and staff members are involved in ITS planning and development?	

Table 2.5 Questions to Consider when Making ITS Visible (continued)

QUESTION	RESPONSE
ENCOURAGE STAFF INVOLVEMENT	
• Have staff been encouraged to participate in ITS activities?	
◊ Have staff been informed early of ITS activities?	
◊ Have staff been shown how ITS can help them be more effective?	
• Have staff from different functions been encouraged to work together?	
◊ Have operations and maintenance staff been included in the design, procurement, and development phases of the ITS project?	
◊ Have construction staff been involved in ITS planning and design?	
◊ Have public safety staff and other users been encouraged to participate?	
◊ Have union members been kept informed and asked to participate?	
◊ Should staff from different functions working on the ITS project be housed in one location?	
• Are there other actions that need to be taken to encourage staff involvement?	

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Note:
EDL stands for the Electronic Data Library that is located at the U.S. DOT ITS Web site at www.its.dot.gov.

3. Understand the Nuances of Partnering

Since the inception of the Intelligent Vehicle-Highway System (IVHS) Program (now the Intelligent Transportation Systems [ITS] Program), the concept of partnering has been widely promoted by program proponents. They recognized that coordination and cooperation would be needed among various participants, especially among public sector agencies and between the public and private sectors to ensure success of the program (U.S. DOT, 1992). Developing partnering arrangements, however, is new to most of the parties involved in planning and implementing ITS, and this newness affects both public-public and public-private arrangements. In areas where partnering agreements were developed, all parties had to adjust to a new business style and working environment (Volpe Center, 1995).

- *Recognize Differing Objectives*
- *Realize It Takes Time to Develop Trust*
- *Define Roles and Responsibilities*
- *Provide Incentives for Participating*

By their nature, ITS products and services are most effective when integrated within a metropolitan area or across state lines. Public-public partnering arrangements among the many jurisdictions and agencies that are responsible for transportation management within a region or state help to assure a technologically and geographically seamless deployment. Public-private partnering arrangements are cost-effective and allow the public to benefit from private firms' expertise in developing, marketing, deploying, and maintaining ITS products and services.

Recognize That Participants Have Differing Objectives

Project participants must explicitly recognize the differences in the underlying missions of the various agencies and organizations involved in an ITS project, especially the difference between the private and public sectors. This recognition will enhance a partnership as the participants clearly define what they hope to realize through the project and make clear how this goal is a natural reflection of their mission. This means that the participants seek to understand the traditional cultures of the other parties. Moreover, they adjust their ways of doing business, if necessary, as a result of the explicit recognition and appreciation of these cultures. Ideally, this will result in project participants reaching a compromise to develop a way of doing business that best fits the project.

Public agencies vary in several ways. State highway agencies focus on freeways and inter-regional travel. Municipal traffic agencies focus on arterials and local road networks. Officials from the core or central city within an area often have a more regional outlook than those from the suburban municipalities and, therefore, are more likely to interact with state and regional transportation officials. Regional and municipal transit agencies naturally focus on public transportation and the facilities necessary to provide services. (Volpe, 1996.)

Table 3.1 Benefits and Costs Associated with Recognizing that the Participants Have Differing Objectives

ACTION	BENEFITS	COSTS
Understand the differences in the missions of the organizations involved	• Enhances the partnership. • Fosters the goals of the participants. • Illuminates that the project is a natural reflection of the missions of the participants. • Leads to a mutually acceptance working relationship.	• Management and staff time to develop relationships.

The differences between the public and private sectors may include mission, approaches to risk, business objectives, and time frames. Public sector agencies work in a political environment, provide a service to the public, want to spend tax dollars wisely, and have comparatively longer time frames. The private sector responds to shareholders, seeks to advance new business opportunities, strives to maintain an adequate return on investment, and works under shorter time frames. Also, private sector firms that previously worked in a defense environment must adjust to a transportation environment. Differences also occur because of the public sector concern for protecting the public interest and the private sector concerns of proprietary interests and intellectual property rights.

Realize It Takes Time to Develop Trusting Relationships

New relationships and partnerships take time to develop. The basis of any successful partnering arrangement is that the participants feel that they will benefit from the arrangement. This provides the rationale for keeping the partnership together. With that as a base, the new partnering arrangements will require time to build trust, clear communications, and mutual understandings. This fact was evident in the early field operational tests. Participants in those tests stated that they learned to work together, but it was a time-consuming process that required a great deal of patience, communications, and education (Volpe Center, 1995). Prior to the *Smart Trek* Model Deployment Initiative (MDI), a trusting relationship was developed among the MDI participants during some operational tests; consequently, some decisions on the direction of the MDI were based on faith in the parties involved.

Table 3.2 Benefits and Costs Associated with Realizing It Takes Time to Develop Trusting Relationships

ACTION	BENEFITS	COSTS
Allow new relationships time to develop	• Develops trust among the participants. • Parties feel they will benefit from participating.	• Staff time to develop and maintain relationships.

Define Explicitly the Roles and Responsibilities of the Parties

Another lesson learned in the early field operational tests and, more recently, in metropolitan ITS deployments is that the roles and responsibilities of the project participants must be defined as early as possible in the life of the project. Participants should be assigned meaningful roles that are consistent with their strengths and basic missions. Defining roles early will also help address any sensitivity over leadership versus supporting roles and any concerns on how risks will be shared (Volpe Center, 1995). This approach was taken in the *AZTech*, *Smart Trek*, and *TransGuide* MDIs. After reviewing the requirements of the project and the strengths of the participants, the roles that should be adopted by different agencies within the respective MDIs became obvious to the project participants.

Table 3.3 Benefits and Costs Associated with Defining Explicitly the Roles and Responsibilities of the Parties

ACTION	BENEFITS	COSTS
Determine roles and responsibilities early in the life of the project	• Assigns roles that are consistent with participants' basic missions. • Allows the project to benefit from the strengths of individual participants. • Addresses sensitivity over leadership versus supporting roles. • Highlights how risks will be shared.	• Management and staff time to develop and communicate roles.
Identify which functions will remain with the public and private sectors	• Enables private sector representatives to plan their involvement in functions that will satisfy their business objectives.	• Management and staff time to develop and communicate policy.

The potential for developing public-private partnering arrangements is now seen as being more limited in scope than previously thought. The area of information processing and dissemination is regarded as the most promising area for public-private interaction (U.S. DOT, 1997). However, officials in some areas are still struggling with defining the role of the public sector vis-à-vis the private sector in this area. Participants must identify what functions will remain the responsibility of the public sector, so that the private sector representatives can plan their involvement in functions that will satisfy their business objectives. To address this concern, the New Jersey State Legislature passed a law (Appendix A.5) to promote the use of public-private transportation initiatives. Also, WSDOT officials are preparing a business plan to address the continued operations and management of the MDI infrastructure, products, and services and identify public and private sector roles and responsibilities.

Provide Incentives for Participating

All participants must be shown the benefits for being involved in an MDI-like project. Public sector officials must be shown that the expenditure of their limited funds will provide tangible improvements to their operations and serve their constituency better. They also must be convinced that working to achieve a regional goal will improve the transportation system at large, which in turn will provide them benefits. Private sector managers must be convinced that participation in the project will advance their business objectives. In all cases, the benefits received should be proportional to the resources expended, especially in the areas of revenue sharing, the assignment of intellectual property rights, and the ownership and use of data.

One goal that the *AZTech*, *Smart Trek*, and *TransGuide* MDIs share is to develop a market in which the private sector can invest. This includes the goal of the *TransGuide* kiosk program which is to identify benefits that private firms may accrue by operating and maintaining kiosks and encourage the formation of partnering arrangements. To encourage private sector participation, the public sector agencies in these three sites are providing data to any potential information service provider free of charge. The public sector assumes that these service providers will add value to the basic transportation information and receive revenues from the distribution of this information and possibly from advertising. The officials at these sites see a benefit in this approach because, as more private firms become involved, more traveler information will be provided to the traveling public. This, in turn, will lead to the better operation of the transportation system.

However, institutional and legal constraints may discourage private sector participation in such activities. In particular, in some areas, private sector firms that worked with the public sector to develop proposals did so free of charge, but could not be guaranteed additional work if the proposal was approved. Additional work had to be competitively bid. Therefore, private firms run the risk of expending resources without the possibility of any reimbursement. Policies and procedures should be identified that will allow partnering arrangements developed at the proposal stage to be continued in the design and development stages after a proposal is accepted.

The Minnesota Department of Transportation (MnDOT) developed an innovative process which involves the private sector in the initial identification of ITS partnering opportunities. Rather than issuing a request for contract proposals for specific projects already defined by the public sector, the MnDOT issues a request for proposed partners which contains a broad strategic plan presenting multiple possible applications of ITS. Private firms then respond with specific project partnering approaches and technologies to meet the state's overall objectives.

Table 3.4 Benefits and Costs Associated with Providing Incentives for Participating

ACTION	BENEFITS	COSTS
Illustrate the benefits to participants	• Enables public sector participants to recognize how project will improve their operations and service to their constituents. • Enables public sector participants to see that achieving a regional goal will provide benefits to individual jurisdictions. • Enables private sector participants to understand how project will advance their business objectives.	• Staff time to engage potential participants.
Develop a market for ITS products and services	• Encourages private sector participation. • Greater involvement of private sector means more traveler information will be provided to the traveling public, which will lead to an improved transportation system.	• Management and staff time. • Possible support from consultants. • Potential loss of revenues for public sector.
Establish policies and procedures that allow partnering arrangements developed at proposal stage to be continued in the design and development stages	• Eliminates the time needed to develop new trusting relationships. • Encourages private sector participation. • Reduces risks assumed by private sector firms. • Ensures continuity of processes.	• Staff time to identify and develop policies.

Table 3.5 on the next two pages lists questions that should be addressed when understanding the nuances of partnering.

Table 3.5 Questions to Consider when Understanding the Nuances of Partnering

QUESTION	RESPONSE
RECOGNIZE DIFFERING OBJECTIVES	
• Have the participants in the ITS project explicitly stated their organization's mission and business objectives?	
• Have the participants articulated what they hope to realize from the ITS project?	
• Have you identified areas in which you may have to adjust the way you previously operated to accommodate the other participants in the ITS project?	
• Are there any other actions that need to be taken to ensure that you recognize the differing objectives of the potential participants of the ITS project?	
REALIZE IT TAKES TIME TO DEVELOP TRUST	
• Have the participants in the ITS project established proper communication channels to foster the development of a trusting relationship?	
◊ Have the appropriate number of meetings been scheduled?	
◊ Have the appropriate individuals been identified and invited to attend meetings?	
◊ Have you decided how to accommodate possible turn over of staff?	
• Are there other actions that need to be taken to ensure that you realize it takes time to develop trust among potential participants of the ITS project?	

Table 3.5 Questions to Consider when Understanding the Nuances of Partnering (continued)

QUESTION	RESPONSE
DEFINE ROLES AND RESPONSIBILITIES	
• Have the strengths of the participants in the ITS project been identified?	
• Have the roles and responsibilities of the participants in the ITS project been put in writing?	
◊ Have the functions of the ITS project that will remain in the public sector been stated explicitly?	
• Are there other actions that need to be taken to ensure that the roles and responsibilities of the participants are defined clearly for the ITS project?	
PROVIDE INCENTIVES FOR PARTICIPATING	
• Have the benefits of participating in ITS projects been shown to potential participants?	
◊ Have public sector officials been shown that their participation in the ITS project will provide tangible improvements to their operations and serve their constituency better?	
◊ Have private sector managers been shown that participation in the ITS project will advance their business objectives?	
• Should the public sector agencies work with the private sector firms to ensure that a market for ITS products and services is developed?	
◊ Have the actions that will be taken by the public sector agencies been explicitly defined?	
• Should policies and procedures that allow partnering arrangements developed at the proposal stage be continued in the design and development stages be developed?	
• Are there other actions that need to be taken to ensure that the potential participants have an incentive to participate in ITS projects?	

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Note:
EDL stands for the Electronic Data Library that is located at the U.S. DOT ITS Web site at www.its.dot.gov.

4. Plan for Long-term Operations and Management

Planning for long-term operations and management of the activities and systems within the metropolitan model deployment initiative (MDI) ensures the continued success of these activities and systems beyond the life span of the implementation of the systems. This planning secures that the investment made to MDI projects continue to reap benefits long after the initial investment is made. Thus, early planning for long-term operations and management is important because it may help ITS program developers see the big picture early in the development process. By understanding what they will need to do in later steps, project developers will have the opportunity to do things differently in the first step.

- *Maintain the Support of Participants*
- *Build Support of Field Staff, Users, and Operators*
- *Facilitate Private Sector Involvement*

Traditional operations and management practices separate the developing and building staffs from the operations and management staffs. This disconnected approach does not facilitate ITS developments which, by definition, rely on the integration and coordination that comes from viewing an ITS project from a system-wide perspective, rather than as separate, stovepipe entities or as systems that are developed by designers and passed on to the operations and maintenance staffs.

Each MDI site is required to provide support to enable the ITS components to remain operational for five years after the systems are deployed. This requirement has necessitated that the partners look at issues beyond the initial project deployment. Decisions regarding how to obtain long-term commitments from both the public and private sectors are questions that must be answered before the individual components and new system links come on-line. Movement to the operations and management stage from the design and deployment stage also requires responses to how each component will be transferred from the entity installing the system to the entity operating the system. Finally, all parties must recognize that future expansion will require the inclusion and interaction with additional partners, both public and private.

Maintain the Support of Participants

A project is only as successful as the degree to which its participants are committed to it. It is crucial to maintain the commitment of participating staffs in every stage of ITS project activities. In order to maintain this commitment, ITS projects must be able to demonstrate that they will further the goals of the respective agencies who are participating in them. They must be tools that assist meeting the needs of both the agency and its constituency. If the participants view the project as helping them meet their needs, the project will provide an incentive for the participants to stay involved.

Table 4.1 Benefits and Costs Associated with Maintaining the Support of Participants

ACTION	BENEFITS	COSTS
Demonstrate that projects further goals of participants	• Provides an incentive for participants to remain involved. • Ensures that the investment made to ITS projects continues to reap benefits long after the initial investment is made.	• Staff time required to work with other agencies.
Ensure that benefits and costs are distributed equitably	• Provides an incentive for participants to remain involved.	
Develop an appropriate business plan	• Explicitly presents commitments, goals, and expectations of project. • Addresses key issues before they become barriers.	• Management and staff time to develop plan.

In the New York-New Jersey-Connecticut Metropolitan Area, the plan for long-term operations and management of the *iTravel* MDI is based on the creation of a self-sustaining system. Revenues are to be generated through advertising and related efforts for the free telephone and Internet services, as well as user fees for the personalized traveler information service. Both the public and private sector team members have on-going roles in the project. The private sector participants are responsible for the on-going operation and maintenance of the system, and the public sector participants are providing the multi-agency traveler information that is the platform for the *iTravel* program.

Based on this share of responsibilities, revenues from the project are to be split between the public and private sector teams. The ability to draw on these revenues provides an incentive for continued involvement in the project. Specifically, for the public sector participants, the *iTravel* program provides one means of implementing the TRANSCOM (Transportation Operations Coordinating Committee) Regional Information Policy, which was approved by the TRANSCOM Executive Committee in 1986. The Policy calls for TRANSCOM to begin to recover the value of its regional information packages through the sale of information. The Executive Committee specifically approved the *iTravel* MDI as one of the means of pursuing this goal. But most importantly, *iTravel* will enable the TRANSCOM member agencies to provide significant new traveler information services to their customers on a regional basis, supporting their customer service goals and strategies.

Representatives from the MDI sites indicate that it is important for ITS developers to keep in mind that benefits and costs of developing and implementing ITS should be distributed equitably across the region in which the ITS product or service is being developed. The agencies that are not in line to directly benefit from the implementation of the product or service should not be expected to shoulder a lion's share of the cost. In addition, within a locality, the costs of projects that are expected to benefit multiple organizations should be distributed equitably among those organizations. The distribution of costs should be proportional to the benefits accrued by each segment. In order to ensure that costs are distributed equitably, in developing ITS projects, distributions of costs and benefits should be spelled out clearly and understood by all involved, early in the process.

Project success can be greatly aided when commitments, goals, and expectations for the project are explicitly and unmistakably presented, or as one Seattle *Smart Trek* participant said, "put in writing." One example of a highly recommended written tool is the use of business plans to map out questions of long-term operations and management. A business plan is in development as part of the *Smart Trek* MDI which will address questions of the transfer of control of the ITS backbone after implementation of the MDI and point to where decisions must be made in these areas. The plan's developers are examining the basic goals, relationships, and financial attachments of the traveler information business venture in the Seattle area. A great deal of this process has to do with defining the dividing line between information provided by the public sector and information provided by the private sector. By addressing key issues such as which information fits into the core mission and who operates the data fusion process, the plan's developers will document a business model for the entire *Smart Trek* MDI traveler information system. By employing the plan, disputes surrounding each party's responsibilities are avoided before they ever arise. This plan is scheduled for completion in the summer of 1998.

Intergovernmental agreements (IGAs) are another method of securing long-range operations and management commitments from the public partners. For example, in the *AZTech* MDI, several participants remarked that the assurances for the long-term success of the *AZTech* partnership are found in the IGAs and private contracts. The IGAs require the municipalities to operate and maintain the equipment through the official duration of the *AZTech* project. The IGAs (Appendix C.3) between the Arizona Department of Transportation (ADOT) and each city cover the transfer of funds; staffing, local funding, and operation and maintenance of *AZTech* equipment commitments; and the municipal rental of the communication structure. The IGA also includes a provision that the partners will enter into a service agreement. The County will pay for three years, through June 2000, to operate the communications link. Thereafter, through at least 2002, each municipality must take over this responsibility either by renting from the telecommunications provider or by linking into the ADOT network.

Build Support of Field Staff, Users, and Operators

ITS has changed the way design, engineering, operations, and maintenance staffs coordinate with one another. Because of the integrated nature of these projects, the involvement of all staff members in the project development is crucial; operations and maintenance staffs must work closer than ever before with design and engineering staffs in order to assure the best possible development and operation of an intelligent transportation system. These two levels of staffs must both be intricately involved in project development, implementation, and maintenance --

the operations and engineering staffs from a daily operations perspective, and the maintenance staffs working to keep the system performing properly. This closer relationship will result in more accurate reporting and a quicker resolution of problems.

Table 4.2 Benefits and Costs Associated with Building Support of Field Staff, Users, and Operators

ACTION	BENEFITS	COSTS
Involve employees as much as possible	• Instills a sense of ownership for users and maintenance staffs. • Develops staff appreciation and a sense of pride. • Ensures acceptance and use of systems. • Ensures long-term maintenance of systems.	• Staff time to work with other staff. • Training for trainers. • Staff time for train other users. • Maintenance training. • Possible missed opportunities.
Include operations and maintenance staffs in the design, build, and implementation stages	• Develops a close relationship between design-and-build staffs and operations and maintenance staffs. • Provides a smooth transition from the design-and-build stages to system operations. • More accurate reporting and quicker resolution of problems.	• Staff time to participate in design meetings and acceptance testing.
Use agency staff to train other staff members	• Develops appreciation and sense ownership of the system by trainers. • Helps ensures acceptance and use of the system by other staff.	• Staff time and possible overtime. • Possible staff and equipment re-deployment costs.
Set aside specific work for agency staff	• Challenges and motivates staff. • Develops appreciation and sense ownership of the system by staff. • Helps ensure long-term use and maintenance of the system.	• Staff time and possible overtime • A potential increase in workload to staff assigned to ITS projects. • Missed opportunity for staff to be working on others projects.

At two non-MDI sites, the participants in projects deploying new systems were concerned about the long-term operation and maintenance of these systems. During the FAST-TRAC field operational test, the management of the Road Commission for Oakland County wanted to ensure that the advanced traffic management system would be maintained. Because of the amount of hardware that had to be installed, contractors performed most of the installation. However, Commission management retained some of the installation work for their technicians. Management felt that the new technology would challenge and motivate the staff. Because of their involvement, the staff developed an appreciation of the system and a sense of pride and satisfaction. This ensured the long-term maintenance of the system.

In Indianapolis, Indiana, the Metropolitan Emergency Communications Agency was formed to develop a regional emergency communication system. Elected and appointed officials wanted to ensure that the systems would be used. In response to that concern, agency staff successfully mounted a pilot project. Seven mobile data terminals were installed in Sheriff's Department cars, and a small number of Sheriff's deputies used them for a while. Agency staff then formally trained these deputies. After being trained and using the units further, these deputies then wrote the users' manual. As additional units were installed, these deputies then trained additional deputies on the use of the equipment. These actions ensured the acceptance and use of the system.

The majority of municipalities that are participating in the MDI have either included operations and maintenance personnel in the designing and planning stages of projects or recognize that they should have included them. For example, in Bellevue, Washington, once the specifics of the involvement of the municipality in *Smart Trek* were decided, information was solicited from technicians in order to gain staff support for the projects. In Bellevue, operations and maintenance staffs are included in every project from street light design to traffic signal adaptations.

Also, in the *Smart Trek,* when staff from the Washington State Department of Information Services undertake a new project, all staff members, including representatives from maintenance and operations, work together to identify, research, and evaluate proposed solutions for the project. Maintenance and operations personnel are also involved in staff meetings. In the San Antonio MDI, because design, maintenance, and operations staffs are housed in the same location, they are constantly interacting with and learning from each other.

An ADOT representative remarked that, while a small operations staff is already familiar with ITS, the construction staff has little experience with ITS. In order to rectify this, the ADOT district management is training the construction staff to make staff members knowledgeable in ITS. In one municipality, officials realized after the fact the value of involving all levels of staff in the MDI. Because of the heavy workload demands on its small staff, management did not involve all members of the transportation department in the MDI project. Those that were left out resented that they were brought in later and were not part of the "selected" group.

To facilitate long-term support from users and operators, the *AZTech* participants have attempted to make new equipment purchased for the project as compatible as possible with existing equipment by allowing flexibility in the purchase of some hardware items. The local partners are able to vary equipment, which they will eventually own and operate, to meet their own need, provided the characteristics needed for regional coordination among the jurisdictions are present and allow compatibility. Flexibility as to who ultimately will operate and manage each partner's

AZTech equipment and system was also included within the partner agreements to allow the transition and operation to be as simplified as possible. In this way, ensuring a fluid transition of the AZTech components from the deployment stage to the operations, maintenance, and management stage can also assist success.

Recommendations from MDI project participants regarding the involvement of staff in system design include involving staff in system design and acceptance testing, ensuring that staff are trained, and involving staff in training others. As one participant of the Seattle *Smart Trek* put it, "There is nothing like having someone who knows what he's doing train someone else." One way to ensure the involvement of different staffs at every level of projects is to illustrate the ways in which the project will either reduce the staff's work loads or will derive other work-related benefits, such as improved customer service. Most municipal MDI participants commented that staffs are enthusiastic about working with new technologies; in many cases, they want to be involved.

A benefit of involving operations and maintenance staffs in the design and build stage is that, with the coordination between staffs, transfer of control of MDI-related equipment will occur with fewer problems. Washington State Department of Information Services has already done cross-training of staffs, simplifying the turnover process, so the transfer of systems from development to operations and maintenance will not be an issue; the operating staff will be involved in the implementation of the systems. This coordination among staffs results in the benefit of a smooth transition. Also, if problems occur, they are identified earlier and fixes are incorporated faster. In this way, the agency staffs of the *Smart Trek* participants are using foresight in looking at operations and maintenance of the systems before they are implemented. In the *TransGuide* program, the transition from the design and build staff to the operations and management staff will be facilitated through training given by vendors and through staff involvement in the acceptance testing.

Facilitate Private Sector Involvement

The goal of MDI-like projects is to create an ITS market in which the private sector is a major player. Regardless of whether the application is information retrieval, analysis, dissemination, or compilation, the final objective of these programs is to encourage private sector participation in ITS, and to move toward a setting in which the private sector is the primary provider of traveler information and the public sector conducts oversight. Discussions with MDI participants reveal two fundamental conditions that must be met in order to facilitate private sector involvement. First, the members of the private sector must have incentives to participate in these projects. They must believe that their involvement will result in profit, either directly or through association with the project activities. Second, a market must exist for ITS products and services if the private sector is going to become involved in providing these products and services. Representatives of the private sector must feel compelled to become involved in these projects. In order to accomplish these goals representatives of the public sector must work with private firms to reach a regional vision and to meet the business objectives of the private sector.

Table 4.3 Benefits and Costs Associated with Facilitating Private Sector Involvement

ACTION	BENEFITS	COSTS
Develop specific opportunities for private sector involvement	• Ability to take advantage of the unique strengths of the private sector. • Potentially ensures the long-range success of the project.	• Staff time to engage the private sector. • Incentives for the private sector must be identified. • A market for ITS products and services must be developed. • Potential loss of revenues by public sector agencies.

Many public sector developers of ITS products and services relate additional opportunities for added private sector involvement. A goal of the *AZTech* representatives is that individuals from the private sector see ITS as an invaluable opportunity to display their products and join in the *AZTech* deployment. In this MDI, public participants would like eventually to draw more private partners into the project by giving these companies a well-publicized showcase in which they could demonstrate their product. An ADOT official saw new partners including an FM subcarrier for a radio data broadcast system, a kiosks partner, and a camera and sensor supplier. An incident management systems specialist envisioned expanding into the trucking and manufacturing industries, especially adding hazardous materials transporters as new partners. A Maricopa County Department of Transportation manager and several municipal officials would like to add other information service providers and additional product suppliers as new partners. A transit representative spoke of expanding the transit component to include smart card fare payment and collection technology with the addition of a software firm. City of Phoenix officials said that the private companies should look at the *AZTech* MDI project as a promotional opportunity.

The *Smart Trek* MDI participants are looking for involvement from information service providers and other private sector firms. In the MDI, private sector representatives have been included since the inception of the project, were involved in developing the project proposal, and have a role in every aspect of the project's development. The *Smart Trek* decision-making structure includes two deputy project managers and four bundle managers from the private sector (Appendix D.3). A goal of the *Smart Trek* MDI is to involve private sector information service providers in the dissemination of traveler and traffic information by making traveler and traffic information from the project's backbone widely available. Also, King County Metro Transit is seeking private sector participants, most likely equipment manufacturers, to provide a business model for operations and maintenance of displays.

Benefits of private sector participation in ITS projects include the ability of the projects and services to take advantage of the unique strengths of the private sector. For example, in the *Smart Trek* project, a private sector organization is responsible for the MDI's public relations and outreach program (Appendix E.3). This firm has unique experience and expertise in information dissemination and is able to distribute compelling information about the benefits of

ITS to the region to a broad and varied audience. The utilization of this breadth of experience in marketing and public relations has not been traditionally available to the public sector. Benefits to public sector interests, however, come with the development of opportunities for private sector involvement in ITS.

The *TransGuide* facility was built as a showcase for ITS with the aid of private funding. The Texas Department of Transportation (TxDOT) District management would like to show the benefits of the kiosk program in order to form a partnership with private sector firms. In addition, TxDOT management would like the private sector to take over the kiosks, removing the maintenance responsibility from the TxDOT. However, because state legislation prohibits advertising on state-owned kiosks, information-sharing issues will have to be resolved if the kiosks are owned and installed by private firms. Additionally, TxDOT staff are concerned that initially the ISPs may not be able to make a profit, at least until additional information becomes available. To respond to this concern, TxDOT officials will develop a policy statement on the implementation of kiosks that will promote ISPs and encourage them to add value to the information that TxDOT provides.

Major private sector employers in the San Antonio area may become involved with ITS especially if the ITS are located in an area with a high concentration of commuters. Representatives from *TransGuide* envision that one way that the private sector will eventually be active in ITS is by employers providing real-time traveler information to employees. In addition, in the future, greater involvement from the hospital community will be sought by the San Antonio Fire Department for the LifeLink project.

Table 4.4 on the next two pages lists questions that should be addressed when planning for long-term operations and management.

Table 4.4 Questions to Consider when Planning for Long-term Operations and Management

QUESTION	RESPONSE
MAINTAIN THE SUPPORT OF PARTICIPANTS	
• Have participants been shown that the ITS project will further the goals of their agencies?	
• Have the benefits and costs of implementing the ITS project been distributed equitably?	
• Have the goals, relationships, and financial considerations for the operations and management phase of the ITS project been clearly articulated?	
◊ Should a business plan be written for the ITS project?	
◊ Have the necessary inter-agency agreements been executed?	
• Are there any other actions that need to be taken to ensure that support from the participants is maintained?	
BUILD SUPPORT OF STAFF, USERS AND OPERATORS	
• Have staff from all disciplines been encourage to participate in ITS activities?	
◊ Has the staff been shown that ITS products and services may reduce their workload or improve customer service?	
◊ Should specific work in the ITS project be set aside for agency staff?	
◊ Should agency staff be used to train other staff members?	
◊ Should staff who are reluctant to accept ITS or have little experience with ITS be given training?	
◊ Should staff be cross-trained in different ITS functions?	
• Have operations and maintenance staffs been included in the design, build, and implementation phases of the ITS project?	
• Are there other actions that need to be taken to ensure that support is built among field staff, users, and operators?	

Table 4.4 Questions to Consider when Planning for Long-term Operations and Management (continued)

QUESTION	RESPONSE
FACILITATE PRIVATE SECTOR INVOLVEMENT	
• Have incentives been shown to private sector representatives to encourage their involvement in the ITS project?	
• Has a market been created in which the private sector firms can sell their products and services?	
◊ Has the representatives of the private sector been convinced that the ITS project is a showcase in which they can display their products and services?	
• Have additional private sector participants in the ITS project been identified and approached?	
• Should any regulations, policies, or procedures be changed to facilitate private sector involvement in ITS activities?	
• Are there other actions that need to be taken to facilitate the involvement of the private sector?	

Resource:

Washington State Transportation Center (TRAC), *Choosing the Route to Traveler Information Systems Deployment, Decision Factors for Creating Public/Private Business Plans*, prepared for ITS America and the U.S. Department of Transportation, Washington, D.C., 1998. (EDL number: 5326.)

Note:
EDL stands for the Electronic Data Library that is located at the U.S. DOT ITS Web site at www.its.dot.gov.

5. Develop a Regional Management Structure

An important step in the development of a successful ITS program is the creation of a regional management structure based on the strengths of the project participants. This structure is often achieved through an evolutionary, as opposed to negotiated, process based on the demands of previous interagency projects, existing relationships, and the needs of the partners. Previously established interaction between agencies in the form of studies and programs can be invaluable in quickly setting the stage for new ITS project management structures and committees. Where parties have built on existing models, regional ITS management structures have come about rapidly, allowing for projects to develop without time delays and institutional impediments.

- *Assign Roles Based on Strengths*
- *Identify a Full-time Project Manager*
- *Dedicate Other Support as Required*
- *Develop an Appropriate Committee Structure*

The project participants must identify ITS functional areas of development, operations, and maintenance. This can help the participants best determine the management and staffing needs when these project areas are combined with the project details and technologies outlined in the proposals. As the management structure and ITS program scope evolve, the need for additional skills and staff support should be expected, and they must be dedicated as needed. It can be beneficial to consider incremental staffing increases when developing program plans.

Identifying a full-time ITS lead administrator simplifies the management structure, providing a direct point of contact for the public agency partners and a likely champion for ITS in the region. The lead administrator can ensure that projects are adequately managed without an excess of meetings, management layers, and duplication of tasks.

Committees should be used to maximize knowledge on specific issues and guarantee continued contact among partner agencies. Committees also may provide a bridge to other regional ITS projects and promote a cross-fertilization of agency relationships and ideas.

Assign Roles Based on the Strengths of the Participants

In establishing a regional management structure, an evaluation of existing capabilities and talent within the partner agencies should lead to the assignment of agency roles within an ITS program. Most often, an agency involved in initial ITS projects in a region usually emerges as the lead agency in additional ITS projects. The lead agency provides the majority of the operations and integration staff. A single lead agency ensures efficient procurement, compatible technology, and no duplication of effort.

Table 5.1 Benefits and Costs Associated with Assigning Roles Based on the Strengths of the Participants

ACTION	BENEFITS	COSTS
Evaluate the existing capabilities within the partner agencies	• Leads to the proper assignment of roles within an ITS program. • Ensures that agencies fill roles in ITS that are compatible with their primary mission.	• Staff time in general management, decision making, and coordination.
Determine the lead agency or agencies	• Ensures efficient procurement. • Ensures that compatible technologies are employed. • Avoids duplication of effort. • Allows for additional projects to be easily incorporated into existing management structures.	
Establish technical and executive committees to evaluate agency roles	• Establishes political feasibility with buy-in from various agencies and jurisdictions. • Leads to cooperative efforts with proper division of activities. • Enhances long-term commitments to keep ITS maintained and operational.	• Staff time in forming, conducting, and participating in meetings.

The police, fire, and other public safety departments generally deal with incident management and emergency dispatch, while municipalities and transit properties are respectively responsible for signal control and any transit programs or dispatch. The metropolitan planning organizations (MPOs) have varying degrees of influence and, therefore, take various roles in the deployment of ITS, which can include interagency coordination, planning, and outreach.

In Texas, the Texas Department of Transportation (TxDOT) Districts are responsible for operating and maintaining the state roadway system in their areas and for developing and implementing ITS within the state. As such, the lead agency in San Antonio is the TxDOT San Antonio District which initiated, developed, and leads the regional, inter-agency, ITS operations at the *TransGuide* Traffic Operations Center. The MDI is being managed within the existing *TransGuide* management structure. *TransGuide* houses the TxDOT San Antonio District Traffic Operations staff, the VIA Metropolitan Transit Authority (VIA) paratransit dispatch staff, the

San Antonio Public Works Department traffic engineering staff, the San Antonio Police Department (PD) traffic dispatch staff and an alternate dispatch for the main dispatch, and the San Antonio Fire Department (FD) alternate dispatch. Additional ITS projects, such as the MDI, are easily incorporated into TxDOT's existing management structure.

In the MDI, the TxDOT District staff will be enhancing the *TransGuide* Web page, developing traveler information kiosks, and establishing connections with the airport and VIA. The TxDOT District staff also took on the procurement role in the process of selecting contractors to implement the MDI. This entailed authoring licensing agreements protecting TxDOT's rights to all intellectual property, releasing work orders to the contracted firms, and developing inter-agency agreements.

VIA's role in the MDI is to implement the Bus Incident Management System, which involves placing cameras on vehicles used in fixed-route service. VIA also will be providing bus location information to the information kiosks and is involved in the site selection of the kiosks.

As part of the MDI, the San Antonio Public Works Department is responsible for the development of an interface between its signal system computer and the *TransGuide* computer and the placement of closed circuit television cameras and changeable message signs along Fredericksburg Road corridor. The San Antonio FD is a participant in the LifeLink Project, which allows emergency medical technicians to consult with emergency room doctors through a video link between the hospital and the ambulance. Because of the LifeLink project, three area hospitals have been added to the regional ITS management structure.

As a result of participating in the deployment of ITS and the MDI, San Antonio PD management is now a prime mover in instrumenting more roadways with ITS. This is significant because Police Department management initially saw ITS as high technology "gizmos" but now see the momentous benefits of improved traffic management that an ITS provides.

Officials in the New York State Department of Transportation (NYSDOT) began the MDI effort for the New York-New Jersey-Connecticut (NY/NJ/CT) Metropolitan Area by advertising for interested private-sector participants and selecting one. Then, when the proposal to the U.S. Department of Transportation (U.S. DOT) began to be developed, NYSDOT staff formed a group of representatives from agencies in the metropolitan region.

The group grew as the representatives saw the need to include more and more agencies. At the same time, the group felt that coordination from a single entity was key to the project. Ultimately, the group determined that if the project were carried out under the umbrella of TRANSCOM (Transportation Operations Coordinating Committee), it could take advantage of the operating and institutional relationships that already existed among the member agencies, rather than try to re-create these relationships in a new entity. Also, the approval of the TRANSCOM Executive Committee to participate in the MDI would automatically bring all of the TRANSCOM member agencies into the project.

Because TRANSCOM is not a legal entity, the NYSDOT served as the contracting agency. This kept a state department of transportation in a key role, utilizing the traditional strong working relationships previously developed for U.S. DOT-funded programs. In addition, the NYSDOT had already gone through a public solicitation for private sector participants, while any other public sector agency would still need to go through that process in order to serve as the contracting agency.

The Arizona Department of Transportation (ADOT) and Maricopa County DOT (MCDOT) are the lead agencies for *AZTech*. The decisions on which agency, and who within each agency, would be responsible for the various aspects of the MDI was made by the Technical Oversight and Executive Committees. The decisions were based largely on each partner's available resources. Committee members recognized that cooperative efforts and division of activities were necessary, based on statutory limitations (i.e., the ADOT could not spend money on local streets), the realization that political feasibility required buy-in from the local jurisdictions and other transportation and public safety agencies, and the need for long-term financial and staff commitments from all the partners to keep the *AZTech* components maintained and operational.

The *AZTech* project team includes a principal administrator and a program manager from the ADOT and the MCDOT, respectively. The Smart Corridor implementation task leader comes from the City of Tempe, and the Incident Management Coordinator is a Phoenix firefighter. MCDOT staff filled the traffic signal coordination, communication, and transit coordination task management roles. ADOT staff filled the public outreach and ATIS implementation task management roles.

In Seattle, the Washington State Department of Transportation (WSDOT) Advanced Technology Branch is the lead agency for the *Smart Trek* MDI. The program manager comes from this agency. The WSDOT regional offices are responsible for the major tasks in implementing the MDI. The roles adopted by different agencies within MDI were obvious to the program partners. All partners thought that WSDOT should manage the program because WSDOT is the only operating agency with a regional perspective.

Specifically, the WSDOT Northwest Region is managing five projects. The first is the Enhanced Video Transmission project, which expands the ability to provide video feeds to other services and ISPs and enhances the ability of the system to deal with video input from other sources. The second is the CD-ROM project, which addresses the deficiencies in the existing system in accessing historic traffic data. The third is the "Incident Video to and from Incident Scene" project, which enable operators at the Traffic Systems Management Center to view and remotely control cameras on the incident response vehicles so the operators can get information on the traffic backups at incidents. The fourth is the Arterial Data Collection project, which will bring more arterial data into the system. The fifth is the Enhanced Incident Information project, which automates the entry and dissemination of Washington State Patrol dispatch information and data from firms providing Mayday services.

The current level of effort for managing the MDI is two WSDOT staff at 100% and one contractor at 50% of their time. Fifteen to twenty other staff members are doing related work. A WSDOT manager acts as the Chair of Oversight Committee and devotes 10% of his time to the MDI.

The University of Washington's role in the MDI is to move the regional ITS backbone from a research activity to implementation, expand the backbone as required by the project, design BusView to provide real-time bus location information, and design BusLink to predict bus arrival times at three regional transit terminals.

The Port Authority of Seattle operates the Seattle-Tacoma Airport. A project manager was assigned to the MDI and other ITS-like projects at the airport that focus on providing information to the MDI backbone for dissemination to the public. The project manager spends approximately 10% of his time on MDI developing programs, planning, scoping capital projects, generating revenue, general management and decision-making, and coordination.

The City of Seattle is doing review, approval, and permitting activities necessary to advance the Seattle Center Project, which is managed by a consulting firm under contract to the WSDOT. The project relates to supplying parking availability information to motorists as they approach the center. Major public parking facilities will be monitored and up-to-date information will be posted on variable message sign.

Before the Washington Information Network, a state-wide system of kiosks, was terminated, the Washington State Department of Information Services was responsible for providing transit and ferry schedule information on its 48 existing kiosks. The Washington State Ferries is involved in MDI activities that will provide information on vehicle queues and waiting times at the docks as well as the location, capacity, and estimated arrival times of the ferries.

The Puget Sound Regional Council (PSRC) is active in outreach, the congestion management automated data collection program, and various surveys on MDI products and services. The PSRC provides a policy advisor to the management team. His primary responsibility is to ensure that policies of the MDI are consistent with state and regional policies.

Identify a Full-time Project Manager and Give the Manager Authority

Areas with extensive ITS projects benefit from the creation of an ITS coordinator position within the lead agency. This lead administrator is needed to manage the ever-increasing ITS project workloads, advance institutional relationships with other local agencies, and seek out additional resources and opportunities for ITS.

In the San Antonio area, the TxDOT San Antonio District Engineer and the Director of Transportation Operations champion ITS and act as the overall ITS program managers. A project administrator was designated to manage the MDI, which was made up of six separate tasks.

In Phoenix, as a result of the MDI work demand, an *AZTech* Chief Administrator position was created. The Phoenix ADOT District Engineer assumed responsibility as the *AZTech* Chief Administrator, which is to be an 18-24 month position, equivalent in grade to a district engineer. The MCDOT also created a similar *AZTech* Program Manager position. In both agencies there are ITS Coordinators who do not have direct responsibility for the MDI.

Table 5.2 Benefits and Costs Associated with Identifying a Full-time Project Manager and Giving the Manager Authority

ACTION	BENEFITS	COSTS
Dedicate a full-time project manager	• Manages the increasing ITS project workload • Brings a vision which moves projects from conception to implementation. • Provides a point of contact for project development team and contractors. • Advances institutional relationships with other agencies. • Possibly identifies additional resources and opportunities for ITS.	• Staffing cost for high-level administrator. • Possible upper management vacancies. • Staff reorganization costs. • Possible new staff.

In Seattle, the former Program Manager for ITS in the WSDOT Advanced Technology Branch became the Project Manager for the *Smart Trek* MDI. This individual has overall responsibility in guiding the MDI project. As such, he is responsible for decisions regarding the 17 different contract arrangements in the *Smart Trek* MDI.

In the NY/NJ/CT Metropolitan Area, the *iTravel* Program Manager position was created within TRANSCOM. A new employee was hired to fill this position.

Although the creation of ITS coordinator positions cause upper management vacancies and associated new staff costs, projects tend to run more smoothly as a result of a full-time leader who can concentrate specifically on ITS projects. In addition, individuals placed in these roles bring a vision which helps move projects from conception to implementation.

Dedicate Other Support as Required

The regional management must determine what skills and staffing are needed to adequately manage MDI projects. They must identify what skills are available in existing agency staffs and which need to be added. As the programs grow, additional management and staff support should be dedicated to ensure coordination and efficiency. As there is a big challenge in hiring additional staff for ITS in this era of downsizing, MDI managers and supporting staff often come from existing staff.

The San Antonio TxDOT District created a separate ITS MDI Administrator position as a single focal point for all MDI decisions. Existing TxDOT District staff have filled this position and reported directly to the District Director of Transportation Operations. The MDI Administrator is responsible for the project development team, which consists of the project managers of the participating agencies and the points of contacts for the contractors. The MDI Administrator also is responsible for coordinating with the various regional and federal agencies involved in the MDI. Because of staff turnover, the responsibility for the position was later distributed among four existing staff members.

Table 5.3 Benefits and Costs Associated with Dedicating Other Support as Required

ACTION	BENEFITS	COSTS
Dedicate additional staff as needed	• Ensures coordination and efficiency that leads to successful ITS programs. • Additional operators, administrative support, and programmers leads to successful project implementation. • Specialists help bring specific technical tasks to fruition.	• Management and staff time is taken away from other programs. • Consultant costs for some project management functions. • Creates vacancies in existing staff or responsibilities are added to other staff members workloads.

In Phoenix, the MCDOT and ADOT *AZTech* upper management identified the skills needed to manage the MDI. Existing MCDOT and ADOT staff with the needed skills were identified to manage the various MDI tasks. The MCDOT provided program managers in the areas of transit, systems integration, and local signal systems. The ADOT provided program managers in the public outreach, kiosk, and in-vehicle navigation tasks, and an incident management coordinator to work on the MDI. The Incident Management Coordinator is a 24-year veteran with the Phoenix Fire Department who will help the incident management system component of the MDI come to fruition based on his understanding of the language of incident management and his connections with other “key players” in the area. An ITS communication specialist position, a full-time position, has been filled by an employee formerly with the county’s computer operations group. The *AZTech* upper management also tapped Arizona State University for the *AZTech* evaluation coordinator, the City of Tempe for the Smart Corridor task lead, and Phoenix Transit for the transit task lead.

In Seattle, no new staff were hired to implement MDI, however, the project manager and a WSDOT engineer give the project most of their time. Two employees were hired to handle work of the employees shifted to the MDI. The project manager also uses a consultant at half time for some program management functions including monthly reports required by FHWA. In the Northwest Region, three staff positions have been filled for the MDI using existing staff. Project managers for the various tasks at the other agencies were identified from existing staffs at the agencies.

None of the sites reported that they anticipate the need for additional management support after the MDI. They did, however, identify operators, administrative support, and programmers to be positions that will be required after the MDIs have been implemented. However, as stated earlier, successful ITS management is often achieved through an evolutionary process. Thus, the dedication of additional management resources must be considered continually and applied where needed in order to achieve a successful ITS program.

Develop an Appropriate Committee Structure

Committees provide opportunities for more agencies and staff to be involved in ITS projects. Committees are also needed to address specific issues and policies that could otherwise turn out to be "show-stoppers."

Table 5.4 Benefits and Costs Associated with Developing an Appropriate Committee Structure

ACTION	BENEFITS	COSTS
Develop an effective committee structure	• Allows for specific troublesome issues to be addressed and solved. • Aids the management and direction of ITS projects. • Facilitates defined lines of authority critical with the numerous agencies and diverse technologies involved. • Ensures development and on-going coordination of ITS programs. • Cooperation leads to seamless, regional, easy-access, multimodal traveler and traffic information. • Enables the creation of additional projects through the blending of existing projects and technology.	• Management and staff time in facilitation and participation.

In San Antonio, two committees have been responsible for the management and direction of *TransGuide* and, in turn, the MDI (Appendix D.1). The *TransGuide* Executive Committee is chaired by the TxDOT San Antonio's District Engineer. The committee includes the General Manager of VIA Metropolitan Transit Authority, the Director of Public Works for the City of San Antonio, the Chief of the San Antonio Police Department, the Chief of the Fire Department, and the Chairman of the MPO. The *TransGuide* Technical Committee consists of a member from the Federal Highway Administration, one member from the Federal Transit Authority, two members from TxDOT, two members from VIA, two members from the City of San Antonio, two members from the San Antonio PD, two members from the San Antonio FD, and one member from the MPO. The Chairman of the Technical Committee is San Antonio TxDOT District Director of Transportation Operations. The *TransGuide* Technical Committee serves as an intermediary between the *TransGuide* Executive Committee and the ITS MDI Administrator.

This approach has facilitated defined lines of authority critical with the numerous agencies and diverse technologies involved.

In Phoenix, there are a number of committees that have been instrumental in the development and ongoing coordination of ITS and the MDI (Appendix D.2). The Executive Committee comprises senior members from partnering jurisdictions. In addition to the Executive Committee, there are the *AZTech* Project Team, the Public Relations Working Group, the Technical Oversight Committee, the Transit Working Group, the Traffic Operations Working Group, and the *AZTech* Evaluation Working Group, and the statewide Technical Advisory Committee. All provide input and assist with coordination with the *AZTech* project.

The activities of the Seattle *Smart Trek* project are organized into project "bundles." These bundles are essentially committees as each has a leader and supporting members (Appendix D.3). Bundle areas include Transportation Management Systems, Regional, Multimodal Traveler Information Services, Transit Management & Electronic Commerce, Emergency Services and Incident Management, and Public Involvement, Outreach and Marketing. There is also an MDI Expert Oversight Committee chaired by the Traffic Services Manager of the WSDOT Northwest Region.

The bundles allow for good cooperation among the different agencies. The traveling public will benefit from cooperation that brings about seamless, regional, easy access, multimodal traveler and traffic information. Because the bundles drive communication, they will also enable the realization of additional projects through blending of existing projects and technology transfer.

To take advantage of existing relationships and arrangements, the committee structure for the *iTravel* program is based on the existing committee structure for TRANSCOM. The TRANSCOM Executive Committee, which consists of the chief executive officers of the 15 TRANSCOM member agencies, provides overall program direction and policy guidance. TRANSCOM's Technology & Operations (Tech & Ops) Committee, which consists of senior-level operations and technical representatives from the member agencies, provides more day-to-day guidance, as it does for all TRANSCOM activities and technology projects. The Tech & Ops Committee typically forms a technical review committee for each technology project. Given the scope of the *iTravel* MDI, the Tech & Ops Committee formed three subcommittees: Oversight (which oversees the entire project), Transit, and Evaluation. These committees work with the *iTravel* project manager to provide ongoing technical and policy guidance to the *iTravel* project.

Table 5.5 on the next two pages lists questions that should be addressed when identifying a regional management structure.

Table 5.5 Questions to Consider when Developing a Regional Management Structure

QUESTION	RESPONSE
ASSIGN ROLES BASED ON STRENGTHS	
• Have the existing capabilities of the participants in the ITS project been identified?	
◊ Should a regional committee be established to identify the roles of the participants in managing the ITS project?	
• Have the agency or agencies with the capability to lead the ITS project been identified?	
◊ Have the managerial roles of the other participants in the ITS project been identified?	
• Are there any other actions that need to be taken to ensure that the roles of the participants are based on their strengths?	
IDENTIFY A FULL-TIME PROJECT MANAGER	
• Has a full-time project manager been appointed?	
◊ Have the responsibilities of the project manager been defined clearly?	
◊ Has the project manager been assigned the appropriate authority?	
• Are there other actions that need to be taken to ensure that a full-time manager is identified and given proper authority?	

Table 5.5 Questions to Consider when Developing a Regional Management Structure (continued)

QUESTION	RESPONSE
DEDICATE OTHER SUPPORT AS REQUIRED	
• Have the skills and staffing required to manage the ITS project been identified?	
• Have representatives from the participating agencies with these skills been identified?	
◊ Should staffing adjustments been made to perform the assigned managerial responsibilities?	
• Have capabilities required by the ITS project but not existent in the participating agencies been identified?	
◊ Should support from non-participating agencies or consultants be obtained?	
• Are there other actions that need to be taken to ensure that other staff is dedicated to the ITS project as required?	
USE A COMMITTEE STRUCTURE	
• Has the appropriate committee structure been established to manage the ITS project?	
◊ Should committees be created to address specific technical and administrative issues?	
• Are there other actions that need to be taken to ensure that an appropriate committee structure is established?	

Resources:

Science Applications International Corporation, *IVHS Institutional Issues and Case Studies, Analysis and Lessons Learned*, FHWA-SA-94-061, DOT-VNTSC-FHWA-94-15, NTIS number: PB 94-186145, Volpe National Transportation Systems Center, prepared for the Federal Highway Administration, Cambridge, Massachusetts, April 1994. (EDL number: 6683.)

Volpe National Transportation Systems Center, *Intelligent Transportation Systems, Institutional and Legal Issues Program, Analysis of ITS Operational Tests, Findings and Recommendations*, FHWA-JPO-95-009, DOT-VNTSC-FHWA-95-5, NTIS number: PB 96-139522, prepared for the U.S. DOT ITS Joint Program Office, Cambridge, Massachusetts, September 1995. (EDL number: 700.)

Note: EDL stands for the Electronic Data Library that is located at the U.S. DOT ITS Web site at www.its.dot.gov.

6. Facilitate ITS Within Your Organization

Facilitating intelligent transportation systems (ITS) in a particular region may involve organizational changes within the participating agencies. These changes may be necessary to deal with the ever-increasing project workload and the requirement that the staff must be dedicated solely to ITS. Reorganizations will result in functional improvements to the partner agencies. Defining roles and responsibilities within partner agencies has emerged as an important precursor to the successful completion of ITS projects.

- *Consider Organizational Changes*
- *Assess Skills and Staffing Requirements*
- *Address Training Needs*

Skills and staffing must be matched to the desired goal of ITS projects early in the development phase. Agency management must then identify what skills are available in the existing staff and which need to be added. General ITS skill areas required include project management, technical, procedural, communications, and operations and maintenance.

Training for staff in ITS technologies is necessary to the success of ITS. Staff training is needed in most of the areas noted above. The best training technique is total immersion and involvement in the system from the inception of a project. Designers, maintenance staff, and operators should learn the system from the ground up. Hands-on training is the most recommended technique, with classroom and video training also proving useful. Frequently, training is received directly from product vendors and is included in the contract.

Consider Organizational Changes

Organizational changes within the participating agencies may be necessary to deal with more demanding workloads and the complexity of ITS projects. This may require that a manager and staff be dedicated solely to projects implementing ITS products and services. The organizational changes made for initial ITS projects benefit later ITS projects in that roles and staff have been defined and knowledge has been gained. Dedicated ITS groups in agencies tend to create a momentum, visibility, and institutional memory for ITS in the region leading to additional and more successful projects and the integration of ITS activities into the day-to-day activities of their agency. This increased focus, though good for ITS programs may limit expenditures in non-ITS areas as agency priorities change.

The Traffic Management Section of the Texas Department of Transportation (TxDOT) at Headquarters was created in 1990, and traffic management and process control projects were made its responsibility. The Section was staffed by traffic engineers and information systems staff. Within the Traffic Management Section, a separate ITS Branch was created in 1991. At the TxDOT San Antonio District, the *TransGuide* Operations Manager was temporarily appointed as the metropolitan model deployment initiative (MDI) project manager after the original project manager moved on. Eventually, the responsibilities of the overall MDI project manager were distributed to several project managers of the individual projects within the MDI.

Table 6.1 Benefits and Costs Associated with Considering Organizational Changes

ACTION	BENEFITS	COSTS
Create an ITS Coordinator position	• ITS becomes more visible within region and agency.	• Requires upper management approval to create new positions and the funding to maintain them.
Define roles and dedicate staff to the project	• Functional improvements in agency. • Creates momentum, visibility, and institutional memory. • Experience and lessons learned can be applied to later projects.	• Expenditures may be limited for non-ITS activities. • Requires approval by upper management. • Additional positions may have to be funded. • Standard operating procedures may have to be modified.
Incorporate ITS activity into current staffing levels	• No additional staffing costs. • Added staff knowledge regarding ITS equipment and applications.	• An increase in workload to staff assigned to ITS projects. • Missed opportunity for staff to be working on others projects. • Staff training may be required to gain skills required for ITS projects. • As ITS projects move from planning to deployment to operations, additional staff time dedicated to ITS may be required.

Within the Arizona Department of Transportation (ADOT), the position of statewide ITS Coordinator was created to manage the ever increasing ITS project workload. The ITS Coordinator, along with the Arizona Technology Group, coordinates the ITS work throughout the state. As a result of the MDI work demand, an *AZTech* Chief Administrator position was created. The former Phoenix ADOT District Engineer assumed responsibility as the *AZTech* Chief Administrator. The new Phoenix District Engineer retained authority over other regional ITS efforts, including daily operations of the traffic control center. The reorganization also included ADOT funding of four *AZTech* staff positions and the transfer of one clerical position.

The Maricopa County Department of Transportation (MCDOT) also altered its organizational structure as a result of its involvement in ITS activities. Similar to the ADOT, in the summer of 1995, a countywide ITS Coordinator position was created. In addition, the county's Traffic Engineering Division was divided into an Operations Branch and a Traffic Engineering Branch, which housed the ITS unit. As a result of the MDI, MCDOT management split its ITS unit to create a section that conducts countywide ITS activities and a section that works directly with the *AZTech* MDI. The former ITS Coordinator became the *AZTech* Program Manager and a new county ITS Coordinator, the Traffic Engineering Branch Manager, was selected. MCDOT representatives noted that there was a wide variation in the demands of the MDI and countywide ITS roles and that the reorganization resulted in functional improvements in the organization. They added that beyond the initial ITS reorganization, the MDI changes created no additional costs, just a reassignment of responsibilities.

Although there has been no organizational change in City of Phoenix Public Transit Department, leaders in that agency are hoping that change is imminent. ITS transit implementations connected to the MDI should involve more management and operations staff and aid in increasing the agency's overall familiarity with new technology. Ideally, one transit staff member will be given additional time to monitor the MDI implementation and make recommendations to enhance the transit aspect of the *AZTech* project.

The only change to city agencies within the Phoenix area has been an increase in workload. Staff from the City of Tempe agreed that the same personnel previously assigned to ITS activities are also involved with the MDI, mainly because this area is so specialized. A City of Glendale official noted that it is difficult for the city to add new staff positions, and thus ITS and MDI responsibilities have been absorbed by the existing public works staff. Two high-level traffic engineers have assumed the majority of the existing ITS components and MDI responsibilities. It is expected that the existing maintenance field staff will maintain and possibly install video and detection systems. Both Glendale and Tempe representatives noted that the primary costs of ITS and the MDI to the city are the missed opportunity for the staff to be working on other transportation items. Both agreed that this is also offset by the benefit of added staff knowledge regarding ITS equipment and applications, and the benefit of traffic improvements. As the projects move from planning to deployment to operations, city and transit agencies are aware that additional staff time dedicated to ITS will be required of their agencies.

An ADOT representative noted that the organizational changes that have occurred have forced the parties in the new positions to learn how to work within the agency's current bureaucratic system. When a new position is created, it does not necessarily mean that the agency's standard operating procedures will conform to that position. A MCDOT official added that the greatest benefit from the internal organizational change is that ITS is more visible within the region. The new positions have given rise to an increased awareness and consideration of ITS, not limited to just those components related to the MDI. The individual feels that with the added awareness, more ITS activities are happening in the area.

Approximately five years ago, the Advanced Technology Branch of the Washington State Department of Transportation (WSDOT) was given the responsibility for grant application and management of ITS. The branch represents the WSDOT in the Washington State Transportation

Center (TRAC) and is responsible for technical management on research projects, the statewide ITS plan, field operational tests, three early deployment planning corridor studies, and the MDI. To manage the MDI, WSDOT management transferred two to three staff to the MDI. WSDOT management and staff made a conscious decision to try to fit the MDI into their existing organizational structure to the fullest extent possible.

The institutional memory of the staff who have been involved with Seattle ITS projects makes a natural transference from initial ITS to subsequent projects, such as the MDI. Lessons learned in the former can be applied to the latter. For example, on the SWIFT project, the details of operations were not taken into consideration in the planning stages as much as they should have been. Because the same people who worked on SWIFT are on the MDI, this lesson has been captured and applied. As a result, the staff are looking at the long-term system operation and maintenance factors before they implement the MDI systems.

Assess Skills and Staffing Requirements

At three MDI sites, the project participants followed a similar approach to determine staffing needs. First, they designed a regional management structure. From this structure and the project details outlined in the MDI proposal, participants then jointly analyzed what were the needed skills and hypothesized how the skills could be achieved. Skills that were not readily available were obtained through consultants in some cases.

At most MDI sites, agencies had some staff assigned to previous ITS-related activities. In general, the state and county transportation departments have added the greatest number of staff to work directly on the MDI. When ITS staff among municipalities has increased, most often a signal systems specialist or a senior level traffic engineering position was added.

Agency management must determine what skills and staffing are needed to develop, operate, and maintain ITS projects when developing a project plan. They must then identify what skills are available in existing agency staffs and which need to be added. In order to implement ITS projects, technical, project management, procedural, communications, operations and maintenance and other specific skills, such as incident and emergency management skills, are imperative. The technical category includes system engineering, electrical engineering, programming, traffic engineering, telecommunications, traffic signal systems, video systems, Web site development, advanced traveler information systems (ATIS), advanced traffic management systems (ATMS), geographical information systems, incident management systems, and database management. Legal, accounting, purchasing, procurement, and administration are the skills included within the procedural category. Public relations and outreach, interpersonal, institutional, coordination, and cooperation are the skills included within the communication category.

The skills needed to maintain ITS projects are not necessarily the same as those required to implement ITS. The operations and maintenance of ITS requires skills in incident and emergency management dispatch, electronic maintenance of all ITS systems, and traffic center operations.

Table 6.2 Benefits and Costs Associated with Assessing Skills and Staffing Requirements

ACTION	BENEFITS	COSTS
Inventory skills and staffing	• Appraises the impact of the ITS project on current staffing levels. • Identifies current gaps in skills required to implement the project leading to a plan to obtain these skills. • Determines which agencies can best fill the staffing and skill needs without depleting the resources from one single agency. • Identifies skills that may be required in the future as ITS products and services are implemented.	Staff time to conduct inventory.
Adjust staffing	• Successful implementation of the project.	• Cost to fill additional staff positions or hire outside support. • Cost associated with re-deployment or re-scheduling of staff.
Cross train staff	• Staff in one discipline gain knowledge of another discipline. • Improves communications among staff.	• Training costs and staff time. • Possible movement of public sector staff to the private sector.

Within the TxDOT Traffic Operations Division, four staff members work part-time on the MDI. Other TxDOT staff such as legal and procurement work on the MDI as needed. Because of limited staff time, TxDOT management is considering hiring a statewide systems integrator to ensure compatibility and interoperability among the systems installed by the Districts. ITS skills in place before the MDI due to previous ITS projects were a benefit to the MDI. In previous projects, civil engineers had to learn about communications and electronics technologies, and electrical engineers had to become familiar with civil engineering principles.

To operate the *TransGuide* facility, operators were hired in 1995. Adequate communications and electronics skills were not available among the existing District staff. Some positions were reallocated within the TxDOT San Antonio District and some were new positions. No additional staffing was added for the MDI. Again, the skills gained by previous ITS experience has been invaluable as it has created a knowledge base which allows operations staff to bring feasible ideas forward. The District also dedicated 1.5 staff positions to public awareness and outreach. Change is so rapid in ITS, especially in the electronics and communications areas, that new employees have been and most certainly will be required in the future. However, the District officials see a big challenge in hiring additional staff for ITS in an era of downsizing.

Due to the MDI, TxDOT maintenance and automation personnel will have new equipment and new applications. Kiosks, automatic vehicle identification (AVI) readers, and in-vehicle navigation units will need to be kept in working order. *TransGuide* has only three maintenance technicians requiring that maintenance contracts be executed for most systems. The AVI reader and in-vehicle navigation unit maintenance will be provided by the original suppliers.

VIA Metropolitan Transit dedicates a small amount of staffing to the MDI. The Systems Manager spends 20% of his time on the MDI and a programmer and a hardware technician each spend 5% of their time. They feel they would benefit if there was a person within the Authority dedicated to ITS and MDI. There is more work than can be assimilated by current staff.

Currently, four San Antonio Public Works Department employees are stationed at *TransGuide*. As ITS expands with the MDI, the Public Works Department may need to hire more operators and engineering technicians. Department management sees the need to maintain an understanding of traffic management and engineering, telecommunications, and ITS in general. Specifically, staff needs to try to stay abreast of that portion of ITS that relates to municipalities. Most of these skills are currently in house, but an even greater understanding of system integration and telecommunication is needed. A contractor will provide software development skills in order to integrate various ITS systems.

Table 6.3 San Antonio MDI Skills Matrix

Agency	Project Mgmt	Technical	Procedural	Communication	Ops & Maint
State DOT	Department Policy Process Control	Programming Electrical Engineering Telecommunication Networks Human Factors	Legal Contracts Procurement Writing statements of work	Public relations and Outreach	Maintenance Technology Traffic Operations
Municipal Public Works		Traffic Management General ITS Telecommunications System Integration			Operations & Maintenance
Transit		Programming			Incident Management Software Operations
Fire				Verbal	Maintenance
Police					Traffic Dispatch Operations
MPO	General ITS Technology	Traffic Engineering Software Electrical Engineering			Traffic Operations

All San Antonio Police Department dispatchers spend some time at the *TransGuide* police traffic dispatch position. Skills are required in operating the cameras and radio system at *TransGuide* because it differs from the system at the downtown center. The San Antonio Fire Department (FD) staffing levels are not anticipated to change due to LifeLink. However, with LifeLink, the interchange between the emergency medical technicians and the doctors will increase, which may cause units to be out of service longer. This, in turn, may require additional staffing or repositioning of staff to ensure that appropriate response times are maintained. Verbal skills have always been required in emergency management activities. These will have to be reemphasized with the increased degree of communications between the doctor and the emergency medical technicians. The maintenance of the LifeLink equipment has not been discussed. San Antonio FD does not have the required expertise in house, and if it assumes maintenance responsibility, training will be sought. Table 6.4 shows the specific skills required within the general ITS skill areas by agency type as identified by the San Antonio MDI participants.

Previous to the *AZTech* MDI project in the Phoenix Metropolitan Area, a number of area agencies were already beginning to commit staff time to ITS-related project deployments and operations. However, the MCDOT ITS Coordinator position, created in June 1995, was the first position within the state to have responsibilities dedicated solely to work on ITS projects, plans, and issues. This position was developed a full nine months prior to the issuance of the MDI Request for Proposals and, therefore, was not a direct result of the MDI.

There have been a number of new staff positions created as a result of the *AZTech* MDI project. Staffing projections for the project were provided in the proposal submitted to the U.S. DOT, but were finalized by ADOT and MCDOT administrators after Phoenix's proposal was submitted. The desire has been to balance the number of *AZTech* positions between the two agencies. Within ADOT, the principal administrator and the public outreach and ATIS coordinators have been added.

Within MCDOT, the *AZTech* program manager and the transit, communication, and traffic signal coordinators are among the positions added by the county. The MCDOT Traffic Engineering Branch Manager, supervisor of the *AZTech* Program Manager, also spends 10% to 20% of his time working on MDI and other ITS-related activities. Both ADOT and MCDOT representatives noted that they will use consultants to fill the other required support. In addition, Arizona State University has provided the *AZTech* evaluation coordinator, Tempe has provided the smart corridor implementation task lead, and Phoenix Transit has provided the transit implementation task lead.

Staff within the majority of Phoenix area municipalities working on the *AZTech* project primarily comprises one or two senior engineers and a traffic signal systems specialist. Most transportation directors are also involved at some regional MDI committee level. While most of the cities used staff to represent them on ITS committees formed for pre-MDI projects, almost all jurisdictions have added the *AZTech* work to their staff's numerous job responsibilities. The City of Scottsdale hired an electrical engineer to perform traffic signal systems analysis. This was the only municipal staff position added in the Phoenix area due to the *AZTech* project.

The Maricopa Association of Governments (MAG) added one-third of a staff position to accommodate all of its ITS responsibilities, including coordination of the MAG ITS Committee (Appendix D.4) with the municipalities. This position was not specifically added to perform *AZTech*-related work. Some respondents felt that the MPO may need to be even more active in the *AZTech* interagency coordination, which could require more dedicated staff time or additional MAG staff.

Once the MDI project is implemented, five to eight more *AZTech* staff may be needed. These positions will include additional operators, a full-time incident management person, some administrative positions, telecommunication specialists, and a couple of system programmers. This is roughly the size of the current *AZTech* staff being provided by ADOT, but the responsibilities and personnel may not necessarily be the same.

City of Phoenix Transit Department staff need additional help in understanding general ITS concepts and how they can be applied to everyday operations to improve efficiency. Transit also needs a versatile person, specializing in radio communications, electrical engineering, and programming to operate and maintain the MDI systems.

As the MDI project expands, there is added pressure for law enforcement presence on the project to expand with it. The Arizona Department of Public Safety assigned one officer to the ADOT's Traffic Operations Center prior to the MDI project. Public Safety management plans to increase staffing level at the Center incrementally. The staff will monitor the cameras and dispatch officers according to law enforcement needs, including incident response and mitigation of freeway congestion. New staff will need good interpersonal skills because of the tight space and the requirement to cooperate with the *AZTech* and traffic operations center staff. Also, prior to the MDI, an accident investigation team was created in one of the three Public Safety districts in the Phoenix metropolitan area. Since the MDI project has been initiated, all three districts have formed accident investigation teams.

The costs of having individuals in the traffic operations center are expected to be salary and other standard personnel costs. The cost of utilizing the accident investigation team will include equipment and overtime, if the trained officers are not on their regular tour-of-duty when needed. Regarding post-MDI deployment, the Public Safety representative noted that eventually they may have a 24-hour position in the operations center which would require additional staff. The officer added that moving the their dispatch center to the traffic operations center is a possibility and would necessitate taking a closer look at the adequacy of existing staffing levels. The table below shows the specific skills required within the general ITS skill areas by agency type as identified by the Phoenix MDI participants.

Table 6.4 Phoenix MDI Skills Matrix

Agency	Project Mgmt	Technical	Procedural	Communication	Ops & Maint
State DOT	Planning Mgmt.	Incident Mgmt. (IMS) GIS Programming, Systems Eng. Traffic Engineering Communication Systems Traffic Signal Systems ATIS	Administrative Developing IGAs Contracting	Public relations and Outreach Interpersonal Relations Negotiating	Telecommunications
County DOT	Mgmt Structure Design Interagency Coordination	System Integration Emergency Mgmt. Systems ATIS ITS Communications	Contracts	Public relations and Outreach	
Municipal Public Works		General ITS Trans. & Traffic Engineering ATMS Traffic Signal Systems Communication/Data Proc.	Administrative	Institutional Skills (Consensus Building)	Video Sys. Maintenance Detector (Radar) Maint.
Transit		Electrical Engineering Radio Communications Programming			
Dept. of Public Safety				Interpersonal	Dispatch System
MPO	Transportation Planning				

In Seattle, representatives from some private sector firms began discussions with WSDOT staff when rumors began circulating about the MDI. When the MDI Request for Information was released, staff from WSDOT and these firms responded to it. This group looked at all of the gaps in the existing traveler information system. They then inventoried a core group of people from within and without WSDOT who had worked on other ITS projects, as well as those who had worked on the operational tests in the area (North Seattle ATMS, SWIFT, PuSHMe, TravelAid) and identified who needed to be involved. This process was followed by several iterations of cost and budget estimates. A yearlong process of monthly daylong meetings, to decide what the system should look like and who would operate it, went into developing the proposal. Table 6.5 below shows the specific skills required within the general ITS skill areas by agency type as identified by the Seattle MDI participants.

Table 6.5 Seattle MDI Skills Matrix

Agency	Project Mgmt	Technical	Procedural	Communication	Ops & Maint
State DOT	Project Management ITS Program Mgmt FHWA Monthly Reports	Programming Electrical Engineering Traffic Engineering Communications Systems Fiber Optics Database Management Data Retrieval & Analysis System Integration	Contracts	Personal Skills	Electronic Systems
Transit – County	Program Management	Programming/Analysis Traffic Management General ITS Database Passenger Information Display		Technical/Non-Technical	Radio Maintenance System Maintenance
Airport	ITS Planning Program Development (Capital Projects) ITS Integration Planning	General ITS AVI Central Processing System			Incident Management Software Operations
Municipal		Construction Inspection Traffic Signal Systems Electrical Engineering Fiber Optics Data Transmission/Comm. Programming SW Video Traffic Flow Theory	Accounting Purchasing		Operations & Maintenance Electrical Signs Traffic Signals Chip Level Repair
State Ferries	Project Management Flow Charting	Civil Engineering Database Design		Coordination & Cooperation	Traffic Center Operations
MPO	Benefits Analysis Market Knowledge	Telecommunications		ITS Marketing	Traffic Operations
University	Research Project Management Business Planning for Oper. and maintenance	Electrical Engineering Programming Object Oriented Design			
State Information Services		Web Site Development Web Linking Interactive Displays			

Address Training Needs

Training for staff on ITS technologies is necessary in the success of ITS. Staff training is needed in most of the technical areas identified in the previous section. The involvement of operators in the design and implementation phase of the system was noted as a great training tool at the three MDI sites. Hands-on training with actual system hardware and software is universally accepted as the best training technique. Classroom and video training received directly from technology vendors and included in contracts has also proven helpful when provided.

Table 6.6 Benefits and Costs Associated with Addressing Training Needs

ACTION	BENEFITS	COSTS
Inventory training needs	• Identifies current training requirements leading to a plan to obtain training. • Identifies the most appropriate methods of training. • Determines if multiple agencies can share the training costs. • Identifies training that may be required in the future as ITS products and services are implemented.	• Staff time to conduct inventory.
Provide training	• Develops required skills. • Maintains staff confidence. • Enables employees to use the system to the fullest extent possible. • More integrated working relationship when members of different agencies receive the same training. • Provides for an exchange of information.	• Training costs. • Possible movement of public sector staff to the private sector. • Possible alienation of staff not included in training.
Provide internal training	• Trainers are familiar with the procedures of the agency. • Accommodates staff schedules.	• Staff time and possible overtime. • Possible staff and equipment re-deployment costs.
Include training requirement within a contract	• Way to circumvent reduced training budgets. • Larger number of staff can be trained. • Reduced travel costs. • No additional procurement is necessary to acquire training.	• Increased contract cost. • Staff time and possible overtime.
Involve operations and management staff in acceptance testing	• Reduced training costs.	• Staff time • Possible overtime.
Visit other sites	• Helpful to view how ITS systems are performing in other areas.	• Staff time. • Travel costs.

Post-MDI training is expected to be largely aimed at guaranteeing that the maintenance staff have enough knowledge to keep the systems operational. Ongoing training is important to maintain staff confidence as well as to enable employees to use the equipment to the fullest extent possible.

In San Antonio, TxDOT staff required training to help integrate the civil and electrical engineering fields. The information systems staff needed to be made aware of the traffic-engineering viewpoint. Likewise, communications and networking training was provided for traffic engineers, but it was considered too in depth for what was required by the civil engineers. Communications and associated training were seen as the backbone to ITS in the San Antonio district. TxDOT Headquarter officials are receptive to training and have a dedicated budget and a Training Division. However, they have a problem finding ITS courses. TxDOT staff cite the lack of commercial or university programs that address the operational concepts and courses to explain the National ITS Architecture.

Hands-on training has been the most effective method of training. Specifically, designers, maintenance, and operations staff working with the application as it goes to deployment is cited as invaluable to project development. This involves total immersion and involvement in the system from the beginning of the project. Visiting other locations and viewing applications, especially on scanning reviews sponsored by the Federal Highway Administration, has also been helpful.

TxDOT funding cuts on typical training procedures has caused some problems. The solution, employed by all the agency partners, has been to include training in contracts and have it carried out in-house to reduce travel costs. The cost for 40 hours of training by a communications company is running at approximately $12,000.

The San Antonio MPO staff sees the need for decision makers to be exposed to all areas of ITS in a general way. Training should cover basic ITS concepts and include how to apply technologies in incident management, transit, high-occupancy vehicle lanes, electronic toll collection, freeway management systems, etc. Training is also required to present how technologies work in specific situations and how to compare ITS solutions with other alternatives in a corridor or sub-area. Continual training is needed to keep up to date on what is occurring in the area of ITS. The changing menu of available technologies, the pros and cons of them, and how they can be applied must be constantly disseminated to ITS practitioners.

Training San Antonio firefighters and emergency medical technicians on new equipment is accomplished through a phased program in which a small group is selected and trained, and in turn, they train others. This works well for the San Antonio FD because the units are geographically dispersed. It is better to do training in-house as outside trainers are not familiar with the conditions and concerns of the personnel or San Antonio FD procedures. There is a cost to training. To free a trainer, who is assigned to a unit, the unit must be placed out of service or the position filled with an employee working overtime. Having one unit out of service can be very critical so the use of an employee on overtime is preferred. Thus, funding must be available for overtime pay in order to facilitate training.

In Phoenix, there are two separate training needs for MDI projects - training for staff and training for policy makers and the public. Training for staff should initially receive the highest priority. Staff training is needed in the areas of ATIS; incident management; selected engineering disciplines, including communications; computer hardware and software; and assorted field equipment.

Only a few training courses specifically for *AZTech* applications and participants and others on related topics have actually been provided. MCDOT staff involved in the MDI have received incident management system training. ADOT sponsored a one-day seminar on fiber optics for resident engineers. These courses need to be given periodically. A two-day course is being developed that will focus on incident using case studies and discussions from professionals in the field, using Phoenix firefighters as instructors. A third short course on incident management is being jointly developed by public safety agencies in the metropolitan area. In keeping with the emphasis of incident management and as part of the procurement bid, a vendor will provide four days of hands-on training for six Arizona Department of Public Safety officers on the use of the Nikon Total Station. The training includes two days of intensive training during the equipment delivery period and two days of follow-up training 45 days after the products are placed in the field.

Training of municipal transportation agency staff has traditionally been received in several manners. Usually training is built into contracts with vendors and includes a manufacturer's representative demonstrating the products. In Phoenix, municipal staff make video tapes of vendor demonstrations and show them to workers at different locations or who work different shifts. Staff members gain knowledge from professional organizations, federal technology sharing, reference materials, and conference attendance. Participants almost unanimously agreed that in terms of training methods, hands-on training in small groups is the most effective. Classroom training will also be employed and also valuable.

While ADOT does provide some funds for training, an official reported that it is very limited and requires managers to be creative in locating their own funding sources for training themselves or their staff. ADOT tries to hire individuals that need minimal training because of the lack of training funds and lack of staff time to commit to training. Because ITS technology is specialized, this strategy rarely works because hiring people already with selected expertise is too costly. In many situation, individuals with potential are hired and trained. This likewise has a downside because some of those employees will leave for more lucrative positions after they have been trained.

Many of the interviewees concluded that the benefits of training are multifold. Benefits are derived from an exchange of information and include giving workers a better understanding of how systems work and how to make the fullest use possible of the systems. Training may also reduce maintenance costs and result in a more integrated working relationship between agencies, especially when members of different agencies receive the same training.

The costs of training are usually included in the cost of systems procured as a part of the public sector's contract with the private sector. Costs for training may also include the cost of consultants to provide training, the costs of educational materials, personnel costs, and facility costs, if training cannot be conducted at the traffic operation center or other local facilities. An ADOT official suggested that an agency's annual training budget should range between $100,000 and $250,000. Representatives from the smaller cities expect the training costs to be minimal, since training will be primarily conducted using in-house staff. Much of the cost of training technicians, to operate and maintain *AZTech* equipment, will be included as part of the procurement and installation contracts with each vendor and will not have to be directly budgeted by the agencies.

In Seattle, most project management skills will be acquired by experience, although a project management course would be useful. The highest priority training need is how to manage so many different software products. WSDOT staff still have to conduct education at the department level about what ITS is and what they are trying to accomplish with these products. Attending conferences and reading literature have been seen an effective methods of training.

The institutional structure of WSDOT has affected the ability of the program manager and his staff to gain knowledge about ITS in that travel restrictions have prevented them from becoming involved in Automated Highway Systems workshops. Both the WSDOT and the municipal DOT officials have noted that training is especially required in specific, important technical, operations, and management skills areas including fiber optic communications, database management, system integration, and electronic systems maintenance. Because a recent gas tax increase was not approved in the legislature, funding will continue to be tight, and travel will likely be restricted even more.

The Port of Seattle staff require training in the Seattle-Tacoma Airport Central Processing System and AVI in order to implement and integrate MDI into existing airport systems. The Washington State Ferries staff have a need for skills and training in database design. There will be a need for more staff working in Internet and kiosk-based communication systems in both the King County Metro Transit and the Washington State Department of Information Services. Both agencies must continually ensure staff training in Web site development and linking, and interactive displays to keep the skill level current in these rapidly changing environments.

To ensure that current transportation professionals have the knowledge, skills, and abilities to effectively deploy ITS, the U.S. Department of Transportation (U.S. DOT) established the ITS Professional Capacity Building Program (Appendix F.1). This program has adopted a multi-faceted approach to identify gaps in the knowledge, skills, and abilities which serve as impediments to ITS deployment and identified and developed, when necessary, seminars, courses, and workshops to assist the ITS professional.

Transportation professionals also can gain knowledge of ITS through the U.S. DOT Peer-to-Peer Program (Appendix F.3) that offers technical assistance. This free service is geared to the requester's specific situation and may include any phase of the project cycle from planning to deployment to operations.

Table 6.7 on this and the two pages lists questions that should be addressed when facilitating ITS within your organization.

Table 6.7 Questions to Consider when Facilitating ITS within Your Organization

QUESTION	RESPONSE
CONSIDER ORGANIZATIONAL CHANGES	
• Should your agency's organizational structure be changed to facilitate ITS within your agency?	
◊ Should the management of ITS activities be centralized or decentralized within your agency?	
◊ Should an ITS Coordinator position be created?	
◊ Should an agency-wide ITS Committee be established?	
◊ Have the roles and responsibilities of the sections within the agency been clearly defined for ITS projects?	
• Will ITS activities be incorporated within the existing staffing levels?	
◊ Should management and staff be dedicated to specific ITS projects?	
◊ What will be the impact of the ITS project on current workloads?	
◊ What opportunities are lost by having staff involved in the ITS project?	
◊ Will staff be able to accommodate the operations and maintenance of the ITS products and services?	
• Are there any other actions that need to be taken to ensure that your agency's organizational structure will accommodate ITS projects?	

Table 6.7 Questions to Consider when Facilitating ITS within Your Organization (continued)

QUESTION	RESPONSE
ASSESS SKILLS AND STAFFING REQUIREMENTS	
• Has a skills and staffing assessment been completed for the ITS activity?	
◊ Has staff with previous ITS experience been identified?	
◊ Have near-term ITS skills requirements been identified?	
◊ Have long-term ITS skills requirements been identified?	
◊ Does a staffing plan for the ITS project need to be developed?	
• Have the appropriate adjustments been made to staffing levels to accommodate the ITS project?	
◊ Will assistance from consultants or other public agencies be required?	
◊ Does the staff have to be cross-trained in ITS skills to accommodate the loss of a key individual?	
◊ Does staff in one discipline need to be exposed to other disciplines working within the ITS project to facilitate communications?	
• Are there other actions that need to be taken to ensure that the proper skills and staffing are available for the ITS project?	

Table 6.7 Questions to Consider when Facilitating ITS within Your Organization (continued)

QUESTION	RESPONSE
ADDRESS TRAINING NEEDS	
• Has an inventory of training needs been completed for staff working on ITS projects?	
◊ Has an ITS training plan been developed?	
◊ Who should receive ITS training?	
◊ What is the most appropriate format for ITS training?	
◊ Would staff from other agencies benefit from proposed ITS training?	
• Are operations and maintenance staff included in acceptance testing of the ITS technologies?	
• Are management and staff familiar with U.S. DOT's Professional Capacity Building Program and scanning tours?	
◊ Have managers who would benefit from these opportunities been identified?	
◊ Have staff members who would benefit from these opportunities been identified?	
• Are there other actions that need to be taken to ensure staff has the proper training in ITS?	

Resources:

U.S. Department of Transportation, *Intelligent Transportation Systems - Professional Capacity Building Program: Framework and Overview for Establishing a Professional Capacity Building Program for Transportation Management and Traveler Information Services in Support of ITS Development*, Washington, D.C., September 31, 1997.

U.S. Department of Transportation, *Intelligent Transportation Systems - Professional Capacity Building Program: ITS Training and Education Needs Assessment Baseline: A Review and Synthesis of Thirteen Prior Studies, Field Interviews, and a Summary Assessment of ITS Needs*, Washington, D.C., December 1997.

U.S. Department of Transportation, *Intelligent Transportation Systems - Professional Capacity Building Program: Planning and Deploying ITS: Six White Papers Describing Current and Planned Programs of Five Transportation Associations and Four University ITS Research Centers of Excellence*, Washington, D.C., December 1997.

7. Identify Appropriate Procurement Mechanisms

Traditional procurement practices used by state and local transportation agencies were developed to support the design and construction of roads, bridges, and railways. The traditional procurement process for construction of a facility normally involves two steps. The first step is to retain an architect or engineer, either competitively or from a list of pre-qualified firms, to prepare detailed design specifications for the facility. The second step is to execute a separate contract to construct the facility. The latter contract is publicly advertised and awarded to the lowest responsive and responsible bidder. This traditional approach, utilizing separate and distinct processes, often lacks the flexibility required when contracting for rapidly evolving technologies and systems such as ITS (Gallegos, 1997).

- *Be Flexible in Selecting Lead Agencies*
- *Be Flexible in Determining Mechanisms*
- *Develop Flexibility Within Contracts*

According to one report, procurement issues have been “the most time consuming and irritating legal constraints confronted by ITS participants.” ITS participants from both the public and private sectors are realizing that current procurement methods may not be suitable for all ITS deployments. New legislation may be necessary at both federal and state levels to allow the parties flexibility to determine the appropriate procurement method based on the needs of the project (U.S. DOT, 1997).

The ability to identify appropriate procurement mechanisms by the metropolitan model deployment initiative (MDI) participants has been instrumental in their achievement of successful deployments. The participants had to respond to questions of who and what, and select appropriate contract terminology to successfully meet this guideline. First, the participants had to determine which agency or agencies should take the lead and manage the procurement processes. Second, the participants had to resolve which contracting methods should be used to procure products and services for the project. Third, the participants had to review and revise standard service, product, or construction contract terminology to accommodate the new public-private relationships being created with the deployment of ITS or advanced technologies. The participants learned to be flexible in the procurement process to allow the greatest opportunity to overcome the uncertainties and ambiguities of the technical systems being deployed.

Be Flexible in Selecting Lead Procurement Agencies

After the initial project concepts are developed and a majority of the funding secured, the participants must determine which agency (or agencies) is best suited to lead the procurement process. Some projects may be more suited for purchases by municipalities and transit agencies, such as traffic signal coordination and automatic vehicle location (AVL) equipment, respectively, while some more suited to purchases by state agencies, such as freeway management equipment.

In the past, state departments of transportation (DOTs) have handled a majority of ITS procurements. In two of the MDI locations, the state DOT is the lead agency. However, in the *AZTech* MDI project, the Maricopa County Department of Transportation (MCDOT) was designated to lead the procurement process. The *AZTech* MDI provides an example that demonstrates there are other partner agencies that can effectively manage procurements.

Staff capabilities must also be considered. Some agencies may have staff already in place that can both write the specifications and efficiently interpret ITS project proposals. Because system designers rather than civil engineers may be writing specifications for ITS projects, staff considerations for selecting a lead procurement agency may be different from traditional contracting processes. It may be that no agency has staff that meet all the requirements needed to develop, bid, analyze, and finalize contracts for ITS products and services. Lead agency staff may have to “learn as they go” to avoid delays.

Regardless of whether the procurement team is from a single agency or multiple agencies to accommodate staff limitations, it is important that there be a single point of contact for both the contracting agency and contractor. To save time and provide support and legitimacy to the point of contact, that individual should be given as much authority as possible. In general, one procuring agency and a single point of contact simplifies the procurement process for all parties involved.

While the *AZTech* Chief Administrator from the Arizona Department of Transportation (ADOT) is responsible for developing the intergovernmental agreements (IGAs) with the cities (Appendix C.3) and Maricopa County; the procurement process, which includes the request for proposal development, the formal bid and proposal submittal process, and contract negotiation, was led by the MCDOT. The County provided one procurement officer, as well as the *AZTech* Program Manager, to coordinate this work. Because of its more flexible procurement process and ability to work with the local participants, it was determined that it was more efficient to use the MCDOT for the official procurement agency rather than the ADOT.

Even with the MCDOT providing procurement management support for the *AZTech* project, there has been a great deal of flexibility for the other participants in whether they chose to procure their equipment or use the MCDOT. The ADOT, the transit agencies, and the participating municipalities are responsible for procuring selected technologies. These other agencies have the flexible option to use the MCDOT as the procuring agency for their selected technologies, or procure the products and services themselves through existing or new contracts and be reimbursed by the *AZTech* project.

Table 7.1 Benefits and Costs Associated with Being Flexible in Selecting Lead Procurement Agencies

ACTION	BENEFITS	COSTS
Determine the agency or agencies to lead the procurement process	• Promotes an effective procurement process. • Builds on experience of existing staff. • Ensures products are compatible. • Minimizes duplication of effort. • Costs may be minimized due to quantity discounts.	• Management and staff time. • Additional support staff may be needed in selected agency.
Determine which agencies should procure specific technologies	• Leverages expertise of agency staffs. • Existing contracts may be used.	• Staff time. • Increased coordination may be needed. • Possible project delays due to staff unfamiliarity with development-type contracts.
Involve operators in writing system specifications and maintenance contracts	• Saves time. • Utilizes staff knowledge of the existing systems and new requirements. • Ensures equipment and system interfaces will be compatible.	• Operations and maintenance staff time to participate. • Procurement staff time to become comfortable working with operations and maintenance staff.
Involve public safety agencies in designing and procuring incident and emergency management systems	• Saves time. • Helps to ensure buy-in from public safety agencies. • Utilizes staff knowledge of operating procedures. • May obtain additional funding source for ancillary equipment.	• Management and staff.

AZTech representatives noted a benefit from using one primary procurement agency is that it is the most efficient method to ensure that all products are compatible, there is no duplication of effort, and costs are minimized because of quantity discounts.

Because, at the time of the site visit, all of the procurements had not been completed, the total administrative cost of procuring the *AZTech* products and services was not available. One significant cost, however, is the amount of time required of the staff of the primary procurement agency. An official from the MCDOT identified that contract negotiations to secure three primary private sector participants had consumed about 75% of the individual's time over several months. The participant added that the time commitments for closing the next set of contracts should not be as lengthy, indicating that the contracts may not be as complex and that staff are more knowledgeable in overcoming private sector concerns.

In Seattle, the primary agency responsible for procurement and contracting for *Smart Trek* is the Advanced Technology Branch of the Washington State Department of Transportation (WSDOT). Although this office is essentially responsible for MDI procurement coordination, the entire mechanism used for contracting in this project is quite flexible. Some of the public sector participants have chosen to buy their own program-related material directly, while some have elected to use private sector participants or other consultants to conduct the required solicitations and purchase equipment. There did not appear to be a great need for WSDOT oversight because, as a WSDOT Northwest Region official noted, unlike many other MDI and ITS efforts, most of the *Smart Trek* system was already in place, and the equipment necessary to connect these components has not been exceedingly expensive.

In San Antonio, the Texas Department of Transportation (TxDOT) San Antonio District was the main purchasing agent for the *TransGuide* MDI. District officials received extensive procurement support from the TxDOT Headquarters staff. While there were other public sector participants, the TxDOT was the logical choice as the lead-procuring agency because of the short time frame, the need for detailed knowledge of the State Catalog and how it could be used, and expertise with the existing system already available in San Antonio.

The TransGuide Operations Manager and the TransGuide Automation Administrator, both TxDOT employees, have led the procurement process. The TxDOT also involved its operators and inspectors in the design of the system and the writing of the maintenance contracts, as a way to save time and utilize their knowledge of the existing traffic operations system. The design and procurement of other systems, especially the emergency incident management systems and transit applications, required the assistance of staff from the local public safety, emergency services, and transit agencies. Staff from the VIA Metropolitan Transit Authority (VIA) were responsible for purchasing equipment and system development services required for the Bus Incident Management System.

There are also specific items being procured directly by local agencies which are still under the coordination of the TxDOT District. A few of the non-TxDOT procurements have resulted in some delays, possibly indicative of the unfamiliarity by the procuring agency with development-type contracts. Because most of the products and services being procured are linked in some aspect to other *TransGuide* systems, delays to one or more procurements may be detrimental to keeping the entire project on schedule. This may be a cost of using multiple agencies in ITS procurements.

Be Flexible in Determining Contracting Mechanisms

Traditional low-bid selection processes are not necessarily the best method to procure ever-evolving advanced technologies that require integration with other sophisticated systems as well as with established (legacy) field and communication components. Therefore, participants in the four MDI sites sought alternative methods to procure the required products and services.

Table 7.2 Benefits and Costs Associated with Being Flexible in Determining Contracting Mechanisms

ACTION	BENEFITS	COSTS
Determine the most effective procurement mechanisms	• Shortens time to complete procurements. • Reduces staff expenditures. • Ensures system components are compatible. • Avoids duplication of effort. • Possible lower prices on procured items.	• Staff time. • Possibly staff time to prepare more initial documentation or justifications. • Time required to change procurement policies. • Involvement of legal staff.

The *Smart Trek* project has essentially been formed through 17 agreements that involve 19 public agencies and private entities. Eleven of the agreements were contracts obtaining products and services from private vendors and consultants; the remaining compacts were interagency and inter-jurisdictional agreements involving public agency roles, data transfers, and funding. This MDI partnership used whatever contract mechanism made sense for each particular participant. Whereas, the *AZTech* public sector participants, based on their interpretation of procurement laws, concluded that they would have to obtain private sector participants through a formal request for proposal process and not through a sole-source mechanism.

Parties from the MDI sites did not think their processes were extremely innovative. They did feel, however, that because time was such a factor in the MDI projects that they were making the best use of available resources and contracts that they either had in-place or were quickest to initiate. This need to achieve their project goals in a timely manner lead the MDI participants to use a variety of contracting mechanisms:

- Federal competitive process
- State catalog
- Multi-party agreements
- Competitive contracts
- Sole-source contracts
- Phased contracts
- On-call and other existing contracts

- Design/build contracts
- Joint, inter-jurisdictional procurements
- Turnkey procurements.

Federal Competitive Process

The WSDOT personnel have employed a unique procurement procedure in the *Smart Trek* MDI, although the WSDOT representatives do not consider it unique. The WSDOT staff regard the national selection process for the MDI Request for Proposal as a competitive process for procuring project participants. After the request for information for the MDI program was issued, several firms approached WSDOT management requesting to be involved. Representatives of these firms and the WSDOT worked together to develop a proposal which identified the private sector participants. Because the U.S. Department of Transportation selection team accepted the proposal, with private sector participants included, the WSDOT used a sole-source method to contract with the private sector firms. The project bundle structure has also allowed for multiple primary contractors, essentially reducing the layers of subcontractors typically found in projects this extensive.

State Catalog

The *TransGuide* participants believed that the short deadline for implementation given the MDI sites precluded the writing of detailed specifications and use of traditional procurement processes. To counteract this short time frame, the TxDOT, the lead procurement agency, turned to the Texas State Catalog (Appendix C.1). The State Catalog of products and services, created by the Texas General Services Commission, was first designed for the rapid purchase of computers because, in the past, procurement procedures were too slow and resulted in the purchase of computer equipment that quickly became obsolete. The scope of the Catalog has since been expanded to include other technologies and products. It allows for less specification in purchasing computer hardware and software and information services than the traditional construction type procurements. The State pre-qualifies contractors, and the contractors list their products and services on the State's Catalog. The Catalog allows for competition but narrows the field as it operates on a "best" bid rather than low-bid basis.

For the MDI, TxDOT and VIA staff will use or already have used the State Catalog to procure products and services for seven *TransGuide* components. The TxDOT purchases products directly from the State Catalog vendors or through the TxDOT's contractors, depending on which method provides the lowest cost. The MDI systems integrator was able to use a system similar to the State Catalog to choose pre-qualified vendors to supply the in-vehicle navigational units, information kiosks, and several other key supportive equipment. The *TransGuide* participants have used the State Catalog process, or a similar private method, to procure railroad grade crossing equipment; AVL tags, readers and associated support; the area-wide database development, including the workstations and computer information system services; LifeLink equipment; and bus incident management system equipment.

At the time of initial MDI approval, the TxDOT HQ sent notice of the MDI and request for offers to procure products and services to hundreds of the Catalog's pre-qualified contractors in an effort to expand interest. The request for offers contained functional specifications.

The advantage of the Catalog process is the reduction of time between the request for offers and selection of the vendor. For most MDI procurements, the time was 30 days. The MDI was the first step outside the traditional TxDOT low-bid process procurement. Because of this deviation from the normal process, the TxDOT HQ senior management and purchasing personnel needed to address the legal and policy issues regarding the use of this process. The decision process to use the Catalog for *TransGuide* equipment and services created some delays in getting the MDI procurements underway. It took the public officials involved time to determine if any regulation or law would prevent the use of this new process. From this effort, a TxDOT official noted that an intimate knowledge of state and local regulations is a prerequisite to overcoming procurement issues.

Multi-Party Agreements

The *Smart Trek* administrators used a consortium agreement (Appendix C.5) which included the WSDOT and three private sector participants, all of whom signed a similar consortium agreement used in the SWIFT field operational test. WSDOT management thought that this method would reduce the time needed to review the intellectual property and liability clauses. The expected benefit of the consortium agreement is that the project team could bring these participants on board at a faster rate than if individual contracts were drawn up for each party. Another benefit was that this agreement also defined the overlapping requirements and inter-dependencies among the tasks of these three information service providers.

Competitive Contracts

For the *TransGuide* MDI, the TxDOT also used the traditional competitive bid process for some selected equipment and services, including weather data for an FM sub-carrier. A committee evaluated the competitive bid proposals and selected the vendors.

Many of the *Smart Trek* public sector participants are trying to minimize the procurement process required by their involvement in the MDI. For example, King County Metro Transit staff, responsible for display unit procurements, are considering a request for information with a negotiated procurement, or any other “short process” that is not a sole-source procurement process.

For purchases of equipment, WSDOT Northwest Region staff used an open, competitive bid process to hire contractors who are responsible for both the purchase and installation of the equipment. In this way, the contractor offers the WSDOT a better price on equipment. As a general rule, the contractor with the lowest profit margin usually was awarded the contract. For example, the contractor for the Olympic Region video system will buy the necessary electronics alleviating the WSDOT staff from dealing with the procurement of the equipment. A MDI project consultant is likewise handling equipment procurement for MDI applications at the Seattle-Tacoma Airport. City of Bellevue staff have contracted with a national firm to procure the equipment for which they are responsible.

Partially because of time constraints, procurement of MDI products and services for *AZTech* has been kept fairly traditional. According to an ADOT interviewee, the most "innovative" procurement practice has been the development of request for proposals with the selection of vendors based on ability, quality, and price, not just selection of the low-cost bidder. For example, the $700,000 automated trip planning system for the City of Phoenix Public Transit Department will be procured through the regular bidding process, but award will be based on qualifications and cost, not just low-bid.

Sole-Source Contracts

Other transit efforts in the *AZTech* MDI have shown that the expanded use of an existing contractor is one alternative to the regular bidding process, but will require documentation justifying the sole-source award. Previous to the MDI, Phoenix Transit staff had obtained an AVL vendor for their paratransit operations. This agency is trying to secure this vendor for the MDI's AVL component through a sole-source agreement based on the same prices in the current paratransit contract. While transit staff may have to work with the city's procurement personnel to justify a sole-source contract, transit agency representatives do not see this as problematic.

Phased Contracts

In order to get work started, even before the final contract negotiations were completed, the WSDOT used lump sum scoping contracts (Appendix C.4) with five private sector participants in the early period of the *Smart Trek* project. These contracts allow for more detailed scope and cost proposals to be developed during the pre-negotiation phase, when a contractor would not normally be paid for their efforts. The parties involved have found that this process makes both sides comfortable during the negotiation process. Contractors are paid for their work with a lump sum amount ranging from $4,000 to $12,000, dependent upon the actual amount of the full contract.

The New York *iTravel* team is using a three-phased, one-contract approach for their procurement of a prime contractor. Work in Phase 1, which encompasses the design phase, will be performed for a cost plus fixed fee. In this phase, the scope of services, which includes a functional system description and baseline performance data, and detailed requirements, design, operations and maintenance, and business plans will be developed. This phase will also cover early actions and outreach as well as developing contract amendments.

Work in Phase 2, which will include development and deployment of the systems, will be performed for a firm fixed price based on the approved design document. Work in Phase 3, which comprises the five-year operation of the system, also will be performed for a firm fixed price which will be covered by some public sector start-up funding and revenues. The MDI team also released a request for information (Appendix C.7) that sought support services from other potential participants to complete Phases 1 and 2.

On-Call and Other Existing Contracts

In the *Smart Trek* MDI, the WSDOT Northwest Region staff used existing contracts to acquire technical expertise necessary for the five projects for which they were responsible. The City of Seattle officials also are planning to purchase equipment through existing contracts.

Washington State Department of Information Systems staff has been able to take advantage of small purchase requirements to conduct simplified procurements. Most of the tools that the Department has needed to procure for this project have been inexpensive and obtainable by its technology leasing and brokering section without having to go through the competitive bid process.

The Washington State Transportation Center (TRAC) was able to utilize an existing partnership contract to become both a participant and a procuring agent for *Smart Trek*. The TRAC, a consortium of the WSDOT and two state universities (University of Washington and Washington State University), already had existing contracts in place with the WSDOT's research office prior to the MDI. These contracts were then used for the University of Washington's participation in the MDI, not requiring any new contracts. For its participation in the MDI, the University of Washington, through the University Purchasing Department, bought computers, hardware, software, and hired employees for the duration of the project.

AZTech officials remarked that the project's system hardware, software, and other products should be procured in the simplest process available which may mean a variety of methods are used. A timesaving process cited by ADOT staff is their use of ADOT's and MCDOT's pre-qualified and approved on-call consultants. Also, some hardware will be acquired through existing state, city, and county contracts. Generally, cities are making use of existing contracts for hardware and software.

Design/Build Contracts

Washington State Ferries (WSF) staff are procuring *Smart Trek* MDI-related items through a consulting firm using a design/build contracting mechanism, which is unusual because a design/build contract mechanism is not usually accessible at the State level. In usual circumstances, WSF staff are required to use a three-bid or request for proposal process, which often results in a six-to eight-month turnaround time and the acceptance of the lowest bid. However, in this project, the consultant, also under contract to the MDI, issued a request for proposals for equipment based on WSF requirements. The WSF staff indicate that this unusual procedure is being allowed to ensure compatibility among the large number of participants.

Joint, Inter-Jurisdictional Procurements

The *AZTech* project has shown that inter-jurisdictional, joint design, or procurement processes may be practical for multiple areas utilizing the same vendor or having the same product or system needs. Both the *AZTech* and *TransGuide* are procuring an open-standard, high-speed sub-carrier transmission and reception infrastructure from a common partner. ADOT officials worked with the TxDOT staff to develop a common protocol for the in-vehicle navigation units.

The *AZTech* contract with the private sector partner includes language that the *AZTech* devices and protocols must be the same as that developed for the San Antonio Traffic Operations Center. Through this action, the *AZTech* public sector participants were able to leverage work already performed by the vendor and reduce development costs of the FM sub-carrier interface control document for the communication system.

This initial effort with San Antonio is thought to have benefits to the *AZTech* project through savings in both time and money. The cooperative design efforts between the Phoenix and San Antonio MDI projects provide an example that can be duplicated by many other metropolitan areas, especially those within a single state. In addition, representatives from several municipalities in the Phoenix Metropolitan Area expressed desires to perform joint jurisdictional procurements, which will also provide examples to be copied within other regions.

Turnkey Procurements

Most of the municipal officials involved in the *AZTech* MDI discussed the options of using their own forces or existing contractors for product installations. A representative from the City of Phoenix pointed out that time is a major consideration in the procurement practices selected for this MDI, and may require procurement procedures to be condensed in some way. Although at that time no procurement methods were set, several municipal representatives cited the term “turnkey system” when referring to the process to purchase, install, and operate their MDI components, primarily the traffic signal control systems. A turnkey process places greater control and responsibility with the contractor to determine the most efficient means for achieving the end results stated by the procuring public agency.

Develop Flexibility within Contracts

In many regards, there are differences between the structure and scope of the traditional construction-type contracts and those being used for ITS projects. Advanced systems for transportation are new and have to undergo more testing than typical infrastructure projects. Unlike traditional public works projects, the MDI systems are rarely self-sufficient and must be integrated with existing or other new systems to obtain their intended operational efficiencies. These interfaces and dependencies on other systems must be taken into account within the contract and specifications. Clauses to deal with staff unfamiliarity with ITS equipment, as well as how far the private contractor remains involved during the system operations phase should also be included within the contract for advanced technologies.

Flexibility is necessary to overcome the high degree of uncertainties that accompany ITS projects and their individual components. There were a variety of ways in which the participants at the MDI sites incorporated flexibility and specific provisions to accommodate ITS efforts within the MDI service and product contracts.

Resolution as to the form of payment and the payment schedule presented major challenges for the MDI sites. The participants had to resolve whether to pay contractors on a per-hour rate (labor and materials) or on a fixed-price basis. The public sector participants felt that contracts based on "cost-plus" payments, lump-sum payments, or "best efforts" and labor hours payments would not ensure that tangible results or acceptable products would be obtained. The *iTravel* project allows compensation for design work to be on a cost-plus-fixed-fee basis; deployment compensation to be a firm fixed price based on approved designs; and operations and management compensation provided by a firm fixed price. The *AZTech* project contract terms of fixed-price payments for each segment of work allows compromise between the private sector's desire for rate structure payments with flexible contract terms and the public sector's need for fixed-price contracts with detailed scopes of work.

Table 7.3 Benefits and Costs Associated with Developing Flexibility within Contracts

ACTION	BENEFITS	COSTS
Maintain flexibility in defining task functions and costs	• Provides an easy method to handle ambiguity within the project. • Allows for better task oversight. • Increases control of funding.	• Staff time. • Possibility of parties being uncomfortable with an open-ended scope of services at time of contract execution.
Detail an appropriate transition procedure in the contract	• Provides gradual transfer of control from vendor. • Allows deficiencies and problems to be addressed before system hand-off.	• Staff time. • Training costs.
Take advantage of previous ITS procurement experience	• Contract development and negotiation processes are shortened. • Eliminates need to develop new contract language.	• Staff time identifying appropriate procedures.
Account for inter-dependencies among systems	• Provides parties with a clear perspective of the project. • Aids in overcoming uncertainty. • Promotes better adherence to project schedules.	• Staff time. • Potential longer time to develop contracts.

TransGuide and *Smart Trek* administrators placed payment schedule language similar to *AZTech*'s within their private sector contracts. For *TransGuide*, TxDOT officials have executed a fixed-price contract with their private systems integrator, with variations available on each task. Under this contract, the systems integrator has offered different options that can be completed under different funding levels. The TxDOT administrators allowed the task cost variation provisions to be incorporated into the contract and will transfer funds among the tasks when necessary. The *Smart Trek* management provides payment based on individual tasks, but they have also made cognizant efforts not to obligate the entire funds available for each contract. Whereas *TransGuide* officials have set up tasks at varying funding levels, *Smart Trek* officials use task orders to specify the cost and functionality of each task. This provides more ability for task oversight and funding controls by the public sector participants.

A second funding issue involves how to account for the equipment purchased by the private sector through the MDI contracts. The participants had to determine what part of the private sector procurements could be counted toward the private sector match. Some of these purchases were performed because the contractors' procurement process is much more simplified than public procurements. After extensive negotiations on many of its early contracts, *AZTech* parties eventually resolved the issue of the value of the goods and services provided by the private sector participants and contractors. The *AZTech* program manager and *AZTech* technical staff have the responsibility of determining what products were enhanced and can be attributed to the private sector.

Transition provisions within the MDI contracts usually include training requirements before the equipment and systems are handed off from the contractor or systems integrator to the operations and management staff. The TxDOT has required the *TransGuide* software vendor to conduct training as part of the acceptance test. The testing and training process is beneficial because it provides a gradual transfer of control from the vendor to the MDI staff.

The MDI contract administrators listed other contract modifications as necessary to accommodate ITS projects, including intellectual property rights, liability, delivery, and termination clauses. The *AZTech* contracts between the MCDOT and private sector participants include an indemnification clause and a limitation of liability. The former states that the private sector participant agrees to hold the County, State, and the Federal Highway Administration harmless in all suits arising from wanton, willful, or negligent acts and omissions on the part of the private sector contractor, its agents, or subcontractors. Liability under the contracts between public sector and private sector participants is limited to the amount of the contract and does not extend to indirect or consequential losses incurred by the County (MCDOT, 1997). Basically, the effect of the indemnification clause is to hold the private contractors responsible for the actions of their employees and public agencies responsible for the actions of their employees, including subcontractors. The modification of the indemnification clause and limitations on liability appear to fit the new business structure of ITS-related projects.

Three MDI sites attempted to resolve issues of delivery. Almost every MDI component is tied to another component or system. When one aspect of the integrated system is delayed, the effect is multi-fold. The *Smart Trek* administrators used a consortium agreement (Appendix C.5) to build the project team quickly; three ISPs and the WSDOT signed this consortium agreement. A benefit to this approach was that the agreement defined the interdependence of the parties' tasks.

The *AZTech* public sector participants included strong performance and default provisions within their contracts in an attempt to ensure that the private sector contractors did not cause undue delays. The *AZTech* participants found that most government contracts do not contain such clauses. As part of the contract modifications, the *AZTech* administrators established limits for the level of effort for specific scope-of-work tasks, as well as adding "termination for cause" and "termination at will" clauses to contracts. An "Acts of God" definition was also included in the contracts.

Procurement efforts from three MDI sites revealed that the contract development, negotiation, and signing processes are shortened greatly through experience gained by staff from developing the initial contracts and by interacting with staff from other areas who previously address procurement issues. To reduce the time expended on the early ITS contracts, the contracts administrators should begin their process early in the ITS project development stage, examine the existing procurement procedures, and make changes to accommodate ITS procurements. The additional effort should provide great benefits to the ITS project in that the MDI participants all believed that the IGAs and contracts ensure long-term commitments from the participants which lead to the project's continued success.

Not all procurement issues have been resolved by the experiences of the three MDI sites. One point that is still open for discussion is whether the best way to contract is to use many independent contractors (and private sector participants), such as was the case in Phoenix and Seattle, or procure one prime contractor and let that contractor secure and be responsible for the subcontractors. Second, many local jurisdictions are currently hesitant to procure any MDI equipment until the IGAs and funding issues are completely resolved. Currently, many of these agencies have not determined which procurement methods they will use. With the limited time frame allotted for the MDI to be deployed, it will be interesting and informative to witness which procurement processes produce the highest quality equipment within the time limitations. Finally, some of the MDI participants maintain the concern that the scopes of work within each contract are still too open-ended and not specific enough, and may require the establishment of more standardized performance standards because of the newness of ITS equipment.

Table 7.4 on the next three pages lists questions that should be addressed when identifying appropriate procurement mechanisms.

Table 7.4 Questions to Consider when Identifying Appropriate Procurement Mechanisms

QUESTION	RESPONSE
BE FLEXIBLE IN SELECTING LEAD AGENCIES	
• Have the procurement capabilities of the participants in the ITS project been identified?	
◊ Have representatives from the participating agencies with the required procurement skills been identified?	
• Have the agency or agencies with the capability to lead the procurement process for the ITS project been selected?	
◊ Have the procurement roles of the other participants in the ITS project been identified?	
◊ Will ITS procurement activities be incorporated within existing staffing levels?	
• Has a single point of contact been identified for the lead procurement agencies?	
• Should public safety and other non-traditional organizations be included in the procurement process?	
• Are there any other actions that need to be taken to ensure that the most appropriate lead agencies are selected?	

Table 7.4 Questions to Consider when Identifying Appropriate Procurement Mechanisms (continued)

QUESTION	RESPONSE
BE FLEXIBLE IN DETERMINING MECHANISMS	
• Have various procurement mechanisms been considered?	
◊ federal competitive process?	
◊ state catalog?	
◊ multi-party agreements?	
◊ competitive contracts?	
◊ sole-source contracts?	
◊ phased contracts?	
◊ on-call or other existing contracts?	
◊ design/build contracts?	
◊ joint, inter-jurisdictional procurements?	
◊ turnkey procurements?	
• Should legislation, policies, or procedures be changed to permit more flexibility in the use of contracting mechanisms?	
• Have procurement mechanisms used in other areas been considered?	
• Are there any other actions that need to be taken to ensure that the most appropriate contracting mechanisms are used?	

Table 7.4 Questions to Consider when Identifying Appropriate Procurement Mechanisms (continued)

QUESTION	RESPONSE
DEVELOP FLEXIBILITY WITHIN CONTRACTS	
• Have contract terms and conditions been written to provide flexibility in defining task products and costs?	
◊ Should policies and procedures be modified to provide for more flexibility in contracts used in ITS projects?	
• Should standard terms and conditions be modified to accommodate the ITS project?	
◊ intellectual property rights clauses?	
◊ liability and indemnification clauses?	
◊ delivery clauses?	
◊ performance clauses?	
◊ termination clauses?	
• Has contract language used in other areas been considered?	
• Have the interdependence of project systems been taken into account when developing ITS contracts?	
• Does the contract provide for the transition of the system from the vendor to the operator?	
• Has a method to determine the value of goods and services provided by ITS project participants been established?	
• Are there other actions that need to be taken to ensure that flexibility in terms and conditions is provided within contracts?	

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Note:
EDL stands for the Electronic Data Library that is located at the U.S. DOT ITS Web site at www.its.dot.gov.

8. Address Intellectual Property Rights Issues Early

Intellectual property refers to patentable inventions, copyrights, and trade secrets, as well as compilations of data derived from the operation of ITS technologies, which may or may not be subject to copyright protection. Applications of intelligent transportation systems (ITS) raise challenging new questions regarding intellectual property. Institutional issues regarding intellectual property can be an area of tension between the public and private sectors. The allocation of sufficient contractual intellectual property rights (IPR) to enable the private sector firms to make a profit is critical. The opportunity to exclusively apply IPR over an extended period of time is the private sector's incentive to invest in research and development. The public sector, on the other hand, encourages competition and resists creating monopolies (Gallegos, 1997).

- *Develop a Clear Policy Early*
- *Address the Possible Areas of Concern*

There is a continuing concern in the private sector that state or federal laws will require firms participating in public-private ITS partnerships to surrender valuable rights in intellectual property (computer programs, patentable inventions, proprietary technical data, etc.) developed with public funds. On the other hand, the public sector strives to give the public the "full benefit" of public spending by acquiring at least the right to use such intellectual property for "government purposes." Government officials also cite a generalized concern about creating a monopoly for certain technologies. Although the issue of intellectual property rights has not been a "show stopper" to the ITS Program, it merits close scrutiny because it has caused delays in operational testing, and the same issues may arise in connection with ITS deployment projects using federal funds (U.S. DOT, 1997).

Develop a Clear Policy Early

A speaker at the third ITS America Annual Meeting in 1993 said that the assignment of IPR will always be an issue and urged listeners to recognize this fact and address the issue. The participants in the metropolitan model deployment initiatives (MDIs) have been forced to resolve this issue before continuing on the MDI projects. Many of these participants had actually dealt with IPR issues in ITS work predating their MDI project. A municipal official working at the *AZTech* MDI site noted that IPR is a regular concern when contracting for traffic signal work, and the best way to settle the issue is with non-disclosure agreements.

As a starting point to resolving IPR concerns, administrators from both the *AZTech* and the *Smart Trek* projects relied on a letter from the Federal Highway Administration's (FHWA's) Associate Chief Counsel. The letter clarified the Federal Government's policy on intellectual property (Appendix A.1). The public sector participants obligated themselves to conform to the FHWA letter. In Phoenix, the letter was included in all contracts between the two sectors. In both the *Smart Trek* and the *AZTech* projects, the use of this letter significantly improved the contract negotiation process and helped to resolve the concerns of the contracting parties. The first *AZTech* contract was signed within two weeks after receipt of the FHWA letter. Although the allocation of IPR was not the only issue prolonging negotiations, it was a significant factor. Earlier receipt of the FHWA letter could have probably cut some significant time from the four-month negotiation period.

Table 8.1 Benefits and Costs Associated with Developing a Clear Policy Early

ACTION	BENEFITS	COSTS
Develop and disseminate a clear policy early in the life of the project	• Improves the contract negotiation process. • Saves time by helping to resolve the concerns of both public and private parties. • Aids in avoiding protracted negotiations as a result of contractual misunderstandings.	• Staff time in authoring policy. • Private partner objections may lead to delays. • Potential loss of participation by qualified firms.

In San Antonio, the parties were fortunate to be able to build on an IPR policy that had already been developed by Texas Department of Transportation (TxDOT) management for *TransGuide* before it became an MDI project. The pre-MDI contracts contained one paragraph covering IPR. The specifications for *TransGuide* software contained language that stated simply that all developed software would be the property of the State of Texas. The original *TransGuide* software development contractor objected and forced the software maintenance contractor to stop modifying code until a memorandum of understanding was signed giving the TxDOT ownership of the code. Because TxDOT management did not want to be involved with any further protracted negotiations as part of contractual misunderstandings, the request for offer for the *TransGuide* MDI contained stronger and more detailed language concerning software ownership. Each proposer had to certify that they had agreed to that condition. In an expansion of the IPR clauses placed in each *TransGuide* contract, TxDOT staff, through its recently established Intellectual Property Committee, has drafted a guidelines manual (Appendix A.2) that covers intellectual property and includes sections that assigns all IPR for software created for the MDI to the TxDOT.

As three MDI sites displayed in varying fashion, IPR issues must be addressed as early in the project planning process as possible in order to avoid delays in negotiations. The FHWA letter may provide a good starting point for other agencies that are grappling to determine ownership and control of proprietary information.

Address the Possible Areas of Concern

There were two primary areas of concern for IPR issues - products used by the MDI participants, such as software and technologies, and the use of data generated by the technologies. Three sites, *AZTech*, *Smart Trek*, and *TransGuide*, had product issues, while the data use was more of an issue with the *Smart Trek* participants.

Table 8.2 Benefits and Costs Associated with Addressing the Possible Areas of Concern

ACTION	BENEFITS	COSTS
Create multiple licensing agreements	• Aids in satisfying all parties by treating products differently based on when and with what funds they were created.	• Procurement staff time. • Possible legal staff involvement.
Develop an appropriate business plan	• Addresses issues in assigning IPR. • Addresses issues relating to ownership and use of data.	• Management and staff time.

The *AZTech* private sector participants wanted to retain ownership and control of existing technologies, including commercial software, which they brought to the MDI. Conversely, the *AZTech* public sector officials focused on questions of ownership and control of products enhanced during the projects, as well as work developed solely with public sector funds. During contract negotiations between public sector and private sector participants in the *AZTech* MDI, the parties realized that their concerns over the allocation of intellectual property rights differed significantly. There were four areas of concern: (1) preexisting products brought to the MDI by private sector participants, (2) products developed through the course of the MDI using private funds, (3) existing products enhanced during the MDI using public funds, and (4) products developed during the MDI with public funds.

The March 1997 letter from the FHWA's Associate Chief Counsel resolved the concern over the FHWA use of MDI products (Appendix A.1). The letter stated that the FHWA's use, if any, of the copyrightable or patentable products developed by the private sector for the MDI is limited to non-commercial purposes. Among the Federal Government's rights in copyrightable material developed with federal funds is the right to "reproduce, publish or otherwise use and to authorize others to use" the technologies for FHWA purposes. The FHWA does not retain the copyright to these works. The letter further states that contractors will receive title to any inventions created during the course of the MDI with federal funds in exchange for providing the Federal Government with royalty-free use. In this respect, "the FHWA does not construe the scope of its license to include sub-licensing the technology to a state or local government, bridge, tunnel, or turnpike authority, or private entity."

Following the FHWA's policy, the *AZTech* public officials developed two licensing agreements: one for preexisting products and privately-funded developments and one for products developed during the course of the MDI using federal funds (Appendix C.2). The license for pre-existing products allows the public sector participants to make limited use of pre-existing products. The private sector partner grants a "non-transferable, non-exclusive five-year license to use the software, data and/or documentation...solely for use on the *AZTech* Model Deployment" (MCDOT, Exhibit D, 1997). The licensing agreement expressly prohibits the public sector participants from making derivative works or from attempting to derive the source code of the products by reverse engineering, disassembly, or any other means. The private sector partner retains all ownership rights, including copyrights, to pre-existing products and privately funded developments. An Arizona Department of Transportation (ADOT) official noted that the software source codes were necessary for *AZTech* operations and, therefore, required ADOT to obtain a license to access private sector source codes from the software vendor (and *AZTech* partner).

The second license pertains to government-funded developments on the *AZTech* Model Deployment. In this license, the public sector participants receive a "royalty-free, non-exclusive and irrevocable license to reproduce, publish or otherwise use, and to authorize others to use, the government funded software, data and/or documentation ...solely for official governmental purposes." The private sector partner similarly retains all ownership rights, including copyrights (MCDOT, Exhibit C, 1997).

Although the costs of the intellectual property rights dispute are difficult to quantify, it is undeniable that discussions lengthened contract negotiations. An *AZTech* contract professional labeled this issue as a "major stumbling block" in obtaining contract closure. The first of the contracts under the MDI was not signed until March 1997, four months after the December 1996 completion of the terms and conditions and the statement of work. Second and third private sector partner contracts were signed within a three-week period after the IPR issues were resolved. Participants viewed the letter from FHWA counsel as a turning point in understanding the varying concerns. The use of the letter pleased both private and public sector participants. The letter will also be included in future *AZTech* contracts and is expected to speed up future negotiations.

The *Smart Trek* participants likewise had issues regarding software codes and ownership. Early in the negotiation process for the MDI, a software vendor was going to be a partner in the project. As part of its involvement, a software provider wanted to use the University of Washington software, TrafNet, but the University refused to sign a form stating that the private partner would own the software, so the software vendor backed off from involvement as a partner. Generally, as part of the MDI, applicable software is given away freely by the Washington Department of Transportation (WSDOT) and the University participants. However, there are limitations as to who receives the software service codes, which are necessary to enable the software to be modified. The software vendor had received the executable service code, but not the entire Internet service code.

The FHWA IPR policy letter made it easier for WSDOT staff to come to contract terms with the private firms. The letter applied mainly to the contract with software vendors, but also helped discussions with the system integrator. WSDOT officials felt that it basically alleviated the fears of the private company management that the public sector participants would distribute the software developed by these companies for the *Smart Trek* MDI.

Under an agreement with the original software developer for *TransGuide,* TxDOT retained the licensed rights to the original software, but the TxDOT will only distribute the software to other government entities. Officials from the TxDOT San Antonio District believed that the original software development was performed in-house and the contractor merely performed the coding. In addition, the TxDOT licenses commercial-off-the-shelf software and equipment and does not assume ownership unless it is modified for TxDOT purposes. In that situation, TxDOT will assume full ownership and will copyright the modified software. Vendors are told of this policy during the proposal stage and sometimes have expressed concerns. Generally, the TxDOT uses a “work for hire” policy when hiring contract programmers, and the TxDOT copyrights the software.

In the *TransGuide* MDI, there are a couple of areas where there are no IPR concerns. It has been a great benefit to have a not-for-profit firm perform as the system integrator. This research foundation is not interested in retaining the rights to the MDI software. Likewise, the City of San Antonio does not generally pursue patents and allows all intellectual property to be open to public use.

There are several areas pertaining to IPR that have not been fully resolved by the MDI deployments. The modification of pre-existing source code by public sector participants and the subsequent issues relating to the ownership of this enhanced software will probably require additional licensing agreements between public agencies and software vendors. In addition, the use and distribution of data by the public and private participants remains an outstanding issue, especially with the *Smart Trek* project, where three information services providers are involved.

Staff members of WSDOT’s Advanced Technology Branch have raised IPR issues regarding the use of *Smart Trek* data. In an attempt to resolve them, the *Smart Trek* participants will develop an advanced traveler information system (ATIS) business plan that will include IPR issues and focus where policy, contractual, and other legal decisions must be made. The issue of the WSDOT supplying free traffic information on the Internet will be discussed in the plan. The current WSDOT position is that such information is public information and should be available for free. However, the WSDOT also wishes to encourage private sector involvement in the dissemination of traffic information. The public’s free access to the information disseminated by the WSDOT may be perceived as competing with the enhanced, or value-added, data that ISPs supply for a fee. The WSDOT personnel expressed concerns that without the WSDOT current traffic information service, the public may have to pay to use information based on the raw data that the WSDOT collects and provides to the information service providers.

In return for receiving raw data from WSDOT and the other MDI participants, the service providers will make value-added data available to WSDOT staff and other *Smart Trek* participants for use in traffic management functions. In accordance with the *Smart Trek* contractual agreements, the service providers own the value-added traffic and transportation data, and the *Smart Trek* participants cannot distribute the information to external entities. The ATIS business plan will include the discussion of the question regarding how a viable market for information service providers can be demonstrated, and how the WSDOT can provide some traffic information for free while enabling that market to develop.

Officials from the University of Washington noted that, generally, the University freely gives away software needed for the MDI. However, the University believes if the private sector profits from intellectual property developed at the University, the University should profit as well. They intend to enforce standard copyright law. King County Metro Transit staffs indicate that IPR issues still exist regarding the disclosure of automatic vehicle location (AVL) software and the formatting of geographic information systems (GIS) data. Metro staff provides GIS data to requesters who will use it for non-commercial purposes but charge for the cost of copying data to disks. Similar to this position, City of Bellevue staff will release unformatted GIS data, if requested, but not in a format developed by the agency (Appendix B.6).

Table 8.3 on this and the next page lists questions that should be addressed when addressing intellectual property rights issues.

Table 8.3 Questions to Consider when Addressing Intellectual Property Rights Issues

QUESTION	RESPONSE
DEVELOP A CLEAR POLICY EARLY	
• Have you requested the federal policy on the assignment of intellectual property from the federal funding agency?	
◊ Should you used this policy to initiate discussions with private sector participants in the ITS project?	
• Has your agency developed a clear policy on the assignment of intellectual property?	
◊ Should this policy be written?	
◊ Should this policy be distributed to potential private sector participants and vendors in ITS projects?	
• Are there any other actions that need to be taken to ensure that a clear policy on the assignment of intellectual property is developed early in the life of the ITS project?	

Table 8.3 Questions to Consider when Addressing Intellectual Property Rights Issues (continued)

QUESTION	RESPONSE
ADDRESS THE POSSIBLE AREAS OF CONCERN	
• Has the appropriate language been developed for contracts used for the ITS project to address potential areas of concern?	
◊ preexisting products brought to the ITS project by private sector participants?	
◊ products developed during the ITS project using private funds?	
◊ existing products enhanced during the ITS project using public funds?	
◊ products developed during the ITS project using public funds?	
• Should a policy be developed covering the use and distribution of source code?	
• Has contract language used to address IPR concerns in other geographical areas been considered?	
• Has your agency developed a policy on the ownership and dissemination of traveler information?	
◊ Should this policy be written?	
◊ Has your agency determined what information will be disseminated without charge and what can be distributed for a fee?	
◊ Should a policy be developed on the use of value-added data provided by information service providers to ITS project participants?	
• Are there other actions that need to be taken to ensure that the potential areas of concern are addressed?	

References:

"Exhibit C, End-User License Agreement for Government Funded Developments," contract between Maricopa County Department of Transportation and private sector firms, 1997.

"Exhibit D, End-User License Agreement for Pre-existing Products and Privately Funded Developments," contract between Maricopa County Department of Transportation and private sector firms, 1997.

L.S. Gallegos & Associates, Inc., *Innovative Procurement Practices for ITS*, prepared for Federal Highway Administration, Washington, D.C., April 1997. (EDL number: 1868.)

U.S. Department of Transportation, *A Report to Congress, Nontechnical Constraints and Barriers to the Implementation of Intelligent Transportation Systems, Update of the 1994 Report*, Washington, D.C., September 1997. (EDL number: 3310.)

Resource:

Washington State Transportation Center (TRAC), *Choosing the Route to Traveler Information Systems Deployment, Decision Factors for Creating Public/Private Business Plans*, prepared for ITS America and the U.S. Department of Transportation, Washington, D.C., 1998. (EDL number: 5326.)

Note:
EDL stands for the Electronic Data Library that is located at the U.S. DOT ITS Web site at www.its.dot.gov.

9. Develop Written Policies

While institutional and legal impediments do exist, many of the barriers to successful intelligent transportation systems (ITS) deployments and operations can be overcome with a consistently developed policy that has considered these issues. The key to overcoming most constraints is realizing that certain problems will arise and that they must be addressed, preferably early in the ITS project (U.S. DOT, 1997). A lesson gained from field operational tests and other ITS projects that have been undertaken throughout the 1990s is that there are areas within the ITS project deployments and system operations where specific policies and procedures should be clearly laid out. For example, clearly written roles and responsibilities will avoid turf battles, possible duplication of work, and delays in initiating partnerships (Volpe Center, 1995).

- *Address Equipment Issues*
- *Delimit the Use and Distribution of Data*
- *Address Legal Concerns*
- *Define Roles and Responsibilities*

The participants of the metropolitan model deployment initiatives (MDIs) found that set policies and procedures created a number of benefits. Intra-agency and regionally developed policies regarding how advanced equipment and the data they generate are used are critical components in ensuring that all parties operate under the same manner for regional consistency and effectiveness. Policies enable the partners and other participants to follow an accepted technical and procedural approach. A well developed, written policy provides staff support for their decisions. A firm policy may even make it easier to develop public-private partnerships, where the private sector knows the opportunities and limitations on the use of the equipment and data before entering into any agreements.

It is also important to acknowledge that while certain actions may limit liability, no particular approach will completely eliminate lawsuits. An agency should not be as concerned with being sued as with being able to put forth a credible defense based on the underlying merits of the agency's procedures. Approved policies and procedures can help address privacy and liability concerns and may limit exposure to potential litigation and aid in case of litigation.

Generally, agencies have not needed to alter their policies or procedures to be involved with the MDI. Staffs at the lead agencies had already considered policy changes when they first installed ITS equipment in their areas. Most new policies only required revising existing policies. The cost to develop these new policies was primarily staff time. However, the more time expended on policy and procedure development, the less available for technical reviews. Based on the discussions with the *TransGuide* MDI representatives, Texas Department of Transportation (TxDOT) officials had to spend a great amount of time revising and creating new internal policies which were conducive to facilitating the MDI information system projects and not targeted to construction project developments. The MDI administrators at the four sites have found it advantageous to develop or consider policies and procedures for (1) the type, use, location, and maintenance of equipment; (2) the use, ownership, and transmittal of data generated by the systems; (3) any legal or contractual items, such as intellectual property rights, privacy, liability, and task revisions or contract change orders; and (4) the roles and responsibilities of the participants.

Address Equipment Issues

There were a variety of equipment issues that called for the application of existing policy or the development of new policies by the MDI participants. The MDI administrators dealt with issues regarding (1) what information would be allowed on changeable (or variable) message signs, (2) the use of the closed circuit television cameras, (3) who would be responsible for the maintenance and replacement of equipment purchased for the MDI, (4) the location of kiosks, and (5) the distribution of automated vehicle identification (AVI) tags. Underlying the policy efforts related to the installation and operation of equipment was the need for standards to be developed to simplify the policies and tie them to national or international procedures.

Changeable Message Signs

Public officials for the *AZTech*, *Smart Trek*, and *TransGuide* MDIs developed policies outlining what information can be placed on a changeable message signs. The Arizona Department of Transportation (ADOT) administration developed a policy, before the first message signs were ever deployed in the Phoenix area, that stated the signs would issue only traffic-related messages. Similarly, the Washington State Department of Transportation (WSDOT) has guidelines for the operations of variable message signs (Appendix B.7). In San Antonio, officials found that non-traffic messages were not well received by the public. TxDOT District officials determined that the only acceptable messages are those related to traffic. However, an exception does exist for messages relating to air quality. In accordance with the policy (Appendix B.3 and Appendix B.4), TxDOT maintains control over the messages that are displayed on the changeable message signs. Operations staff will issue two messages during an incident. The first message will inform the driver what is going on and the second message will tell the driver what to do. Advertising on the signs is not permitted in any of the areas.

Closed Circuit Television Cameras

There were also limitations placed on the use of closed circuit television cameras in San Antonio, Phoenix, and Seattle sites. *TransGuide* camera images are not to be used for law enforcement. There is to be no indiscriminate videotaping. When tapes are retained, they are to be used only for training and evaluation purposes. In addition, the cameras are not to have full scan (360°) capabilities to prevent viewing non-transportation activities and neighboring residential property (Appendix B.5).

The use of *AZTech* cameras aimed on accidents is a great concern of the representatives of the ADOT and Maricopa County Department of Transportation (MCDOT). A county participant noted that there is already a policy in place against displaying “gruesome” details of an accident scene. This policy requires the camera operator at the ADOT traffic operations center to "pull back" from the scene but still provide enough information to pass along to emergency aid providers. The resolution of the cameras should be at enough zoom detail to provide basic necessary information for the transportation staff and emergency service agencies, but not to a level that is voyeuristic. WSDOT guidelines (Appendix B.7) restrict the use of closed circuit television cameras to monitoring traffic and verifying incidents and stress that the privacy of drivers and accident victims is maintained.

Table 9.1 Benefits and Costs Associated with Addressing Equipment Issues

ACTION	BENEFITS	COSTS
Develop guidelines on the use of message signs	• Ensures messages will convey information that is consistent and easily understood. • Public will tend to pay more attention when a message appears.	• Staff time to develop policies. • Potential lost opportunity to use a message sign for purposes other than traffic. • Potential loss of revenues.
Establish guidelines on the use of television cameras	• Assuages the public concerns of video surveillance and privacy. • Aids in gaining public support for ITS technologies. • Reduces the operating agency's concerns over liability.	• Staff time to develop policies. • Potential lost opportunity to use cameras for law enforcement or other purposes.
Develop guidelines on ownership and replacement of equipment	• Eliminates confusion among participants. • Ensures funding will be available to maintain and replace equipment.	• Staff time to develop policies.
Establish guidelines on kiosk placement	• Encourages requesting agencies to take ownership of kiosks. • Ensures kiosks are placed in areas where they provide the highest possible public benefit and have maximum visibility.	• Staff time to develop policy.

Ownership and Replacement of Equipment

The project participants have had to come to terms with who is responsible for the operation and maintenance of the equipment used for the MDIs. Along with these responsibilities is the issue of what agency will be responsible for the eventual replacement of the technology. The City of Bellevue, Washington, has developed an Equipment Rental Fund (Appendix C.6) which has been used to replace outdated computers and other equipment. There are three independent subfunds included within the City of Bellevue's Equipment Rental Fund - the Electrical Equipment Rental Fund, the Mechanical Equipment Rental Fund, and the Information Services Replacement Fund. The Equipment Rental Fund was created as an internal process designed to rent equipment to other funds, maintain and repair equipment administered by the Fund, and provide equipment replacement through the establishment of replacement services. These services are grouped into different functions, each of which has a separate revenue stream. The Fund will include *Smart Trek* MDI items under the responsibility of the City. Although state legislation allows all cities within the state to develop equipment replacement funds, the City of Bellevue has developed the most sophisticated procedures.

The *TransGuide* partners are still discussing who is responsible for system maintenance. The TxDOT has a policy stating that whatever equipment TxDOT staff purchase, they own and must maintain. This policy raises a question of maintenance liability within the Bus Incident Management System project. If the cameras for this system, which will be placed on buses owned by the VIA Metropolitan Transit Authority (VIA), are bought by the TxDOT, then according to TxDOT policy, the cameras are considered TxDOT property. Therefore, the maintenance of the cameras becomes the responsibility of the TxDOT. TxDOT officials do not want this responsibility, so VIA staff will purchase the equipment and assume maintenance responsibility. There have also been discussions regarding the purchase, operation, and management of the LifeLink equipment. In this project, cameras and other equipment will be placed in ambulances owned by the City of San Antonio, but it must be determined which agency will purchase this equipment and which will maintain it.

Kiosk Placement

Partners at the MDI sites are also trying to develop policies on where kiosks should be located. These efforts are being hampered by the lack of information as to the true value of the information kiosks. *Smart Trek* partners have developed a procedure that distributes one kiosk to each public partner agency at no cost and charges for additional units. The usage patterns of these kiosks will provide valuable knowledge for other areas that wish to develop kiosk location criteria and guidelines.

In the *AZTech* project, a participating municipality can receive a kiosk entirely purchased with MDI funds. If municipal officials want additional kiosks, the *AZTech* project will subsidize the units at 50% of the approximately $20,000 cost per unit and the balance will be paid by the municipality. Furthermore, if a private sector entity would like one of the fifty kiosks available, *AZTech* officials will subsidize those units at 25% of the total cost. By requiring financial commitments for additional kiosks, *AZTech* management can be assured that only those entities that truly want to take ownership of the information kiosks will be involved.

Similarly, *TransGuide* officials have developed a kiosk location policy (Appendix B.1). In this MDI, policy criteria include multimodal locations, high tourist and pedestrian traffic, and other factors that would aid in increasing the volume of kiosk use.

Distribution of AVI Tags

TxDOT officials created a plan to ensure the proper distribution of AVI tags (Appendix B.2). This plan covered the voluntary placement of tags on vehicles owned by public agencies, on personal vehicles owned by employees of these agencies on fleets of private sector firms, and on vehicles owned by private citizens. The plan also included a distribution campaign, which would be used to solicit participation in the AVI program.

Consideration of Standards

The issue of national standards arises in many discussions of ITS equipment issues. The implementation of standards may be a boon to the ITS Program, speeding up the development and deployment of ITS technologies and making products more marketable. However, given the number of industries involved in the research and design of ITS technologies, a consensus on design and performance standards may be difficult to reach (U.S. DOT, 1997). The *ITS Architecture: Standards Development Plan* (JAT, 1996) identifies three risks associated with the implementation of standards. Standards may (1) hinder the development of new technologies, (2) jeopardize investments made in ITS technologies prior to the establishment of standards, and (3) inhibit market competition. The report also identifies the benefits of standards, which include interoperability of diverse systems, preservation of investment, technology insertion, creation of broader markets, and interchangeability. National standards, as well as conformity to the National ITS Architecture, must be considered when officials develop policies and procedures that address equipment issues.

Delimit the Use and Distribution of Data

The value of the MDI operations lay in the data that is generated by the equipment and systems involved. Data policy issues that have been tackled and are under review by the MDI partners include resolving the questions of (1) who owns the data generated, (2) how this information will be shared among partners and to whom this information will be released, (3) how to protect confidential information, and (4) what is the proper use of and retention time frame for videotapes. The MDI forced the primary partners to formalize the direction that they were already headed regarding distributing traffic and traveler-related data. In response to these questions, the project management at each MDI has developed slightly different data policies.

Policies of AZTech Participants

Public officials in Arizona believe that transportation information should be easily available and free to the public because the public's funds enabled it to be gathered, implying that it is essentially already in the public domain. Currently, in compliance with ADOT policy, *AZTech* releases transportation-related data to both the public and private sectors under the Freedom of Information Act. Private sector individuals and agencies who request information are sometimes charged if *AZTech* incurs a cost in providing the information. Television stations are given live video feed for no cost except hook-up fees.

Table 9.2 Benefits and Costs Associated with Delimiting the Use and Distribution of Data

ACTION	BENEFITS	COSTS
Develop guidelines for the retention, use, and distribution of data	• Ensures timely information is provided to the traveling public. • Reduces privacy and liability concerns. • Protects confidential and personnel information. • Provides ISPs with clear direction.	• Staff time in establishing policy. • Reduced benefits to law enforcement and emergency service agencies. • Cost to comply with guidelines.

Generally, the municipalities involved with the *AZTech* MDI are bound, as public agencies, to release transportation-related data. These cities share the state's policy. For example, the City of Phoenix releases transportation-related data after a written request. Most of these requests concern signal timing issues and traffic counts. Information is usually provided verbally. The City of Tempe features most information on its municipal Web site. The City of Scottsdale is currently in the process of making policy changes to allow other cities to look at their traffic information. City staff projected that this policy change will not incur any additional costs to the city. Because of liability, the City of Scottsdale staff do not release traffic signal timing parameters to the public but usually respond to most other transportation-related data requested by the general public.

However, because of the nature of the information, the Arizona Department of Public Safety, the state's law enforcement agency, places greater restrictions on who may receive their transportation-related data. Public Safety officers release transportation-related data to persons within other law enforcement agencies, grant limited access to the media, but restrict most access to persons outside the department. The distribution of information, especially video feeds, to the Public Safety and other law enforcement agencies is a major point that has yet to be fully resolved. Generally, ADOT officials believe that camera images should not be used for law enforcement. The development of this policy, however, is further complicated because a Public Safety officer is present at the ADOT Traffic Operations Center and of the need to exchange information among the Center staff, the *AZTech* operation personnel, and the region's public safety agencies.

An issue tied to the distribution of information is the taping of traffic flows captured by the video monitoring cameras along the roadways. The participants see transportation data collection and distribution as liability and procedural issues, not privacy issues. However, camera-based traffic monitoring systems used by the state and cities have generated the greatest level of privacy anxieties, although public sector partners report there is less concern than anticipated. The concerns involve what the cameras monitor and how operators and others, including law enforcement personnel, use the traffic information.

The *AZTech* officials have tried to counteract the concerns involving camera use. First, ADOT officials made a linguistic change to address privacy concerns related to the use of the cameras, replacing the intrusive-sounding "video surveillance" with "video monitoring." This change helped to allay some of the "Big Brother" fears and negative connotations associated with the word "surveillance." Second, in keeping with the limited and defined role of the cameras, ADOT administrators agreed that the cameras should not play a law enforcement role, even if there is an officer stationed in the Traffic Operations Center. ADOT staff is currently formulating a policy to this effect. Third, the *AZTech* participants provide open access to the camera feeds via local television. Finally, the *AZTech* managers enacted an informal policy of not retaining any tapes from the camera feeds. This will avoid any tapes being subpoenaed and used in lawsuits. Public sector partners must continue grappling with problems posed by videotaping. Currently, many cities do not have the ability to videotape, but some local representatives feel that each jurisdiction will probably have to decide individually if they will tape the closed circuit television video images.

The major benefit of the changes made to alleviate or reduce privacy issues has been an increased amount of public support for the technologies. The costs of the changes have been minimal and have mostly involved personnel time to make policy decisions. Related material costs used to open the information up to the public and subsequently reduce privacy concerns likewise have been minimal. Publicly accessible transportation information via video was already part of the ITS program in the Phoenix Metropolitan Area and only required additional feeds from the MDI components.

Policies of Smart Trek Participants

The WSDOT policy for sharing data, which is also applied to *Smart Trek*, is that WSDOT staff will give the data to anyone who requests it, as long as there is not a substantial cost to the WSDOT to provide the information. WSDOT officials have been willing to fund the distribution of the data because the dissemination of data benefits the MDI project. Transportation-related information from the WSDOT is regularly distributed on the Internet. Traffic data and other "paper data" is considered public information. Presently, the primary restriction to information access is the physical limitations of the system. Access to this information will be greater as the system moves from phone line connections to expanded Internet availability.

Because of the media's ability to quickly reach a wide audience, the WSDOT policy actually gives the media a priority over other users. The WSDOT provides video images to the media, but the media outlet has to make the connection. If external agencies put in the receivers, WSDOT staff will make the connection with them. Currently, there is no charge for the connection and none are anticipated. There is, however, no existing policy that would preclude implementing a charge. Legal agreements are being developed that clarify the process of data retrieval (Appendix C.9) and access to video input from other agencies by the WSDOT and the independent service providers (Appendix C.8). A legal agreement will also be developed regarding the ISPs' distribution of traveler information.

All other public agencies involved with the *Smart Trek* project have similar information distribution policies, although many are not formalized, and none were revised to accommodate the MDI. Except for special circumstances, no agencies charge for the public information. In fact, there is proposed state legislation that will preclude selected public agencies from charging for information unless extra work is required to process the data.

One municipal representative cited the Freedom of Information Act and other related laws as the guides for their public access policy. The individual added that the city's staff was reviewing issues associated with providing data to a profit-making organization, such as an information service provider. An official from a second municipality noted that the *Smart Trek* partners eventually will have to develop legal agreements, rather than informal policies, to cover what data will be released (Appendix C.9), what video feeds will be shared (Appendix C.8), what agency can control the cameras, and what information will be shown on the traffic flow maps. The City of Bellevue policy of providing requested geographical information system (GIS) data follows the City's ordinances on the disclosure of public records (Appendix B.6). King County Metro Transit likewise has a informal policy of filling GIS requests for all non-commercial purposes for a data transfer fee.

Because staff at the University of Washington is developing the MDI information backbone, there is a great deal of data that is passed through its operations. A University of Washington representative perceives that the *Smart Trek*'s intention regarding distribution of data is to make it available so that there will be more players on the field who distribute this data. The University's policy is to make the traveler information available to anyone who wants to build products that add value to the data. However, personal information is stripped from the data to protect the privacy of individuals. Each data source has a computer, or "firewall," to strip out any private data before it goes into the *Smart Trek* system. The stripped data always resides at the source agency. For example, the computer residing at Metro Transit extracts bus driver identification before vehicle identification data is passed to the communications backbone. This "firewall" stripping process is consistent with the written policy developed by the WSDOT.

Policies of TransGuide Participants

The existing TxDOT transportation data policy is to share as much information as possible. Likewise, in keeping with the Texas Open Records Act, all transit and traffic signal data is readily available to the public, with few restrictions. The TxDOT and other *TransGuide* public partners have realized that with the increase in transportation data resulting from the *TransGuide* operations, a detailed formal policy to cover the sharing of transportation data is needed. One restriction already placed on data access which serves to limit access to the information gathered and displayed there is that the media is not allowed in the *TransGuide* control room.

A draft policy has been developed by the Texas Transportation Institute, on behalf of the TxDOT, that formulates a procedure whereby traffic data (speeds and counts) and video images can be released over the Internet on the TxDOT Web page and over the telephone. This policy is to be applied to both the *TransGuide* operation in San Antonio and the TransStar operation in Houston. The policy is undergoing review by the TxDOT Headquarters and the TxDOT ITS Committee.

Unanswered questions still exist that apply to the closed circuit television camera feeds. The Open Records Act set deadlines for record retention, but it is unclear if these guidelines apply to images generated by the cameras. In general, videotaping is a large concern for both the San Antonio Police Department (PD) and the *TransGuide* staff. There is no indiscriminate videotaping allowed, and *TransGuide* images are not used for law enforcement. TxDOT management has set a policy of not retaining recorded video images in order to reduce the risk of liability suits. *TransGuide* operations will retain videotaped camera images when requested for specific reasons, such as hazardous material spills or special events. These tapes are only used for training and evaluation.

The TxDOT has an unresolved issue concerning the provision of information on incidents. It has not been determined if just incident information (i.e., queue length, lanes blocked) should be provided or if alternate routing information should also be given. A policy may be developed to address this issue.

The San Antonio PD has a policy covering accident and incident report data. The individual requester must know the case number, the name of the person involved, or the location of the accident to get the specific accident report. This policy aids in discouraging attorneys who want to search accident reports and other police department resources for potential clients. The San Antonio PD also has policies that cover the retention of recorded information; usually, records are not retained for longer than 30 days. The San Antonio Fire Department staff are following the Police Department policies specific to the Fire Department but may develop their own to address retention of video images created in the LifeLink component of the *TransGuide* MDI.

Another *TransGuide* policy that is under discussion concerns the level of information that private sector participants must add to information kiosks in order to be granted control or access to the kiosks. Public partners want to make sure the private sector will add value to the *TransGuide*-generated data and not just use the kiosks as advertising venues.

Policies of iTravel Participants

In the New York Metropolitan Area, TRANSCOM staff are developing a regional information policy that will be applied to numerous projects, including the *iTravel* MDI and the I-95 Corridor Coalition's ATIS project. The policy sets out what information is deemed to be "TRANSCOM information" and, therefore, the property of TRANSCOM and included under the rules of this policy. The policy further presents who may have access to the information, the level of compensation required for the information, and how compensation will be established. Briefly, TRANSCOM's policy states that any public or private organization that will use the information for the purpose of generating revenues shall compensate TRANSCOM for this information.

On a broader scale, both the States of New Jersey and New York passed laws (Appendix A.7 and Appendix A.6) that govern the use of photo-monitoring systems that are used to enforce automated toll collection. These laws specify restrictions on the use of images captured by these systems.

Policies of the Gary-Chicago-Milwaukee Corridor Coalition Participants

The partners involved with the Gary-Chicago-Milwaukee Corridor Coalition have also developed a policy (Appendix A.8) on providing access to information from the Internet. The Coalition policy states that all information on the Internet is provided for free, except to any users who plan to reuse the information or financially benefit from the data presented. These individuals or organizations must register with the Illinois DOT's ITS Program Office.

In summary, all of the MDI sites have policies that primarily allow open access to the transportation information generated by the MDI equipment. However, the access and use of data by law enforcement agencies have required a large amount of discussion and policy detail to ensure the privacy of the general public was protected. In Arizona, the decision by ADOT management to make all cameras feeds used for monitoring available to the public has worked well. In addition, agencies might find a written policy on camera use helpful. Furthermore, agencies must resolve if video surveillance tapes will be made, for what purpose, and who may gain access to them.

Address Legal Concerns

Most of the legal concerns encountered by the MDI participants eventually have had to be settled through legal agreements. These issues include liability, intellectual property rights, and task change orders or contract revisions. However, agency policies have been instrumental in determining how these concerns are initially addressed and what language are inserted within the contracts and other agreements.

Liability

Texas State law places the liability for the improper use of equipment on the purchaser of the equipment. This law, along with policies of the participating agencies to avoid liability, has made some agencies hesitant to purchase LifeLink equipment. Because of its functions, however, the San Antonio FD has been open to liability issues and is comfortable accepting responsibility for purchasing and using the LifeLink equipment.

Based on an *AZTech* policy, each *AZTech* MDI partner should be legally responsible for the actions of its employees, including subcontractors. The contract between the Maricopa County DOT and private sector participants includes an indemnification clause and a limitation of liability. The former states that the private sector participant agrees to hold the County, State, and the Federal Highway Administration (FHWA) harmless in all suits arising from wanton, willful, or negligent acts and omissions on the part of the private sector contractor, its agents, or subcontractors. Liability under the contracts between public sector and private sector partners is limited to the amount of the contract and does not extend to indirect or consequential losses incurred by the MCDOT (MCDOT, 1997). In basic terms, the effect of the indemnification clause is to hold the private firms responsible for the actions of their employees and public agencies responsible for the actions of their employees.

Boilerplate indemnification clauses, however, would not cover some of the subcontractors. These firms provide goods and services through informal agreements, and these clauses create only selected coverage of them. This is one factor that led all parties involved with *AZTech* to agree to terms of indemnification. The benefits of addressing liability concerns are to allay the concerns of the public and private sector participants. The cost of addressing liability concerns includes staff time. Even with the time taken to overcome liability concerns, an ADOT official was relieved that "public sector-private sector liability" was less of an issue than was expected.

Table 9.3 Benefits and Costs Associated with Addressing Legal Concerns

ACTION	BENEFITS	COSTS
Develop guidelines on indemnification	• Properly distributes responsibility for inappropriate actions • Clearly defines limitation of claims.	• Staff time to develop policies.
Establish guidelines for the control and modification of traffic signal systems	• Reduces liability concerns. • Ensures that agencies take only appropriate actions when modifying signal timing. • Demonstrates that approved engineering principles have been followed.	• Staff time to develop policies. • Time to develop trusting relationship among staffs of agencies.
Develop guidelines regarding intellectual property rights	• Aids in avoiding lengthy negotiations related to contractual misunderstandings.	• Staff time to develop policies. • Potential loss of participation by qualified firms.

Based on the responses from participants in the *AZTech*, *Smart Trek*, and *TransGuide* MDIs, the real liability concern for the municipalities is with cooperative signal control. Although trusting other agencies to take only appropriate action is an important aspect of achieving inter-jurisdictional signal coordination, it is equally important that there be written agreements specifying who may control another agency's signals, under what circumstances, and within what limitations.

Some public sector partners in the Phoenix Metropolitan Area, however, feel that liability issues in this area have already been resolved through discussions in the Signals Working Group, a regional group created as a result of the Metropolitan Area Governments Information Center (MAGIC) study. The group's participants know each other from MAGIC and have confidence that only appropriate actions will be taken when representatives of one jurisdiction assume control of another jurisdiction's traffic signal system. In securing this confidence, it was important to start early to give participants a chance to get to know one another in a professional capacity. Another manner of overcoming liability concerns is by agreeing that signal plans can be altered (e.g., in the event of a freeway closure) within certain specified thresholds, with each agency maintaining the ultimate control of its own system. Some adjacent municipalities and the

MCDOT are beginning to draft coordination policies and plans to cover multi-jurisdictional corridors and signalized corridors bordering two jurisdictions.

In summary, it should again be noted that while actions may limit liability, no particular approach will eliminate lawsuits. An agency should not be as concerned with being sued as with being able to put forth a credible defense based on the underlying merits of the agency, including following standard formal and written policies and procedures.

Intellectual Property Rights

As a starting point to resolving intellectual property rights (IPR) concerns, administrators from both the *AZTech* and the *Smart Trek* projects relied on a letter from the FHWA Associate Chief Counsel. The letter clarified the Federal Government's policy (Appendix A.1) on proprietary information. As a result of this letter, the public sector partners at both MDI sites modified their policies to conform to the FHWA policy. In Phoenix, the letter was included in all contracts between the two sectors. In both the *Smart Trek* and the *AZTech* projects, the contract managers' use of this letter significantly improved the contract negotiation process and helped to resolve the concerns of both parties.

Following the FHWA's policy, the *AZTech* public officials developed two licensing agreements: one for pre-existing products and privately-funded developments and one for products developed during the course of the MDI using federal funds (Appendix C.2). The license for pre-existing products allows the public sector partners to make limited use of pre-existing products and expressly prohibits the public sector partners from making derivative works or from attempting to derive the source code of the products by reverse engineering, disassembly, or any other means (MCDOT, Exhibit D, 1997). The second license pertains to government-funded developments in the *AZTech* Model Deployment. In this license, the public sector partners receive a "royalty-free, non-exclusive and irrevocable license to reproduce, publish or otherwise use, and to authorize others to use, the government funded software, data and/or documentation...solely for official governmental purposes" (MCDOT, Exhibit C, 1997). In both agreements, the private sector partner retains all ownership rights, including copyrights, to pre-existing products and privately funded developments.

The FHWA IPR policy letter made it easier for WSDOT managers to come to contract terms with the private agencies. The letter applied mainly to the contract with the software vendor, but also helped discussions with the system integrator. WSDOT officials felt that it basically alleviated the fears of the private company management that the government partners would distribute the software developed by these companies for the *Smart Trek* MDI. Costs associated with effecting changes in legal agreements include the time of the person working on the agreements, while the benefits of new agreements can be found in the ability to get the information out to the public.

Staff members of WSDOT's Advanced Technology Branch have noted that concerns regarding the use of *Smart Trek* data have been raised. In an attempt to resolve these issues, project participants are developing a business plan that will include IPR issues and focus where policy, contractual, and other legal decisions must be made. The issues of the WSDOT supplying free traffic information on the Internet and of the use and ownership of data will be discussed in the plan. The current WSDOT policy is that such data are public information and should be available for free. This issue has already been tackled by King County Metro Transit officials through a non-disclosure agreement that covers proprietary information related to Metro Transit's automatic vehicle location system and limits the type of information provided to other parties.

In San Antonio, the parties built on an IPR policy that had already been developed by the TxDOT for *TransGuide* before it became a MDI project. The original contracts for *TransGuide* software contained only one paragraph covering IPR and simply stated that all developed software would be the property of the State of Texas. Because the TxDOT officials did not want to be involved with any protracted negotiations attributed to contractual misunderstandings, they expounded upon the IPR language developed prior to the MDI. As a result, the request for offer for the *TransGuide* MDI contained stronger and more detailed language concerning software ownership. Each proposer had to certify that they had agreed to TxDOT policy pertaining to the ownership of software. In an expansion of the IPR clauses placed in each *TransGuide* contract, the TxDOT, through its recently established Intellectual Property Committee, has drafted a guidelines manual (Appendix A.2) that covers intellectual property and includes sections that give possession of all IPR for software created for the MDI to the TxDOT.

Under an agreement with the original software developer for *TransGuide*, the TxDOT retained the licensed rights to the original software, but the TxDOT will only distribute the software to other government entities. In addition, the TxDOT licenses commercial-off-the-shelf software and equipment and does not assume ownership unless it is modified for TxDOT purposes. In that situation, the TxDOT will assume full ownership and will copyright the modified software. Generally, the TxDOT uses a "work for hire" policy when hiring contract programmers, and TxDOT copyrights the software.

Define Roles and Responsibilities

As advanced technologies are becoming more commonplace, state department of transportation officials are identifying their role in deploying ITS. The ADOT now has an Advanced Technology Committee that is examining advanced technologies and looking at where there are opportunities to deploy these technologies to achieve positive results. Similarly, the Washington State's Transportation Committee has adopted a policy on the use of advanced technologies (Appendix A.3) and a policy to ensure a linkage between telecommunications and transportation, especially including ITS activities (Appendix A.4).

The MDI projects are cooperative and coordinated efforts among multiple public and private entities. The parties have found that some traditional agency roles are overlapping and, therefore, require clear delineation of which agency staff is responsible for what MDI tasks. New policies must be accompanied by the addition or modification of authority granted to each partner. Each MDI area had already established cooperative working relationships before the MDIs were initiated. However, the MDIs necessitated the expansion of these relationships. In these expanded relationships, the roles and some responsibilities for the public and private partners were documented during the proposal writing phase. Responsibilities have been further laid out in subsequent partner contracts, memoranda of understanding, and intergovernmental agreements.

Table 9.4 Benefits and Costs Associated with Defining Roles and Responsibilities

ACTION	BENEFITS	COSTS
Ascertain roles and responsibilities	• Clarifies what each agency will do. • Informs each staff member of their particular duties. • Avoids overlapping of roles. • Utilizes expertise from multiple agencies.	• Staff time to develop policies. • Staff time to adjust to new roles. • Loss of staff loaned to the project. • Time to address union concerns.

Administrative Responsibilities

Roles and responsibilities are needed not only to clarify what each agency will do, but to inform each individual staff member of their duties and to advise them as to the proper way to perform their designated tasks. Detailed staffing procedures have proven to be invaluable to the *TransGuide* operations staff.

San Antonio PD management developed procedures that assigned specific responsibilities to the police dispatcher at *TransGuide* and prescribed how that dispatcher interacted with the Department's central dispatch center. It took four or five months to adjust to the newly decentralized dispatch position, but this adjustment period could have been longer without the procedures guidance. The creation of an alternate dispatch center at *TransGuide* will also necessitate new policies and procedures relating to the transfer of functions from the central dispatch center to the new, alternate center. One area that these procedures must address is gaining access to the *TransGuide* facility during off-peak hours.

Administrators from one transit agency are attempting to develop policies and procedures that can respond to the participation of private sector partners as part of the agency's involvement in the MDI. By adopting new procedures to avoid the extensive request-for-proposal process, this transit agency has found it easier to contract with companies providing highly specialized products and services. An agency representative remarked that both time spent and costs involved to acquire these components have been reduced by modifying their procurement procedures. The new operating procedures, however, have raised concerns from the agency's labor unions regarding contracting-out of maintenance activities on the display units and the issue of transit information being provided by resources other than union staff.

Operational Responsibilities

The *Smart Trek* partners noted that they will likely be developing additional policies and procedures after more agencies are connected to the advanced traffic management system. The new policies will include which agency can control the cameras, as well as procedural information. All areas are developing policies that include the level of involvement that law enforcement should have in dealing with the daily MDI operations.

One area in which law enforcement will play a primary role is with incident and emergency management. In Phoenix, with the introduction of the Nikon Total Station to the Arizona Department of Public Safety, the law enforcement officials expect that they will have to revise their policies and procedures regarding the duties of staff at accident scenes and in accident investigations in order to give more responsibility to officers trained on ITS equipment. Traditionally, the first officer on-scene at an accident began an investigation using traditional roller-tape methods. Generally, local fire officials then took the lead responsibility when they arrived at the scene. With the new procedures, certain Public Safety officers are being trained on the new equipment and will be called to accidents to investigate, reducing the investigatory role of the first officer and requiring an even greater coordination with the lead agency at the site. Incident management guidelines have also been produced for Miami-Dade County, Florida (Appendix B.8), and Bergen County, New Jersey (Appendix B.9).

With the advent of the LifeLink project in San Antonio, the incident, motor vehicle accident, and hazardous material procedures for the City of San Antonio will be more formalized to ensure that the greatest value is attained from the equipment. The procedural changes will reflect the increased authority of those personnel that are trained on the LifeLink equipment. Specific responsibilities must be defined to eliminate any potential misdiagnosis or improper treatment resulting from insufficient or misinterpreted information. Cooperatively developed procedures present one way of counteracting these concerns.

The MDI participants must also agree on the roles and responsibilities of agencies involved with cooperative signal control systems. Cooperative signal control may include one jurisdiction having the ability to operate another jurisdiction's traffic signals and to modify the signal timing. Although it is mutually agreed that cities need to work together, how this will be accomplished and to what extent control of signals will be shared must be determined. There is always the question of coordination versus control: how much control is passed to another jurisdiction when coordination is desired? Although trusting other agencies to take only appropriate action is an important aspect of achieving inter-jurisdictional signal coordination, it is equally important that there be written agreements specifying who may control another agency's signals, under what circumstances, and within what limitations.

Cooperative control agreements, including control transfer procedures are being written by the *AZTech* partners. The San Antonio Public Works Department staff are also working with the *TransGuide* center and TxDOT staff to determine the proper procedures to change the signal timing during the "off-peak" hours when the San Antonio's traffic signal operations staff are not present at the *TransGuide* operations center. A Public Works representative said that their policy to ensure due diligence in the pre-engineering phase and during signal timing plan design has been beneficial in alleviating some of the concerns raised over the operation of traffic signals. A municipal representative at *Smart Trek* stated that a rationale for clearly spelling out the roles of all participating *Smart Trek* agencies is to lay out who specifically had signal control and to ensure that in the event that route deviation onto the local streets occurred, proper procedures are followed and the neighborhoods are protected from excessive traffic.

Conclusion

MDI administrators are now utilizing a wide variety of policies. Many of these policies were initially conceived prior to the MDI program when the first ITS equipment was being deployed and during the early operations period. The MDIs moved participants to the next step in deployment, produced more points for integration, and created the need for new policies and informal policies to become written and formalized. The cited examples may not work for all areas, and policies do not have to be the same as what has been described. However, because they achieve greater efficiency, cooperation, consistency, and legal protection, written policies have proven to be more beneficial than costly.

Table 9.5 on this and the next two pages lists questions that should be addressed when developing written policies.

Table 9.5 Questions to Consider when Developing Written Policies

QUESTION	RESPONSE
ADDRESS EQUIPMENT ISSUES	
• Should written policies be developed to address equipment issues?	
◊ use of changeable message signs?	
◊ use of closed circuit television cameras?	
◊ ownership equipment?	
◊ replacement of equipment?	
◊ provision of kiosks?	
◊ location of kiosks?	
◊ distribution of equipment, such as AVI tags?	
• Have policies used to address equipment issues in ITS projects in other areas been considered?	
• Has the National ITS Architecture been employed during the design and implementation of the equipment?	
• Are there any other actions that need to be taken to ensure that equipment issues have been addressed?	

Table 9.5 Questions to Consider when Developing Written Policies (continued)

QUESTION	RESPONSE
DELIMIT THE USE AND DISTRIBUTION OF DATA	
• Should written policies be developed to address data issues?	
◊ ownership of data generated by the ITS project?	
◊ sharing of data among participants in the ITS project?	
◊ release of data to non-participants?	
◊ protection of confidential information?	
◊ use of video images?	
◊ retention of video recordings?	
◊ provision of information and advertising on kiosks?	
• Have policies used to address data issues in ITS projects in other areas been considered?	
• Are there other actions that need to be taken to ensure that the use and distribution of data are delimited?	
ADDRESS LEGAL CONCERNS	
• Should written policies be developed to address legal concerns?	
◊ liability?	
◊ indemnification?	
◊ intellectual property rights?	
◊ transfer of traffic signal system control?	
• Have policies used to address legal concerns in ITS projects in other areas been considered?	
• Are there other actions that need to be taken to ensure that legal concerns have been addressed?	

Table 9.5 Questions to Consider when Developing Written Policies (continued)

QUESTION	RESPONSE
DEFINE ROLES AND RESPONSIBILITIES	
• Have the roles and responsibilities of the participants in the ITS project been defined clearly?	
◊ administrative?	
◊ operational?	
• Should these roles and responsibilities be put in writing?	
◊ policy statement?	
◊ contracts?	
◊ partnering agreements?	
◊ inter-agency agreements?	
◊ memoranda of understanding?	
• Are there other actions that need to be taken to ensure that the roles and responsibilities of the ITS project participants are defined?	

References:

Contract between Maricopa County Department of Transportation and private sector firms, 1997.

"Exhibit C, End-User License Agreement for Government Funded Developments," contract between Maricopa County Department of Transportation and private sector firms, 1997.

"Exhibit D, End-User License Agreement for Pre-existing Products and Privately Funded Developments," contract between Maricopa County Department of Transportation and private sector firms, 1997.

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Joint Architecture Team (JAT), *ITS Architecture: Standards Development Plan*, prepared for the Federal Highway Administration, June 1996. (EDL number: 5404.)

Volpe National Transportation Systems Center, *Intelligent Transportation Systems, Institutional and Legal Issues Program, Analysis of ITS Operational Tests, Findings and Recommendations*, FHWA-JPO-95-009, DOT-VNTSC-FHWA-95-5, NTIS number: PB 96-139522, prepared for the U.S. DOT ITS Joint Program Office, Cambridge, Massachusetts, September 1995. (EDL number: 700.)

Resources:

L.S. Gallegos & Associates, Inc., *Innovative Procurement Practices for ITS*, prepared for Federal Highway Administration, Washington, D.C., April 1997. (EDL number: 1868.)

U.S. Department of Transportation, *ITS Procurement Resource Guide*, Washington, D.C., October 1997.

Washington State Transportation Center (TRAC), *Choosing the Route to Traveler Information Systems Deployment, Decision Factors for Creating Public/Private Business Plans,* prepared for ITS America and the U.S. Department of Transportation, Washington, D.C., 1998. (EDL number: 5326.)

Note:
EDL stands for the Electronic Data Library that is located at the U.S. DOT ITS Web site at www.its.dot.gov.

ACRONYMS AND ABBREVIATIONS

Acronyms and Abbreviations

ADOT	Arizona Department of Transportation
ATIS	advanced traveler information systems
ATMS	advanced traffic management systems
AVI	automatic vehicle identification
AVL	automatic vehicle location
DOT	department of transportation
FD	fire department
FHWA	U.S. Department of Transportation Federal Highway Administration
GIS	geographical information systems
IGA	intergovernmental agreement
IPR	intellectual property rights
ITS	intelligent transportation systems
IVHS	intelligent vehicle highway systems
JPO	U.S. Department of Transportation ITS Joint Program Office
MAG	Maricopa Association of Governments
MAGIC	Metropolitan Area Governments Information Center
MCDOT	Maricopa County Department of Transportation
MDI	Model Deployment Initiative
Metro Transit	King County, Washington, Department of Transportation Transit Division
MnDOT	Minnesota Department of Transportation
MPO	metropolitan planning organization
NSATMS	North Seattle Advanced Traffic Management System
NY/NJ/CT	New York-New Jersey-Connecticut
NYSDOT	New York State Department of Transportation
PD	Police Department
PSRC	Puget Sound Regional Council
PuSHMe	Puget Sound Help Me
RPTA	Regional Public Transportation Authority

SWIFT	Seattle Wide-area Information For Travelers
Tech & Ops	Technology and Operations
TRAC	Washington State Transportation Center
TRANSCOM	Transportation Operations Coordinating Committee
TRANSMIT	TRANSCOM System for Managing Incidents and Traffic
TxDOT	Texas Department of Transportation
U.S. DOT	United States Department of Transportation
VIA	VIA Metropolitan Transit Authority
Volpe Center	U.S. Department of Transportation Volpe National Transportation Systems Center
WSDOT	Washington State Department of Transportation
WSF	Washington State Ferries

APPENDICES

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F. TRAINING

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APPENDIX A
LEGISLATION AND POLICIES

A.1. Federal Highway Administration Policy on Intellectual Property Rights

A.2. Texas Department of Transportation Intellectual Property Rights Policy

A.3. Washington State Department of Transportation Policy on Advanced Technologies

A.4. Washington State Department of Transportation Transportation and Communication Plan

A.5. New Jersey Legislation on Public-Private Partnering

A.6. New York State Law on Toll Collection Violations

A.7. New Jersey Law on Video Images and Toll Collection Violations

A.8. Gary-Chicago-Milwaukee Traffic Information Access via the Internet Policy

Appendix A.1

Federal Highway Administration Policy on Intellectual Property Rights

FHWA's Rights in Copyrightable Material Developed with Federal Assistance

The Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments, codified at 49 C.F.R. Part 18 and often referred to as the Common Rule, provides regulations and guidelines for Federal agencies to follow when awarding grants and cooperative agreements to state and local governments. The Common Rule at 49 C.F.R. § 18.34 provides standard language detailing the Government's right in copyrightable works developed with Federal assistance. This language, included in the FHWA's ITS MDI Partnership Agreements with the states, provides the Government with "a royalty-free, nonexclusive and irrevocable license to reproduce, publish, or otherwise use and to authorize others to use for Federal Government purposes" copyrightable work produced with Federal funds.

The FHWA does not interpret its rights in copyright to include the authority to distribute software or other copyrightable products outside of the Agency. With regard to the ITS program, the Intermodal Surface Transportation Efficiency Act (ISTEA) mandates that one of the goals of the program is to "promote an intelligent transportation system industry." (Pub. L. No. 102-240, 105 Stat. 1914.) The FHWA's use of its license in any copyrightable work outside of its immediate needs would diminish the market for industry and would be contradictory to the broad mandate provided in the ISTEA.

FHWA's Right in Inventions Developed with Federal Assistance

The Government's policy governing rights to inventions created in the course of a Federal funding agreement (including an ITS MDI Partnership Agreement) is set forth in 37 CFR Part 401. The standard patent rights clause of this provision at § 401.14(b) provides contractors with title to patents made with Federal assistance in exchange for royalty-free use by the Federal Government. The standard patent rights clause also requires recipients for Federal assistance (in this case, the Maricopa County Department of Transportation) to include this provision in all contracts, subcontracts and subgrants for experimental, developmental or research work.

The FHWA construes the scope of its license to include (1) use for research and development and supports services performed under an FHWA procurement contract and (2) use of the subject invention on a federally-owned road (e.g., national forest, parks, and Indian reservations).

The FHWA does not construe the scope of its license to include sublicensing the technology to a state or local government, bridge, tunnel or turnpike authority, or private entity for uses unrelated to the two described above.

Conclusion

The FHWA's objectives in this project are to test, evaluate and demonstrate ITS deployment in a metropolitan area featuring fully integrated transportation management systems and strong regional traveler information services provided by a vigorous public-private partnership. The reason behind the FHWA retaining rights in copyright and inventions made with Federal assistance is to ensure that the Agency's minimum needs are adequately met, leaving contractors with the rights to generate private sector investment and develop commercial applications in the copyrightable work or patentable invention.

Appendix A.2

Texas Department of Transportation Intellectual Property Rights Policy

To: Holders of the Legal Manual

Effective Date: December 22, 1997

Functional Manual: Legal Manual

Purpose: To provide department standards regarding TxDOT Ownership of Intellectual Property in an electronic form that will be accessible to all employees on a TxDOT wide-area-network.

Contents : This Manual Notice Incorporates:
- ¨ Transportation Code §201.205
- ¨ Government Code §2054.115

Instructions: This manual will be distributed online only.
Manual distributors may print and distribute a hardcopy from the online version for employees not on the TxDOT wide-area-network or those preferring to retain a hardcopy. In this case, manual distributors must retain a distribution list and must also print and distribute all revisions.

Contact: Address questions concerning information contained in this Manual Notice to Jennifer Soldano (512/463-8630). If you have questions regarding the use of these provisions, for modifications, or you would like your document reviewed, please contact IPG at (512) 416-2055 or OGC at (512) 463-8630**.**

Chapter 1. TxDOT Ownership of Intellectual Property

Section 1. Introduction

Abbreviations Used:
District/Division/Special Office (d/d/so)
Public Information Act (PIA)
Texas Administrative Code (TAC)

Definition

Intellectual property - Copyrights, patents, trademarks and related interests.
TxDOT intellectual property consists of works such as data bases, software, inventions, publications, audiovisual works, architectural works, sound recordings, maps, systems design, or other proprietary information in any tangible form or medium. Property ownership may be claimed through a copyright, trademark, or patent.

Need and Authority to Protect Ownership

Until 1995, TxDOT did not have the statutory authority to protect its intellectual property. As a result, TxDOT saw an increasing number of disputes over ownership of intellectual property developed by third parties. In some cases, TxDOT lost ownership and subsequent rights to unrestricted use of the property. In other cases, TxDOT retained the right to use the property but the third party sold the property to others for commercial gain. In some instances, TxDOT property was used in commercial enterprise with no compensation or recognition of TxDOT ownership.

The frequency and intensity of these disputes continued to increase until the 74th Legislature adopted Article 6673a-4, Use of Intellectual Property. This has been codified as Transportation Code, §201.205. This law specifically authorizes TxDOT to apply for, register, secure, hold, and protect patents, copyrights, trademarks, or other evidence of protection or exclusivity. The authority to protect ownership of intellectual property includes literary works; logos; slogans; studies; maps and planning documents; engineering, architectural, and graphic designs; manuals; automated systems software; audiovisual works; sound records; and travel literature. In addition, Government Code, §2054.115 mandates that a state agency obtain appropriate compensation under a contract which finances the development of software.

Organization

The Intellectual Property Group within the General Services Decision will administer the day-to-day operations concerning intellectual property. Its duties and responsibilities are discussed in Section 6, "TxDOT Intellectual Property Group." Decisions regarding what types of intellectual property to protect will be made by the Intellectual Property Committee as discussed in Section 7, "Intellectual Property Committee."

Public Domain

If TxDOT fails to claim and/or protect its property rights, the work may be considered to be abandoned and therefore within the public domain. A copyright may be considered to be abandoned if the copyright notice is not affixed to the document. If the work is already in the public domain, then any member of the public may utilize it, and the department cannot assert property rights. However, a work may be protected by copyright if the author, through skill or effort, contributes to a substantial, distinguishable variation from the older work.

The Public Information Act

Since intellectual property is an exception to Government Code, Chapter 552, the Public Information Act, a person may not procure a copy unless the person purchases a copy or obtains a license. Section 552.110 of that Act provides:
"a trade secret or commercial or financial information obtained from a person and privileged or confidential by statute or judicial decision is excepted . . ."

A person may view protected intellectual property. If a copy is requested and the requestor refuses to purchase a copy or procure a license from TxDOT, then the request must be sent through OGC for processing with the Opinion Division of the Office of the Attorney General to assert the exception unless the department wishes to release.

Types of Ownership Protection

There are three types of ownership protection that the department may obtain:

- copyright,

- trademark, and
- patent.

Ownership of these rights gives the department the exclusive use of the property and derivative works, including the rights to:

- sell,
- distribute,
- license, and
- modify.

This does not mean that someone may not view the property. It means that TxDOT may control access, and terms and conditions, and charge a royalty and/or fee. Although state copyright exists, intellectual property is governed almost exclusively by federal law.

Copyright

A common law copyright exists the moment that an original work, such as literature, music, drama, graphic, sculpture, or audiovisual, is created. A copyright notice "©" is affixed to a document or encoded in software to give notice to the world that TxDOT owns the copyright. A registered copyright is a copyright that has been registered with the U.S. Copyright Office (a registration fee of $20 must be paid). The registration of a copyright allows the copyright owner to bring an action for infringement under the federal Copyright Act. The burden of proof is easier if the copyright has been registered because the registration certificate is presumed to show ownership. Registration also entitles the copyright owner to collect statutory damages if the statutory damages are greater than the actual damages. In addition, the violation of a registered copyright carries a criminal penalty. A copyright in the name of TxDOT will last for 75 years.

Trademark

A trademark is a word, phrase, symbol or design which identifies and distinguishes the source of goods of one party from another. An example is the TxDOT logo.
Service mark -A service mark identifies and distinguishes the source of services of one party from another. An example would be the logo of a consultant.

The right to a mark exists at common law. There is no property right in a mark except as connected to a good or service. Rights in a mark generally arises automatically upon first commercial use. A mark is registered with the U.S. Patent and Trademark Office for use in specific categories of goods, such as clothing, textiles, or hand tools. Registration can secure benefits beyond the rights acquired by merely using a mark. The owner of a federal registration is presumed to be the owner of the mark for goods and services specified in the registration, and to be entitled to use the mark nationwide. The term for a mark is ten years with ten years renewals allowed indefinitely. Between the fifth and sixth year after initial registration, TxDOT must file an affidavit setting forth certain information. The designations "TM" and "SM" can be used if the trademark or service mark is not registered. The registration symbol "®" can be used only after the mark has been registered.

Patent
A patent is an original invention. Patents are registered with the U.S. Patent and Trademark Office. There is no "common law patent." A patent can cost thousands of dollars and is more difficult to obtain than a copyright or trademark. A patent has a life of 17 years with a possible extension of five years under certain circumstances. Examples of the establishment of intellectual property ownership are as follows:

Establishment of Intellectual Property Ownership
Type of Property
Examples
Protection
Works of Authorship
Computer programs
Publications
Maps
Sculptural Works
Copyright and/or Registered Copyright
Inventions
Chemical de-icer
Patent
Marks
TxDOT Logo
TransGuide Logo
Registered Trademark

Section 2. Ownership Criteria

General
A Work developed by an employee is a "work-made-for-hire" as that term is understood under the copyright law of the United States, 17. U.S.C. §101 et seq. as long as the Work is:

- related to the employee's employment responsibility or to a TxDOT goal, project, or concern;
- a result of activities performed on department time;
- developed with support by state funds; or
- developed from using department facilities.

All copyright and other property interest in the Work shall vest at the time of its creation in the department and the employee shall have no copyright or other property interest in any Work produced.

Intellectual property is the exclusive property of the employee if it is not:

- related to the employee's employment responsibility or to a TxDOT goal, project, or concern;
- a result of activities performed on department time;
- developed with support by state funds; and
- developed from using department facilities.

TxDOT will establish and retain ownership of intellectual property in any of the following instances, whether developed by a TxDOT employee or third party as "work-made-for-hire" (for procurement process, see Equipment and Procurement Manual):

- the property may be of significant commercial value;
- TxDOT desires to retain the ability to control distribution;
- use of the property by third parties will necessitate monitoring; or
- TxDOT desires to protect the contents or the integrity of the data.

TxDOT may transfer ownership of intellectual property or enter into an appropriate agreement concerning intellectual property, whether developed by a TxDOT employee or third party as work-made-for-hire, when it does not have the ability or resources to handle property rights and/or distribution or for other reasons. For example, if a TxDOT employee invents a chemical de-icer or revolutionizes the distribution of herbicide from mobile sources, TxDOT may contract with a third party for its development and marketing.

TxDOT may use the property even if it chooses not to assert ownership.

Systems developed under research agreements with universities allow the research institute to claim patent and copyright ownership, although the university and TxDOT jointly own the information. TxDOT has an irrevocable license to use the Work. Research contracts will continue to be coordinated through RTT and do not fall under the subject of this manual.

Section 3. Trademark/Service Mark and Patent Requirements

General

Questions concerning patents and trademarks/service marks must be referred to the TxDOT Intellectual Property Group (Section 6) for approval of the Intellectual Property Committee (Section 7). If the Intellectual Property Committee approves a patent or trademark/service mark, the registration will be coordinated with OGC who may outsource the registration to a law firm through the Office of the Attorney General.

Section 4. Copyright Requirements

General

Since the bulk of TxDOT intellectual property involves works of authorship, and ownership protection is limited to copyrights, the remainder of this policy addresses copyright requirements. The district/division/special office (d/d/so) is responsible for initiating the process. (See Section 5, Responsibilities.)

The Types of Property to be Copyrighted or Registered table describes types of property to be copyrighted and/or registered. These Works are subject to exceptions and protection may be decided on a case-by-case basis. The protection of works not listed on the chart will also be decided on a case-by-case basis. (See Section 6, TxDOT Intellectual Property Group.) Items will be coordinated by IPG with the appropriate d/d/so.

In general the department will provide a notice of copyright and register the copyright with the Copyright Office if the work is of a permanent nature, there is a probability that it will be misused, or there is a commercial use. Works will be copyrighted, but not registered if they are revised often, there is little probability that they will be misused, or they are of limited commercial value.

Types of Property to be Copyrighted or Registered:

Intellectual Property
TxDOT will NOT Copyright
Intellectual Property
TxDOT will Provide Notice of Copyright
Intellectual Property
TxDOT will Provide Notice of Copyright and Register*
Personnel Files
Travel Literature (Except Books)
Texas State Travel Guide
Routine Reports and Summaries (contacts with media; legislative contacts)
Texas Highways Magazine
Standard Specifications for Construction of Highways, Streets and Bridges
Memoranda
Published Maps
Book Publications
Correspondence
Selected Photographs
Coloring Books
Annual Reports (Traffic Safety, PTN, HR)
Curricula for Training Courses Accredited by HRD
Unique Architectural Design (to be determined by IP Committee)
Personnel Reports
Training Manuals
Unique Building, Highway, Bridge Design (to be determined by IP Committee)
Strategic Plan
Handbooks, Guidelines
ITS software and significant modifications**
Safety Reports
Functional d/d/so Manuals (HR, AUD, Contract Management)
Highway Sign Software
Project Status Reports/Advisories
Research Reports
Traffic Control Signs Software
Financial/Statistical Reports
Bulletins and Pamphlets (BOP's "How to do Business with TxDOT"; Employee Handbook of Safe Practices)
Continuous Beam Analysis Software
Routine architectural designs, for buildings, highways, and bridges

Prestressed Concrete Girder Design and Analysis Software
Feasibility Studies
Culvert Design for Windows Software
Route Studies
Storm Drain for Windows Software
Videos and Sound Recordings (Training, Public Relations, TRV, Seminars)
Construction and Maintenance Contract System (CMCS)
Consultant Studies
Mailing Lists
Environmental Studies
Retooling Reports
Transportation News
Workgroup or Enterprise-wide Software

* Copyright registration of software will include the design, code, and final documentation.

** A significant modification is a change which alters the character of the software to such a degree that it becomes another program.

Figure 1-1. Intellectual Property Chart: A step-by-step guide to the process.

Section 5. Responsibilities

General

Districts/divisions/special offices will do the following:

1. Using the Types of Property to be Copyrighted or Registered table and the Intellectual Property Chart: a step-by-step guide to the process, inventory intellectual property in the d/d/so. For more information see Section 4, "Copyright Requirements."

- If the property is not to be copyrighted, and there is no question about further protection, take no further action.
- If there is some question about the need to do so, contact the TxDOT Intellectual Property Group for further direction.
- If the property is to be copyrighted, complete Notice of Copyright, Form 1971, for each property and send the notice and a copy of the document's title page to the TxDOT Intellectual Property Group. For software include copies of any documentation which displays the copyright symbol. The Intellectual Property Group will then coordinate with the d/d/so and ISD to append the copyright symbol to the document or software.
- If the copyright is to be registered, complete Notice of Copyright, Form 1972, for each property and send the notice and three copies of the property to the TxDOT Intellectual Property Group. For software include copies of any documentation which displays the copyright symbol and the first 25 pages of the program.
- If there is any question about any intellectual property, contact the Intellectual Property Group.
- All requests must be signed by the division director or district engineer.

2. Protected material can be placed on the TxDOT web site. D/D/SO or the Standing Committee on Internet Business Strategies (SCIBS) may initiate a request for placement of intellectual property on the department's Internet web site. The Intellectual Property Group will notify ISD to coordinate the style and content of information that will appear on the department's Internet Web page. ISD will add the copyright symbol and warning to TxDOT property on the Internet (Notice of Trademark, Service Mark, or Patent, Form 1972.)

3. The Human Resources Division will add a "work-made-for-hire" provision in the HR manual; Currently work-made-for-hire subheading in Appendix C of this manual.

4. As new intellectual property is developed, add the copyright symbol to the property using appropriate technology. For example, in Word 7.0,

- Click on the "Insert" command
- Choose "Symbol"
- Under "Symbol" choose "Special Characters"
- Choose © and insert; or
- Alt + Ctrl + C
- When the property is copyrighted but not registered, the correct copyright notation is:
  ©1998 by Texas Department of Transportation;
  (512) 416-2055.; all rights reserved.
- When the property is copyrighted and registered, the correct copyright notation is:
  ©1998 by Texas Department of Transportation. All rights reserved.
  Any sale or further use is strictly prohibited
  without written permission of the Texas Department of Transportation.
  This material may not be reproduced or transmitted in any form by any means, electronic or mechanical, including photocopying, recording, or by any information and retrieval systems without the written consent of the
  Texas Department of Transportation
  125 East 11th Street, Austin, TX 78701, (512) 416-2055.

5. Existing intellectual property may be copyrighted. Add the copyright symbol to the property using appropriate technology. The date of the copyright is the first year of publication.

6. When a TxDOT procurement involves intellectual property, either primarily or incidentally, the language included in Appendix A, Intellectual Property Requirements, must be included in the procurement document.

7. When a TxDOT contract involves intellectual property, either primarily or incidentally, the language included in Appendix B, Intellectual Property Provision, must be included in the contract.

8. When the intellectual property Work is delivered or fixed in final form, the d/d/so completes either the Notice of Copyright or the Notice of Trademark, Service Mark, or Patent, Form 1972, and sends the required information to the TxDOT Intellectual Property Group.

9. When a d/d/so receives a request by a third party to use unregistered copyright property, the d/d/so may refer the requestor to the Intellectual Property Group or the d/d/so may authorize further use of the property using Form 1973. The authorization for further use must be made in writing, and a copy furnished to the Intellectual Property Group.

10. When a d/d/so receives a request by a third party to use registered copyrighted property, the d/d/so must ask the requestor to fill out Form 1974, "Request for One-Time License for Material" or Form 1975, "Request for License for a Period of Time," and refer the requestor to the Intellectual Property Group. The Intellectual Property Group will prepare and negotiate proper license agreements and other use agreements as appropriate, using copyright and trademark license agreements as the basis for negotiation.

11. If a d/d/so becomes aware of unauthorized use of protected property, it must contact the Intellectual Property Group for assistance as soon as the use is detected.

Section 6. TxDOT Intellectual Property Group

General
There will be established in the General Service Division (GSD) of TxDOT an office to provide the following copyright services:

- Maintain rules in TAC relating to intellectual property protection.
- Maintain database of all TxDOT owned intellectual property.
- Apply for copyrights and trademarks.
- Coordinate requests for licenses with appropriate offices.
- Develop and maintain a written policy/procedure manual.
- Negotiate terms of licenses and coordinate execution.
- Coordinate with appropriate offices to determine the monetary value of the property.
- Coordinate requests to use protected property.
- Monitor licensing agreements.
- Collect/direct payments.
- Coordinate copyright renewals.
- Maintain records, indices, and custody of all original registrations.
- Generate annual and periodic reports itemizing copyright and trademarked material and receipts.
- Serve as liaison with the Intellectual Property Committee.
- Provide technical assistance to d/d/so.
- Track and coordinate intellectual property renewals.

Section 7. Intellectual Property Committee

General

The Executive Director appointed an Intellectual Property Committee to evaluate and make recommendations to the Executive Director or his designee concerning items to be protected, monetary value of property, waiver of fees, and issues relating to ownership of intellectual property. Members include the division directors (no designees) from the following:
ISD, GSD, RTT, DES, TRF, TRV, CST, OGC

If the IPG disapproves a request for a work to be copyrighted, trademarked, or patented, the requestor may appeal the disapproval to the IPC by submitting a written request for appeal. The IPC's decision will be final.

Section 8. Guidelines for Determining Use Fees

General

The Intellectual Property Committee will develop rules to be adopted by the Commission for licensing fees or other charges for the use of TxDOT property considering the following:

- commercial rates for comparable property
- original development cost
- charge to furnish comparable information under the PIA
- intended use of the property
- the requestor (i.e., governmental entity, nonprofit organization, commercial)
- the primary beneficiary (i.e., governmental entity, nonprofit organization, commercial)

The Committee may recommend that the executive director or his or her designee waive or reduce the amount of fees, royalties, or other monetary or non-monetary value to be assessed if the Committee determines that such waiver will further the goals and missions of the department and result in a net benefit to the state. The Committee will consider whether any of the following apply:

- Payment amount or royalty is expected to be insignificant.
- The requestor is a local, state, or federal governmental entity.
- TxDOT desires to maximize distribution/use of the property because of the benefits to the public and itself.
- TxDOT is the primary beneficiary.
- There will be no commercial benefit (monetary or publicity) to the requestor, and TxDOT does not expect any possible benefit.

Appendix A. Intellectual Property Requirements

General

This appendix includes language that should be used in TxDOT procurement for software whether the procurement is department ownership of software or joint ownership of software. Department Ownership of Software. Department ownership of software includes language for:

- vendors , including consultants, catalog procurement, and when procuring software
- changeable message signs vendors
- professional providers

Vendor
RFO Work-made-for-hire Intellectual Property Contract Language for use with vendor (to be used for consultants, including catalog procurement, when procuring software) is as follows:

Software Delivery and Intellectual Property Rights.

a. Delivery.

The Vendor shall deliver:

i. all Custom and Reuse Software, described in paragraph "g," as machine readable source files, and linkable or executable modules, and printed source listings, in addition to installed and operating copies of the programs (baseline software or hardware configuration shall not be created such that only Vendor could change);

ii. tools required for the modification and compilation of the Custom and Reuse Software programs;

iii. source codes for all Custom and Reuse Software programs developed under this contract with all needed support resources needed to edit, compile and link these programs on the central processors, including, but not be limited to, Computer Aided Software Engineering (CASE) tools, compilers, editors, and function libraries used in the development of the programs; and

iv. all documentation concerning protocol for Reuse and Custom Software, source code, commented listings, descriptions of software structure, database utilization, and instructions necessary to convert the source code into an operational system.

b. Software.

i. The Vendor shall not create Software that only Vendor could modify.

ii. The Vendor shall not utilize Reuse Software that is not in the public domain.

c. License.

i. The Vendor may not place any legend on the Custom or Reuse Software which restricts the department's rights in such software unless the restrictions are set forth in a license agreement that has been approved and executed by the department.

ii. The Vendor shall not use any of the Custom Software developed for this contract without a license from the department.

d. Ownership.

i. The Vendor shall transfer to the department or purchase for the department all license to COTS Software, described in paragraph "g," acquired in conjunction with this project, including all original media, documentation, warranties, licenses, and applications software and developmental software used in developing custom applications.

ii. The department shall own the entire rights (including copyrights, copyright applications, copyright renewals, and copyright extensions), title and interests in and to the Custom Software development documentation, software, and any other intellectual properties created for Custom Software and versions thereof, and all works based upon, derived from, or incorporating works thereof, and in and to all income, royalties, damages, claims, and payments now or hereafter due or payable with respect thereto, and in and to all causes of action, either in law or in equity for past, present, or future infringement based on the Custom Software and copyrights arising therefrom, and in and to all rights corresponding to the Custom Software and versions thereof throughout the world.

e. Work-made-for-hire.

i. This is a "work-made-for-hire" as that term is understood under the copyright law of the United States, Title 17, U.S.C. §§101 et seq. so that all copyright and other property interest in the Custom Software shall vest at the time of their creation in the department and the Vendor shall have no copyright or other property interest in any Custom Software produced under this contract.

ii. All future works relating or pertaining to said Custom Software and versions thereof shall be regarded as works-made-for-hire within the meaning of the copyright laws of the United States and that if, for any reason, said future works relating or pertaining to said Custom Software shall be held not to be a work-made-for-hire within the meaning of the copyright laws of the United States, Vendor does hereby sell, assign, and transfer to the department, its successors and assigns, all of Vendors rights, title and interests in and to said future Custom Software versions thereof, relating or pertaining to the Custom Software.

f. Non-disclosure.

Any department owned, developed, or licensed software will be returned to the department before the end of the contract. Vendor acknowledges that the source code, program, and related documentation constitute valuable trade secrets for the department. Vendors shall not disclose, publish, or disseminate them to any third party who is not bound by a written confidentiality agreement expressly covering the department's intellectual property and related documentation.

g. Description of Software.

Software to be developed and/or designed shall include, but not necessarily be limited to, the Central Processors, the Operator and Projector Workstation, the hardware platforms, and the System Control Units located throughout the System. The Software Implementation activities include the following:

i. Re-use Software: Operational software in the public domain that Vendor shall select, recommend, and/or transfer from corporate inventories which appropriately satisfy required System Functionality. Inclusion of Reuse Software is subject to the department's approval. Vendor shall bench mark test each Reuse Software item to assure its performance of required functionality.

ii. Commercial Off-The-Shelf Software Acquisition (COTS): COTS Software that is required to provide necessary System functionality. Vendor shall submit to the department sufficient information and documentation on the software items to determine if the proposed items meet the required System functionality. Submittals shall include, but not be limited to, shop drawings, cut sheets, manufacturer's literature, independent lab documentation, etc. Items shall be approved, in writing, by the department prior to the purchase of the item. Vendor shall accept delivery of, facility install, and Acceptance Test all COTS Software to assure its performance of required functionality.

iii. Custom Software: Any required software functionality, test tools, interface stubs and drivers, and configuration build procedures including all documentation, manuals, and protocols which are not covered by COTS or Reuse Software products that Vendor shall code or unit test. This Custom Software shall be developed in accordance with the modular detailed design approved at the Critical Design Review, and shall not infringe on another's copyright or other rights.

Changeable Message Signs Vendor (Definitions at end)

RFO Work-made-for-hire Intellectual Property Contract Language for use with Changeable Message Signs Vendor is as follows:

Software Delivery and Intellectual Property Rights.

a. Delivery.
The Vendor shall deliver:

i. all Vendor Master and Sign Controller Software, described in paragraph "g," as machine readable source files, and linkable or executable modules, and printed source listings, in addition to installed and operating copies of the programs (baseline software or hardware configuration shall not be created such that only Vendor could change);

ii. tools required for the modification and compilation of the Vendor Master and Sign Controller Software programs;

iii. source codes for all Vendor Master and Sign Controller Software programs;

iv. all support resources needed to edit, compile and link these Vendor Master and Sign Controller Software programs on the central processors, including, but not be limited to, Computer Aided Software Engineering (CASE) tools, compilers, editors, and function libraries used in the development of the programs (Vendor is not required to provide COTS Software, described in paragraph "g," CASE Software owned by companies other than Vendor); and

v. all documentation concerning Vendor Master and Sign Controller Software protocol, source code, commented listings, descriptions of software structure, database utilization, and instructions necessary to convert the source code into an operational system.

b. Software.

i. The Vendor shall not create Software that only Vendor could modify.
ii. The Vendor shall not utilize Re-use Software, described in paragraph "g," that is not in the public domain.

c. License.

i. The Vendor may not place any legend on Vendor Master and Sign Controller Software which restricts the department's rights in such software unless the restrictions are set forth in a license agreement that has been approved and executed by the department.
ii. The Vendor shall not use any of the Vendor Master and Sign Controller Software necessary for the implementation of or provided for in this contract without a license from the department.

d. Ownership.

i. The Vendor shall transfer to the department or purchase for the department all license to COTS Software acquired in conjunction with this project, including all original media, documentation, warranties, licenses, and applications software and developmental software used in the project.
ii. The department shall own the entire rights (including copyrights, copyright applications, copyright renewals, and copyright extensions), title and interests in and to the Vendor Master and Sign Controller Software development documentation, software, and any other intellectual properties created for Vendor Master and Sign Controller Software and versions thereof, and all works based upon, derived from, or incorporating works thereof, and in and to all income, royalties, damages, claims, and payments now or hereafter due or payable with respect thereto, and in and to all causes of action, either in law or in equity for past, present, or future infringement based on the Vendor Master and Sign Controller Software and copyrights arising therefrom, and in and to all rights corresponding to the Vendor Master and Sign Controller Software and versions thereof throughout the world.

e. Work-made-for-hire.

i. This is a "work-made-for-hire" as that term is understood under the copyright law of the United States, Title 17, U.S.C. §§101 et seq. so that all copyright and other property interest in the Vendor Master and Sign Controller Software shall vest at the time of their creation in the department and the Vendor shall have no copyright or other property interest in any software produced under this contract.
ii. All future works relating or pertaining to said Vendor Master and Sign Controller Software and versions thereof shall be regarded as works-made-for-hire within the meaning of the copyright laws of the United States and that if, for any reason, future works relating or pertaining to the Vendor Master and Sign Controller Software shall be held not to be a work-made-for-hire within the meaning of the copyright laws of the United States, Vendor does hereby sell, assign, and transfer to the department, its successors and assigns, all of Vendor's rights, title and interests in and to future Vendor Master and Sign Controller Software and

versions thereof, relating or pertaining to the Vendor Master and Sign Controller Software.

f. Non-disclosure.
Any department owned, developed, or licensed software will be returned to the department before the end of the contract. Vendor acknowledges that the source code, program, and related documentation constitute valuable trade secrets of the department. Vendors shall not to disclose, publish, or disseminate them to any third party who is not bound by a written confidentiality agreement expressly covering the department's intellectual property and related documentation.

g. Description of Software.
Software to be used shall include, but not necessarily be limited to, the Central Processors, the Operator and Projector Workstation, the computer hardware platforms, and the System Control Units located throughout the System The software implementation activities include the following:

i. Re-use Software: Operational software in the public domain (other than any software owned by Vendor) that Vendor shall select, recommend, and/or transfer which appropriately satisfy required System Functionality. Inclusion of Reuse Software is subject to the department's approval. Vendor shall bench mark test each Reuse Software item to assure its performance of required functionality.
ii. Commercial Off-The-Shelf Software Acquisition (COTS): COTS Software (other than any software owned by Vendor) that is required to provide necessary System Functionality. Vendor shall submit to the department sufficient information and documentation on the software items to determine if the proposed items meet the required System functionality. Submittals shall include, but not be limited to, shop drawings, cut sheets, manufacturer's literature, independent lab documentation, etc. Items shall be approved, in writing, by the department prior to the purchase of the item. Vendor shall accept delivery of, facility install and Acceptance Test all COTS Software to assure its performance of required functionality.
iii. Vendor Master and Sign Controller Software: Any required Vendor owned or developed Reuse, Custom, COTS or other Software functionality, test tools, interface stubs and drivers, and configuration build procedures including all documentation, manuals, and protocols which are not covered by COTS or Reuse Software products that Vendor shall code or unit test.

Professional Provider

RFO Work-made-for-hire Intellectual Property Contract Language for use with Professional Providers is as follows:

Software Delivery and Intellectual Property Rights.

a. Delivery. The Professional Provider shall deliver:

i. all Custom and Reuse Software, described in paragraph "g," as machine readable source files, and linkable or executable modules, and printed source listings, in addition to installed and operating copies of the programs (baseline software or hardware configuration shall not be created such that only Professional Provider could change);

ii. tools required for the modification and compilation of the Custom and Reuse Software programs;

iii. source codes for all Custom and Re-use Software programs developed under this contract with all needed support resources needed to edit, compile and link these programs on the central processors, including, but not be limited to, Computer Aided Software Engineering (CASE) tools, compilers, editors, and function libraries used in the development of the programs; and

iv. all documentation concerning protocol for Re-use and Custom Software, source code, commented listings, descriptions of software structure, database utilization, and instructions necessary to convert the source code into an operational system.

b. Software.

i. The Professional Provider shall not create Software that only Professional Provider could modify.

ii. The Professional Provider shall not utilize Re-use Software that is not in the public domain.

c. License.

i. The Professional Provider may not place any legend on the Custom or Re-use Software which restricts the department's rights in such software unless the restrictions are set forth in a license agreement that has been approved and executed by the department.

ii. The Professional Provider shall not use any of the Custom Software developed for this contract without a license from the department.

d. Ownership.

i. The Professional Provider shall transfer to the department or purchase for the department all license to COTS Software, described in paragraph "g," acquired in conjunction with this project, including all original media, documentation, warranties, licenses, and applications software and developmental software used in developing custom applications.

ii. The department shall own the entire rights (including copyrights, copyright applications, copyright renewals, and copyright extensions), title and interests in and to the Custom Software development documentation, software, and any other intellectual properties created for Custom Software and versions thereof, and all works based upon, derived from, or incorporating works thereof, and in and to all income, royalties, damages, claims, and payments now or hereafter due or payable with respect thereto, and in and to all causes of action, either in law or in equity for past, present, or future infringement based on the Custom Software and copyrights arising therefrom, and in and to all rights corresponding to the Custom Software and versions thereof throughout the world.

e. Work-made-for-hire.

i. This is a "work-made-for-hire" as that term is understood under the copyright law of the United States, Title 17, U.S.C. §§101 et seq. so that all copyright and other property interest in the Custom Software shall vest at the time of their creation in the department and the Professional Provider shall have no copyright or other property interest in any Custom Software produced under this contract.

ii. All future works relating or pertaining to said Custom Software and versions thereof shall be regarded as works-made-for-hire within the meaning of the copyright laws of the United States and that if, for any reason, said future works relating or pertaining to said Custom Software shall be held not to be a work-made-for-hire within the meaning of the copyright laws of the United States, Professional Provider does hereby sell, assign, and transfer to the department, its successors and assigns, all of Vendors rights, title and interests in and to said future Custom Software versions thereof, relating or pertaining to the Custom Software.

f. Non-disclosure.

Any department owned, developed, or licensed software will be returned to the department before the end of the contract. Professional Provider acknowledges that the source code, program, and related documentation constitute valuable trade secrets for the department. Vendors shall not to disclose, publish, or disseminate them to any third party who is not bound by a written confidentiality agreement expressly covering the department's intellectual property and related documentation.

g. Description of Software.

Software to be developed and/or designed shall include, but not necessarily be limited to, the Central Processors, the Operator and Projector Workstation, the hardware platforms, and the System Control Units located throughout the System. The Software Implementation activities include the following:

i. Reuse Software: Operational software in the public domain that Professional Provider shall select, recommend, and/or transfer from corporate inventories which appropriately satisfy required System Functionality. Inclusion of Reuse Software is subject to the department's approval. Professional Provider shall bench mark test each Reuse Software item to assure its performance of required functionality.

ii. Commercial Off-The-Shelf Software Acquisition (COTS): COTS Software that is required to provide necessary System functionality. Professional Provider shall submit to the department sufficient information and documentation on the software items to determine if the proposed items meet the required System functionality. Submittals shall include, but not be limited to, shop drawings, cut sheets, manufacturer's literature, independent lab documentation, etc. Items shall be approved, in writing, by the department prior to the purchase of the item. Professional Provider shall accept delivery of, facility install and Acceptance Test all COTS Software to assure its performance of required functionality.

iii. Custom Software: Any required software functionality, test tools, interface stubs and drivers, and configuration build procedures including all documentation, manuals, and protocols which are not covered by COTS or Reuse Software products that Professional Provider shall code or unit test. This Custom Software shall be developed in accordance with the modular detailed design approved at the Critical Design Review and shall not infringe on another's copyright or other right.

Joint Ownership
Joint ownership of software language includes language for

- vendors and
- professional providers

Vendor
RFO Joint Ownership Intellectual Property Contract Language for Use with Vendor (to be used for consultants including catalog procurement when procuring software) is as follows:

Software Delivery and Intellectual Property Rights.

a. Delivery.

The Vendor shall deliver:

i. all Custom and Reuse Software, described in paragraph "g," as machine readable source files, and linkable or executable modules, and printed source listings, in addition to installed and operating copies of the programs (baseline software or hardware configuration shall not be created such that only Vendor could change);

ii. tools required for the modification and compilation of the Custom and Reuse Software programs;

iii. source codes for all Custom and Reuse Software programs developed under this contract with all needed support resources needed to edit, compile and link these programs on the central processors, including, but not be limited to, Computer Aided Software Engineering (CASE) tools, compilers, editors, and function libraries used in the development of the programs; and

iv. all documentation concerning protocol for Reuse and Custom Software, source code, commented listings, descriptions of software structure, database utilization, and instructions necessary to convert the source code into an operational system.

b. Software.

i. The Vendor shall not create Software that only Vendor could modify.

ii. The Vendor shall not utilize Reuse Software that is not in the public domain.

c. License.

i. The Vendor may not place any legend on the Custom or Reuse Software which restricts the department's rights in such software unless the restrictions are set forth in a license agreement that has been approved and executed by the department.

ii. The Vendor shall not use any of the Custom Software developed for this contract without a license from the department.

d. Ownership.

i. The Vendor shall transfer to the department or purchase for the department all license to COTS Software, described in paragraph "g," acquired in conjunction with this project, including all original media, documentation, warranties, licenses, and applications software and developmental software used in developing custom applications.

ii. The department shall own the entire rights (including copyrights, copyright applications, copyright renewals, and copyright extensions), title and interests in and to the Custom Software development documentation, software, and any other intellectual properties created for Custom Software and versions thereof, and all works based upon, derived from, or incorporating works thereof, and in and to all income, royalties, damages, claims, and payments now or hereafter due or payable with respect thereto, and in and to all causes of action, either in law or in equity for past, present, or future infringement based on the Custom Software and copyrights arising therefrom, and in and to all rights corresponding to the Custom Software and versions thereof throughout the world.

e. Work-made-for-hire.

i. This is a "work-made-for-hire" as that term is understood under the copyright law of the United States, Title 17, U.S.C. §§101 et seq. so that all copyright and other property interest in the Custom Software shall vest at the time of their creation in the department and the Vendor shall have no copyright or other property interest in any Custom Software produced under this contract.

ii. All future works relating or pertaining to said Custom Software and versions thereof shall be regarded as works-made-for-hire within the meaning of the copyright laws of the United States and that if, for any reason, said future works relating or pertaining to said Custom Software shall be held not to be a work-made-for-hire within the meaning of the copyright laws of the United States, Vendor does hereby sell, assign, and transfer to the department, its successors and assigns, all of Vendors rights, title and interests in and to said future Custom Software versions thereof, relating or pertaining to the Custom Software.

f. Non-disclosure.

Any department owned, developed, or licensed software will be returned to the department before the end of the contract. Vendor acknowledges that the source code, program, and related documentation constitute valuable trade secrets for the department. Vendors shall not disclose, publish, or disseminate them to any third party who is not bound by a written confidentiality agreement expressly covering the department's intellectual property and related documentation.

g. Description of Software.

Software to be developed and/or designed shall include, but not necessarily be limited to, the Central Processors, the Operator and Projector Workstation, the hardware platforms, and the System Control Units located throughout the System. The Software Implementation activities include the following:

i. Reuse Software: Operational software in the public domain that Vendor shall select, recommend, and/or transfer from corporate inventories which appropriately satisfy required System Functionality. Inclusion of Reuse Software is subject to the department's approval. Vendor shall bench mark test each Reuse Software item to assure its performance of required functionality.

ii. Commercial Off-The-Shelf Software Acquisition (COTS): COTS Software that is required to provide necessary System functionality. Vendor shall submit to the department sufficient information and documentation on the software items to determine if the proposed items meet the required System functionality. Submittals shall include, but not be limited to, shop drawings, cut sheets, manufacturer's literature, independent lab documentation, etc. Items shall be approved, in writing, by the department prior to the purchase of the item. Vendor shall accept delivery of, facility install and Acceptance Test all COTS Software to assure its performance of required functionality.

iii. Custom Software: Any required software functionality, test tools, interface stubs and drivers, and configuration build procedures including all documentation, manuals, and protocols which are not covered by COTS or Reuse Software products that Vendor shall code or unit test. This Custom Software shall be developed in accordance with the modular detailed design approved at the Critical Design Review, and shall not infringe on another's copyright or other rights.

Professional Provider

RFP Joint Ownership Intellectual Property Contract Language for Use with Professional Providers is as follows:

Software Delivery and Intellectual Property Rights.

a. Delivery.

The Professional Provider shall deliver:

i. all Custom and Re-use Software, described in paragraph "f," as machine readable source files, and linkable or executable modules, and printed source listings, in addition to installed and operating copies of the programs (baseline software or hardware configuration shall not be created such that only Professional Provider could change);

ii. tools required for the modification and compilation of the Custom and Reuse Software programs;

iii. source codes for all Custom and Re-use Software programs developed under this contract with all needed support resources needed to edit, compile and link these programs on the central processors, including, but not be limited to, Computer Aided Software Engineering (CASE) tools, compilers, editors, and function libraries used in the development of the programs; and

iv. all documentation concerning protocol for Re-use and Custom Software, source code, commented listings, descriptions of software structure, database utilization, and instructions necessary to convert the source code into an operational system.

b. Software.

i. The Professional Provider shall not create Re-use Software that only Professional Provider could modify.
ii. The Professional Provider shall not utilize Re-use Software that is not in the public domain.

c. License.
The Professional Provider may not place any legend on the Custom or Re-use Software which restricts the department's rights in such software unless the restrictions are set forth in a license agreement that has been approved and executed by the department.

d. Ownership.
i. The Professional Provider shall transfer to the department or purchase for the department all license to COTS Software, described in paragraph "f," acquired in conjunction with this project, including all original media, documentation, warranties, licenses, and applications software and developmental software used in developing custom applications.
ii. The department and the Professional Provider shall jointly own the rights (including copyrights, copyright applications, copyright renewals, and copyright extensions), title and interests in and to the Custom Software development documentation, software, and any other intellectual properties created for Custom Software and versions thereof.

e. Non-disclosure.
Any department owned, developed, or licensed software will be returned to the department before the end of the contract. Vendors shall not to disclose, publish, or disseminate to any third party who is not bound by a written confidentiality agreement expressly covering the department's intellectual property and related documentation.

f. Description of Software.
Software to be developed and/or designed shall include, but not necessarily be limited to, the Central Processors, the Operator and Projector Workstation, the hardware platforms, and the System Control Units located throughout the System The Software Implementation activities include the following:
i. Re-use Software: Operational software in the public domain that Professional Provider shall select, recommend, and/or transfer from corporate inventories which appropriately satisfy required System Functionality. Inclusion of Reuse Software is subject to the department's approval. Professional Provider shall bench mark test each Reuse Software item to assure its performance of required functionality.
ii. Commercial Off-The-Shelf Software Acquisition (COTS): COTS Software that is required to provide necessary System functionality. Professional Provider shall submit to the department sufficient information and documentation on the software items to determine if the proposed items meet the required System functionality. Submittals shall include, but not be limited to, shop drawings, cut sheets, manufacturer's literature, independent lab documentation, etc. Items shall be approved, in writing, by the department prior to the purchase of the item.

Professional Provider shall accept delivery of, facility install and Acceptance Test all COTS Software to assure its performance of required functionality.

iii. Custom Software: Any required software functionality, test tools, interface stubs and drivers, and configuration build procedures including all documentation, manuals, and protocols which are not covered by COTS or Reuse Software products that Professional Provider shall code or unit test. This Custom Software shall be developed in accordance with the modular detailed design approved at the Critical Design Review, and shall not infringe on another's copyright or other rights.

Appendix B. Intellectual Property Provision

General
Intellectual Property contract provisions pertain to software contracts, general contracts , and the ownership of documents.

Software Contracts
To be used in contracts requiring the Vendor/Professional Provider to develop software for the department.

For Vendors, use:
INTELLECTUAL PROPERTY CONTRACT PROVISION
FOR DEVELOPMENT OF CUSTOM SOFTWARE (VENDOR)
a. Delivery. The Vendor shall deliver all Custom and Reuse Software, described in paragraph "g," as machine readable source files, and linkable or executable modules, and printed source listings, in addition to installed and operating copies of the programs (baseline software or hardware configuration shall not be created such that only Vendor could change); the tools required for the modification and compilation of the Custom and Reuse Software programs; the source codes for all Custom and Reuse Software programs developed under this contract with all needed support resources needed to edit, compile and link these programs on the central processors, including, but not be limited to, Computer Aided Software Engineering (CASE) tools, compilers, editors, and function libraries used in the development of the programs; and all documentation concerning protocol for Reuse and Custom Software, source code, commented listings, descriptions of software structure, database utilization, and instructions necessary to convert the source code into an operational system.

b. Software. Vendor agrees not to create Software, as more specifically described in paragraph "g," such that only Vendor could modify, and agrees to use Reuse software which is in the public domain.

c. License. The Vendor shall not place any legend on the Custom or Reuse Software which restricts the department's rights in such software unless the restrictions are set forth in a license agreement that has been approved and executed by the State. The Vendor shall not use any of the Custom Software developed for this contract without a license from the State.

d. Ownership. The State shall own the patent, copyright, trademark, or other evidence of protection or exclusivity, title or interest issued under the laws of the United States, any state or any nation, for any intellectual property and versions thereof, and all works based upon, derived from, or incorporating works thereof, created under this contract, including ideas, publications, and other original innovations fixed in a tangible medium. The State, as the holder of these intellectual property rights, shall possess all rights of ownership, including, but not limited to the exclusive right to modify any patent, copyright, trademark, or other evidence of protection and to patent, copyright, trademark, or protect that modification. The State shall own all income, royalties, damages, claims, and payments now or hereafter due or payable with respect thereto, and in and to all causes of action, either in law or in equity for past, present, or future infringement based on the intellectual property rights arising therefrom, and in and to all rights corresponding to the intellectual property and versions thereof throughout the world. The Vendor shall transfer to the State or purchase for the State all license to COTS Software, described in paragraph "g," acquired in conjunction with this project, including all original media, documentation, warranties, licenses, and applications software and developmental software used in developing custom applications.

e. Work-made-for-hire. All Custom Software relating or pertaining to the contract and versions thereof shall be regarded as works-made-for-hire as that term is understood under the copyright law of the United States, Title 17, U.S.C. §§101 et seq. All copyright and other property interests shall vest at the time of its creation in the State and the Vendor shall have no property interest in any Custom Software produced under this contract. All future works relating or pertaining to said Custom Software and versions thereof shall be regarded as works-made-for-hire within the meaning of the intellectual property laws of the United States and that if, for any reason, said future works relating or pertaining to said Custom Software shall be held not to be a work-made-for-hire within the meaning of the law of the United States, Vendor does hereby sell, assign, and transfer to the State, its successors and assigns, all of Vendor's rights, title and interests in and to said future versions thereof, relating or pertaining to the Custom Software.

f. Non-disclosure. Any State owned, developed, or licensed software will be returned to the State before the end of the contract. Vendor acknowledges that the source code, program, and related documentation constitute valuable trade secrets for the State. Vendor shall not to disclose, publish, or disseminate them to any third party who is not bound by a written confidentiality agreement expressly covering the department's intellectual property and related documentation.

g. Description of Software. Software to be developed and/or designed shall include, but not necessarily be limited to, the Central Processors, the Operator and Projector Workstation, the hardware platforms, and the System Control Units located throughout the System. The Software Implementation activities include the following:

i. Reuse Software: Operational software in the public domain that Vendor shall select, recommend, and/or transfer from corporate inventories which appropriately satisfy required System Functionality. Inclusion of Reuse Software is subject to the department's approval. Vendor shall bench mark test each Reuse Software item to assure its performance of required functionality.

ii. Commercial Off-The-Shelf Software Acquisition (COTS): COTS Software that is required to provide necessary System functionality. Vendor shall submit to the State sufficient information and documentation on the software items to determine if the proposed items meet the required System functionality. Submittals shall include, but not be limited to, shop drawings, cut sheets, manufacturer's literature, independent lab documentation, etc. Items shall be approved, in writing, by the State prior to the purchase of the item. Vendor shall accept delivery of, facility install and Acceptance Test all COTS Software to assure its performance of required functionality.

iii. Custom Software: Any required software functionality, test tools, interface stubs and drivers, and configuration build procedures including all documentation, manuals, and protocols which are not covered by COTS or Reuse Software products that Vendor shall code or unit test. This Custom Software shall be developed in accordance with the modular detailed design approved at the Critical Design Review, and shall not infringe on another's copyright or other rights.

For Professional Providers use:

INTELLECTUAL PROPERTY CONTRACT PROVISION
FOR DEVELOPMENT OF CUSTOM SOFTWARE
(PROFESSIONAL PROVIDER) (Definitions at end)

a. Delivery. The Professional Provider shall deliver all Custom and Reuse Software, described in paragraph "g," as machine readable source files, and linkable or executable modules, and printed source listings, in addition to installed and operating copies of the programs (baseline software or hardware configuration shall not be created such that only Professional Provider could change); the tools required for the modification and compilation of the Custom and Reuse Software programs; the source codes for all Custom and Reuse Software programs developed under this contract with all needed support resources needed to edit, compile and link these programs on the central processors, including, but not be limited to, Computer Aided Software Engineering (CASE) tools, compilers, editors, and function libraries used in the development of the programs; and all documentation concerning protocol for Reuse and Custom Software, source code, commented listings, descriptions of software structure, database utilization, and instructions necessary to convert the source code into an operational system.

b. Software. Professional Provider agrees not to create Software, as more specifically described in paragraph "g," such that only Professional Provider could modify, and agrees to use Reuse software which is in the public domain.

c. License. The Professional Provider shall not place any legend on the Custom or Reuse Software which restricts the department's rights in such software unless the restrictions are set forth in a license agreement that has been approved and executed by the State. The Professional Provider shall not use any of the Custom Software developed for this contract without a license from the State.

d. Ownership. The State shall own the patent, copyright, trademark, or other evidence of protection or exclusivity, title or interest issued under the laws of the United States any state, or any nation, for any intellectual property and versions thereof, and all works based upon, derived from, or incorporating works thereof, created under this contract, including ideas, publications, and other original innovations fixed in a tangible medium. The State, as the holder of these intellectual property rights, shall possess all rights of ownership, including, but not limited to the exclusive right to modify any patent, copyright, trademark, or other evidence of protection and to patent, copyright, trademark, or protect that modification. The State shall own all income, royalties, damages, claims, and payments now or hereafter due or payable with respect thereto, and in and to all causes of action, either in law or in equity for past, present, or future infringement based on the intellectual property rights arising therefrom, and in and to all rights corresponding to the intellectual property and versions thereof throughout the world. The Professional Provider shall transfer to the State or purchase for the State all license to COTS Software, described in paragraph "g," acquired in conjunction with this project, including all original media, documentation, warranties, licenses, and applications software and developmental software used in developing custom applications.

e. Work-made-for-hire. All Custom Software relating or pertaining to the contract and versions thereof shall be regarded as works-made-for-hire as that term is understood under the copyright law of the United States, Title 17, U.S.C. §§101 et seq. All copyright and other property interests shall vest at the time of its creation in the State and the Professional Provider shall have no property interest in any Custom Software produced under this contract. All future works relating or pertaining to said Custom Software and versions thereof shall be regarded as works-made-for-hire within the meaning of the intellectual property laws of the United States and that if, for any reason, said future works relating or pertaining to said Custom Software shall be held not to be a work-made-for-hire within the meaning of the law of the United States, Professional Provider does hereby sell, assign, and transfer to the State, its successors and assigns, all of Professional Provider's rights, title and interests in and to said future versions thereof, relating or pertaining to the Custom Software.

f. Non-disclosure. Any State owned, developed, or licensed software will be returned to the State before the end of the contract. Professional Provider acknowledges that the source code, program, and related documentation constitute valuable trade secrets for the State. Professional Provider shall not to disclose, publish, or disseminate them to any third party who is not bound by a written confidentiality agreement expressly covering the department's intellectual property and related documentation.

g. Description of Software. Software to be developed and/or designed shall include, but not necessarily be limited to, the Central Processors, the Operator and Projector Workstation, the hardware platforms, and the System Control Units located throughout the System. The Software Implementation activities include the following:

i. Reuse Software: Operational software in the public domain that Professional Provider shall select, recommend, and/or transfer from corporate inventories which appropriately satisfy required System Functionality. Inclusion of Reuse Software is subject to the department's approval. Professional Provider shall bench mark test each Reuse Software item to assure its performance of required functionality.

ii. Commercial Off-The-Shelf Software Acquisition (COTS): COTS Software that is required to provide necessary System functionality. Professional Provider shall submit to the State sufficient information and documentation on the software items to determine if the proposed items meet the required System functionality. Submittals shall include, but not be limited to, shop drawings, cut sheets, manufacturer's literature, independent lab documentation, etc. Items shall be approved, in writing, by the State prior to the purchase of the item. Professional Provider shall accept delivery of, facility install and Acceptance Test all COTS Software to assure its performance of required functionality.

iii. Custom Software: Any required software functionality, test tools, interface stubs and drivers, and configuration build procedures including all documentation, manuals, and protocols which are not covered by COTS or Reuse Software products that Professional Provider shall code or unit test. This Custom Software shall be developed in accordance with the modular detailed design approved at the Critical Design Review, and shall not infringe on another's copyright or other rights.

General Contract Provision (Non-Software Use)

The following language is to be used in contracts requiring the Vendor/Professional Provider to create non-software works (such as manuals, studies, or reports).

For Vendors use:
a. Ownership. The State shall own the patent, copyright, trademark, or other evidence of protection or exclusivity, title or interest issued under the laws of the United States any state, or any nation, for any intellectual property and versions thereof, and all works based upon, derived from, or incorporating works thereof, created under this contract, including ideas, publications, and other original innovations fixed in a tangible medium. The State, as the holder of these intellectual property rights, shall possess all rights of ownership, including, but not limited to the exclusive right to modify any patent, copyright, trademark, or other evidence of protection and to patent, copyright, trademark, or protect that modification. The State shall own all income, royalties, damages, claims, and payments now or hereafter due or payable with respect thereto, and in and to all causes of action, either in law or in equity for past, present, or future infringement based on the intellectual property rights arising therefrom, and in and to all rights corresponding to the intellectual property and versions thereof throughout the world.

b. Work-made-for-hire. All Work relating or pertaining to the contract and versions thereof shall be regarded as works-made-for-hire as that term is understood under the copyright law of the United States, Title 17, U.S.C. §§101 et seq. All intellectual property interests shall vest at the time of its creation in the State and the Vendor shall have no property interest in any Work produced under this contract. All future works relating or pertaining to said Work and versions thereof shall be regarded as works-made-for-hire within the meaning of the intellectual property laws of the United States and that if, for any reason, said future works relating or pertaining to said Work shall be held not to be a work-made-for-hire within the meaning of the law of the United States, Vendor does hereby sell, assign, and transfer to the State, its successors and assigns, all of Vendor's rights, title and interests in and to said future versions thereof, relating or pertaining to the Work.

c. Non-disclosure. Any State owned, developed, or licensed software will be returned to the State before the end of the contract. Vendor acknowledges that the source code, program, and related documentation constitute valuable trade secrets for the State. Vendor shall not to disclose, publish, or disseminate them to any third party who is not bound by a written confidentiality agreement expressly covering the department's intellectual property and related documentation.

For Professional Providers use:
a. Ownership. The State shall own the patent, copyright, trademark, or other evidence of protection or exclusivity, title or interest issued under the laws of the United States any state, or any nation, for any intellectual property and versions thereof, and all works based upon, derived from, or incorporating works thereof, created under this contract, including ideas, publications, and other original innovations fixed in a tangible medium. The State, as the holder of these intellectual property rights, shall possess all rights of ownership, including, but not limited to the exclusive right to modify any patent, copyright, trademark, or other evidence of protection and to patent, copyright, trademark, or protect that modification. The State shall own all income, royalties, damages, claims, and payments now or hereafter due or payable with respect thereto, and in and to all causes of action, either in law or in equity for past, present, or future infringement based on the intellectual property rights arising therefrom, and in and to all rights corresponding to the intellectual property and versions thereof throughout the world.

b. Work-made-for-hire. All Work relating or pertaining to the contract and versions thereof shall be regarded as works-made-for-hire as that term is understood under the copyright law of the United States, Title 17, U.S.C. §§101 et seq. All intellectual property interests shall vest at the time of its creation in the State and the Professional Provider shall have no property interest in any Work produced under this contract. All future works relating or pertaining to said Work and versions thereof shall be regarded as works-made-for-hire within the meaning of the intellectual property laws of the United States and that if, for any reason, said future works relating or pertaining to said Work shall be held not to be a work-made-for-hire within the meaning of the law of the United States, Professional Provider does hereby sell, assign, and transfer to the State, its successors and assigns, all of Professional Provider's rights, title and interests in and to said future versions thereof, relating or pertaining to the Work.

c. Non-disclosure. Any State owned, developed, or licensed software will be returned to the State before the end of the contract. Professional Provider acknowledges that the source code, program, and related documentation constitute valuable trade secrets for the State. Professional Provider shall not to disclose, publish, or disseminate them to any third party who is not bound by a written confidentiality agreement expressly covering the department's intellectual property and related documentation.

Ownership of Documents (Interagency Agreements: Non-Software Use)

The following language is to be used in Interagency Agreements when the Contract requires the performing agency to create non-software works.

TxDOT Ownership of Documents
a. The Receiving Agency shall own all of the rights (including copyrights, copyright applications, copyright renewals, and copyright extensions), title and interests in and to all data and other information developed under this contract and versions thereof.

b. The Receiving Agency reserves all rights to property which Performing Agency (or any of its subcontractors) purchases with funds provided under this Contract.

c. Upon completion or termination of this contract, all documents, data and information including work product, field and laboratory notes, and all analyses deriving from the study prepared by the Performing Agency or furnished to the Performing Agency by the Receiving Agency shall be delivered to and become the property of the Receiving Agency.
The following language is to be used in Interagency Agreements when the contract authorizes the performing agencies to share joint ownership of non-software works with TxDOT.

Joint Ownership of Documents
a. The Receiving Agency and the Performing Agency shall jointly own all the rights (including copyrights, copyright applications, copyright renewals, and copyright extensions), title and interests in and to all data and other information developed under this contract and versions thereof. Each Agency may license, reproduce, publish, modify, or otherwise use, and authorize others to use the copyright in any work developed under this contract. All documents will contain a copyright mark acknowledging this joint ownership. There will not be a charge to either agency for such use.

b. The Receiving Agency reserves all rights to property which Performing Agency (or any of its subcontractors) purchases with funds provided under this Contract.

c. Upon completion or termination of this contract, all original final documents prepared by the Performing Agency or furnished to the Performing Agency by the Receiving Agency shall be delivered to and become the property of the Receiving Agency. All data and information including work product, field and laboratory notes, and all analyses deriving from the study shall be made available to the Receiving Agency, but shall be the responsibility of the Performing Agency to maintain unless they are turned in to a curatorial facility. Upon request, the Receiving Agency shall be provided with high quality copies, or originals, of all data and information to use without restriction.

Appendix C. Agreements and Forms

General
This appendix includes the miscellaneous agreements and forms that are a part of the TxDOT Ownership of Intellectual Property policy. These agreements and forms include:

- copyright and trademark license agreements
- TxDOT confidentiality non-disclosure agreement
- Provisions for the Internet
- work-made-for-hire provisions for the HR manual
- Copyright license agreement for television and radio stations

Copyright License Agreements
Use Form 1976 for the "Copyright Agreement for the Use of the Texas Department of Transportation's __________"

Trademark License Agreements
Use Form 1977 for the "License Agreement for the Use of Texas Department of Transportation's Trademark"

TxDOT Confidentiality Non-Disclosure Agreement
The TxDOT Confidentiality Non-Disclosure Agreement, Form 1978, is to be used for TxDOT employees or third parties who use TxDOT computers.

Provision for the Internet
The Internet Download Message is to be used in conjunction with department software that is available online.

Internet Download Message
The text of the Internet Download Message is:
The following information details TxDOT guidelines.

CHANGES TO THESE GUIDELINES
TxDOT reserves the right to change these guidelines solely at its discretion.

PROPRIETARY RIGHTS
TxDOT_________ is proprietary software of TxDOT and may contain TxDOT trademarks. Use of TxDOT _________ acknowledges TxDOT's ownership of the copyright and trademarks. All use of or goodwill associated with the TxDOT software shall inure to TxDOT's benefit.

TERMINATION
TxDOT reserves the right to immediately terminate permission to use the software to anyone not following these guidelines as determined solely by TxDOT's judgment. In addition, TxDOT may terminate this entire program with 30 days' electronic notice.

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Work-made-for-hire Provisions for the HR Manual

A Work developed by an employee is a "work-made-for-hire" as that term is understood under the copyright law of the United States, 17 U.S.C. §§101 et seq. as long as the Work is developed by the employee as a part of employment with TxDOT and the subject matter is related to a TxDOT goal, project, or concern. All copyright and other property interest in the Work shall vest at the time of its creation in the department and the employee shall have no copyright or other property interest in any Work produced.

Copyright License Agreement for Television and Radio Stations

Use Form 1979, "Copyright License Agreement for the use of the Texas Department of Transportation's __________________ Video Data by Television and Radio Stations.

Appendix A.3

Washington State Department of Transportation Policy on Advanced Technologies

Application of Advanced Transportation Technology Within Washington State: Discussion and Policy Recommendations

Prepared by:
The Committee for Advanced Technology in State Transportation Policy

March 8, 1996

Final Advanced Technology Policy as Adopted by the Commission 8/1/96

A. Washington's Commitment to ITS

- Aggressively pursue the application of advanced technology to transportation systems in Washington.
- Continue WSDOT's lead role in coordinating the statewide implementation of ITS technology, working collaboratively with cities, counties, transit agencies, other state agencies, and the private sector, and consistent with the state ITS strategic plan, "Venture Washington."
- Place a higher priority and greater level of commitment, across all transportation agencies in Washington, on transportation programs that improve operational efficiency - through advanced technology systems and the long term maintenance of those systems. Operational improvements should be given consideration equal to that given to infrastructure expansion in meeting mobility needs.

B. Partnerships

- Transportation agencies in Washington should:
  - Be aggressive in forming partnerships among state, federal, and local agencies where relevant. Such partnerships assure integrated applications across modes and jurisdictions, speed deployment, and leverage the investment of each individual agency.
  - Seek predictable funding for grants that allow the state to partner with other public agencies.
  - Be aggressive in seeking and forming partnerships with private companies that have technological resources and knowledge applicable to ITS applications. Such partnerships provide access to the creativity, technological ability, and marketing prowess of the private sector; leverage public investment; and speed deployment of ITS applications. If necessary, seek changes in statute to allow WSDOT to receive revenues from partnerships with private companies.
  - Protect the public interest by promoting competition among private sector providers.
  - Require a significant benefit to the public in any public/private technology partnership and pursue advanced technology applications that allow access and use by the broadest possible spectrum of the traveling public.

C. Risk Management

- Transportation agencies in Washington should minimize the uncertainty and risk in deploying new ITS technology by pursuing the following strategies:
  - Aggressively pursue the implementation of applications that have proved effective through research, demonstration projects, and broadscale deployment elsewhere.
  - Demonstrate applications supported by substantial research and indications of strong demand, but whose benefits have not yet been fully documented; seek federal and other funding to measure the benefits of state and local funds in proceeding with such demonstrations.
  - Monitor applications and projects nationwide that have the potential to create substantial benefits for travelers, shippers, and transportation agencies.
  - WSDOT should seek to involve relevant staff in the national ITS program to both stay informed of the newest technologies and to shape the development of these technologies to assure that they will provide maximum benefit to the state.

D. Protection of Citizen Privacy

- WSDOT and other transportation agencies in the state should follow the guidance provided by ITS America in its draft Fair Information and Privacy Principles when developing, implementing and operating ITS Systems.
- WSDOT should actively work with the State Attorney General to assure that current state law and guidance regarding Freedom of Information and individual privacy issues are fully understood, and that safeguards are incorporated in ITS applications. If necessary, WSDOT should propose changes to statute to protect citizen privacy when using ITS applications.
- WSDOT should monitor developing privacy standards, assist in developing those standards, and support standards that ensure the privacy of travelers.

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Introduction

As increasing congestion throughout the country creates greater delay, threatens safety, increases energy use, and escalates the daily frustration of motorists, government at all levels is searching for ways to address the problems. One tool that is already proving its usefulness is the application of advanced technology to our surface transportation network. Such technology, referred to as Intelligent Transportation Systems (ITS), is used to gather and process information, provide communication, and manage traffic.

What is ITS technology? The national ITS program is directed toward applying computer, information systems, and telecommunications technology to improve the movement of people and goods on the surface transportation system. Some applications have proven effective and are widely used today, in Washington State and throughout the country. Other promising applications have been extensively tested and are just beginning to be deployed in limited ways in some areas. Finally, some ideas are in the research and analysis stage and are years away from widespread, effective application.

This range of development, from proven systems to theoretical concepts, illustrates the need for a focused and coherent policy encompassing technical exploration, operational tests, and large-scale field deployment. Further, the nature of the information and telecommunications technologies involved require new working relationships among various levels of government, cooperation with private industry, and attention to legal issues such as product liability and individual privacy. Institutional and legal barriers must be addressed, and both public investment and private financing and support must be obtained.

This policy paper overviews Intelligent Transportation Systems technology. It includes the objectives in applying ITS, the kinds of technologies involved, the participants needed to make ITS work; a discussion of benefits that jurisdictions around the country are deriving from its use; and an explanation of the current planning for deployment of ITS in Washington state. In the last chapter, the paper presents policy recommendations for dealing with issues such as the state's commitment to ITS, risk management, partnerships, and protection of privacy.

I. Advanced Transportation Technology: An Overview

A. Advanced Technology

In basic terms, advanced technology is the application of computer, information systems and telecommunications technologies either separately or, increasingly, together to improve the service to the user.

B. Advanced Technology Related to Transportation

As early as the 1950s and 1960s, as the Interstate Highway System was just being developed, transportation industry experts were envisioning self-guided automobiles, traveling on guideways, that delivered their passengers to their destinations automatically without a driver. While these concepts were thought at the time to be far-fetched, in the mid-1990s technology has advanced to the point of making these “smart cars” and “smart highways” a near reality, including dashboard maps to guide drivers to their destinations and automatic breaking systems to avoid collisions. The same computer and telecommunications technology that has revolutionized the workplace, and will soon revolutionize our homes, will also be applied to our transportation systems to improve safety, efficiency, and compliance with environmental requirements. When applied to transportation systems, these technologies are generally referred to as Intelligent Transportation Systems (ITS).

C. Intelligent Transportation System Applications

Intelligent Transportation Systems can be described in six broad categories:

Advanced Traffic-Management Systems (ATMS)

ATMS applications make traffic flow more efficiently, and many of these applications are already in place. One example is a computer controlled signal system. These systems allow traffic to flow smoothly, at a fixed speed, down an arterial without stopping at a red light, or adjust a single signal’s cycle length depending on how many vehicles are using the intersection. Another example is a ramp meter on a freeway that limits how many vehicles can enter the freeway based on measurements of how many vehicles are already upstream. Such ramp meter systems can smooth out the flow on the freeway by regulating merge rates, thereby increasing freeway speed and capacity. A final example is an incident management team. Through improved communications, emergency response crews can respond soon after a collision or breakdown, minimizing the delay experienced by other travelers on the roadway.

ATMS require some means of collecting traffic data (loops in the pavement and/or cameras), computer systems for analyzing those data, and a means of adjusting the operation of the system to reflect current traffic conditions. As computer systems and telecommunications continue to advance, many more applications that improve the efficiency of traffic movement will be possible.

Advanced Traveler Information Systems (ATIS)

ATIS are based on the premise that when more information on system conditions is available to travelers, they will adjust their time, route, or mode of travel to their own advantage, which will also improve system efficiency. Simple forms of ATIS are radio traffic reports that let drivers know about backups and collisions, and highway advisory radio broadcasts for special conditions. More advanced applications include traffic flow maps and transit operations information accessible over the Internet from home or work; in-vehicle navigation systems that provide drivers with maps, traffic flow information and directions on how to reach their destinations; and traffic condition information broadcast to personal communications devices (pagers, smart watches, cellular telephones, etc.).

ATIS applications require detailed system operations information, which may be generated from Advanced Traffic Management Systems, and a means to communicate that information in various forms to the traveler. The private sector already plays a significant role in communicating ATIS information to various users. This role is likely to grow as more sophisticated navigation systems become available in automobiles.

Advanced Vehicle Control Systems (AVCS)

AVCS get the closest to the 1950s vision of self-guided automobiles. While completely automatic cars probably won't be available on the market within the next twenty years, many AVCS technologies are either available now or soon will be marketed in automobiles. Available now are anti-lock braking, traction control, and dynamic skid control. On the horizon are such applications as adaptive cruise control, which will automatically decelerate the car upon approaching a slower vehicle; drowsiness detectors that will sound a wake-up call when needed; infrared night vision systems; and lane warning sensors that will warn a drifting driver. Further in the future are automatic collision avoidance systems, which relieve the driver of some or all control of the vehicle. These will be similar to autopilot systems in airplanes. Fully automated highways will require not only in-vehicle computer controls, but also in-highway equipment that will guide vehicles to their destinations. These in-vehicle technologies will be provided by automobile manufacturers as fast as the market demands them, provided that the highway infrastructure is in place to accommodate such systems.

Advanced Rural Transportation Systems (ARTS)

ARTS include applications that address the special needs of the rural traveler. These include automatic SOS signaling that reports a vehicle's location and the severity of an emergency or accident; systems that help vehicles safely pass other vehicles on two-lane roadways; and systems that help drivers detect animals or other objects on the roadway. On-board navigation systems will also help intercity travelers find their way.

Advanced Public Transportation Systems (APTS)

These include applications that are specific to improving the efficiency and user-friendliness of public transportation services. They include improved information systems to disseminate schedule, fare, and ride-sharing information more conveniently to users through the Internet and other real-time media; automated fare collection systems that eliminate the need for exact change; and vehicle locator systems for improved fleet management, increased security, and communicating to riders the exact arrival time of the next bus.

Commercial Vehicle Operations (CVO)

Public sector regulation of trucking for weight control, licensing, and permitting causes delays for truckers, which increase the cost of delivering goods. ITS applications for commercial vehicles are aimed at minimizing unnecessary stops for trucks. Technologies include automatic vehicle identification to allow truckers with all needed permits to by-pass ports of entry; weigh-in-motion scales to screen vehicles so that trucks that are legally loaded do not have to stop at scale houses; electronic placarding/bill of lading to monitor the movement of hazardous materials; and automatic collection of tolls on toll roads. An added benefit of commercial vehicle ITS applications is that trucking firms can use the information generated to better manage their fleets and improve just-in-time delivery to reduce transportation costs.

To better understand how these six general categories will benefit transportation customers, the national ITS community has defined user services that describe the capabilities of ITS. The complete list of the 29 user services, grouped in seven categories, is presented in Appendix A, along with a brief description of each. The seven categories listed in Appendix A represent a different way to define the benefits of ITS and therefore do not relate on a one-to-one basis with the six categories described above.

D. Proven Effectiveness of ITS Applications

Across the United States and the world, ITS applications have proven their effectiveness in improving transportation safety, efficiency, and customer service. Some examples of these applications follow.

- A six-year study of the Seattle area freeway management system, which includes ramp metering showed that, despite traffic growth of 10 percent to 100 percent along I-5, speeds remained steady or increased up to 48 percent, and accident rates fell to 62 percent in comparison to the base period. The improvements occurred while average metering delays at each ramp remained at or below 3 minutes.

- The Minnesota DOT's Traffic Management Center, which operates freeways in the Minneapolis area, reports that capacity has risen to 2200 vehicles per hour per lane from 1800 before the use of the ramp meters. Average speeds have risen from 34 mph to 46 mph. Before management on I-35W, accidents averaged 421 per year; they have since dropped to 308 per year. Before management, annual accident experience on I-35W was 3.4 collisions per million vehicle miles traveled; after management it is 2.11.

- The Fuel Efficient Traffic Signal Management and the Automated Traffic Surveillance and Control programs in California showed benefit/cost ratios of 58:1 and 9.8:1, respectively. Automated Traffic Surveillance and Control, which includes computerized signal control, reported a 13 percent reduction in travel time, 35 percent reduction in vehicle stops, 14 percent increase in average speed, 20 percent decrease in intersection delay, 12.5 percent decrease in fuel consumption, 10 percent decrease in hydrocarbons, and a 10 percent decrease in carbon monoxide.

- The FAST-TRAC program in the Detroit, Michigan, area reported that, as a result of the installation of a traffic management system that included the SCATS adaptive signal control system and related improvements to intersection geometrics, certain types of accidents were virtually eliminated. During the study period injury accidents decreased 6 percent, injuries decreased 27 percent, serious injuries decreased 100 percent, and left turn accidents decreased 89 percent. At the same time, peak hour, peak direction speeds increased 19 percent and intersection delay decreased by up to 30 percent.

- Use of several popular traveler information projects is growing. The Los Angeles Smart Traveler project set up 78 information kiosks in locations such as office lobbies and shopping plazas. During this evaluation, the number of daily accesses ranged from 20 to 100 in a 20-hour day, with the lowest volume in offices and the greatest in busy pedestrian areas. The most frequent request (83 percent of users) was for a freeway map showing traffic conditions. Over half of the users requested bus and train information. WSDOT's Internet-accessible freeway map showing Seattle area traffic conditions is visited thousands of times a day.

- Surveys performed in the Seattle, Washington, and the Boston, Massachusetts, areas indicated that 30 percent to 40 percent of travelers frequently adjust travel patterns on the basis of travel information. Of those who change travel patterns, about 45 percent change their route of travel and another 45 percent change their time of travel; an additional 5 percent to 10 percent change their travel mode.

- The impact of Boston's SmarTraveler on emissions has been modeled, given the assumption that 30 percent of daily callers would change their travel plans. On a daily basis, this adjustment in travel behavior would reduce carbon monoxide by 33 percent. Although only 28,800 daily trips are expected to be affected in a metropolitan area with 2.9 million registered drivers, it represents significant reductions in pollutants by the participating travelers.

- Rail transit systems in San Francisco and Washington, DC, have been using magnetic stripe fare cards since the 1970s. Several pilot programs are testing newer electronic fare payment techniques. For example, an experiment involving 2400 rail travelers has been testing the use of radio frequency cards in the Washington, DC, system since February 1995. In California, tests comparing various card technologies have found that fare cards that use radio frequency to communicate are highly reliable. A test in the Marseilles, France, metropolitan area is comparing radio frequency and infrared technologies that would allow patrons to use the card of their choice (credit card, debit card, monthly pass) for transportation payment. In addition to gaining popularity, electronic fare payment has benefited fare collection and data collection.

- Phoenix, Arizona, transit operators have used electronic fare payment techniques since 1991. In response to an air quality bill passed by the Arizona state legislature in the late 1980s, the county encompassing Phoenix passed a travel reduction ordinance that required each employer in the Phoenix area with over 100 employees to reduce single-occupancy commuting trips by 5 percent in 2 years. The City of Phoenix Public Transport System led development of the Bus Card Plus system, which uses magnetically encoded plastic passes that enable the system to collect data that benefits the commuting program and helps reduce operational problems. Currently, 190 companies participate, and 35,000 cards are in use. The employers of those using the cards are billed monthly for their use. On express bus routes 90 percent of fares are paid by card. Processing fees have totaled under 7 percent of revenue generated, and no major problems have been encountered. In similar programs, New Jersey Transit estimates an annual cost reduction of $2.7 million in cash handling, and Atlanta estimates $2 million in savings.

E. The Implications of ITS for transportation programs

The computer revolution has and will continue to touch all of our lives, regardless of whether or not we individually choose to embrace the technology. The same can be said for transportation systems. Following are several implications of advanced technology, and specifically ITS, for transportation programs:

Operations versus construction focus

ITS applications have great potential to improve the operating efficiency and safety of our surface transportation systems. However, transportation programs have historically been dominated by large-scale construction activity, with operational-type improvements taking a back seat for funding and attention. The implementation of advanced technology applications will require a change in this construction focus, with a significant up-front commitment to installation of these operational systems, and continued commitment to day to day operations and maintenance.

Overcoming jurisdictional boundaries

ITS needs to be implemented on a system basis, regardless of jurisdictional control of specific facilities, and across public sector/private sector lines. Historically, however, the jurisdictional funding of our transportation programs has led to each jurisdiction making individual investment decisions that may not optimize the efficiency of the system.

Service to the customer

Most ITS applications are intended to improve transportation services for customers, whether those services are improved traffic information, more certainty in bus or train arrival times, or fewer unnecessary stops for commercial trucks. Many ITS applications, especially the Automatic Vehicle Control Systems, will be marketed to the public by private firms, and those with the most consumer appeal will be implemented first. Transportation agencies will have to remain keenly aware of these consumer trends, identify the applications that have a public benefit, and be willing and able to adapt the transportation infrastructure to accommodate or support those advanced technologies that have a public benefit and that the private sector can effectively market.

Making our highways smart

While fully automated highways may be still a long range vision, transportation agencies need to recognize the tremendous social and cost implications of converting our basic transportation structure to a more interactive, customer-oriented “smart” system. On the social side, does the public really want some level of external control over their driving behavior, even if that control means increased safety and efficiency? On the cost side, a fully implemented “smart” highway or transit system is probably akin to building another interstate system, not to mention the increased cost to consumers of smart vehicles. Although ITS will probably be implemented incrementally, transportation agencies need to discuss these social and cost implications with the public and to agree to some long-range vision of an ITS future.

II. ITS: The National Program

A. The National Evolution of Intelligent Transportation Systems

Over three decades ago, precursors to some of the user services included under today's advanced transportation technology umbrella began appearing in America's cities. Since then their implementation has become more flexible, capable, and integrated. Isolated ramp meters have developed into freeway management systems in metropolitan areas such as Los Angeles, Houston, San Antonio, and Seattle. Many cities aside from Seattle, such as Detroit and Atlanta, are building or expanding traffic management centers that include freeway management components. Incident management programs that began as courtesy patrols and CB monitoring have incorporated new technologies such as motorist call boxes, cellular phone call-in, loop detectors, live video and image processing techniques and are being integrated into transportation management centers. Transit fleet management has also evolved from managers with radios and clipboards to dispatch centers that receive real-time automatic vehicle location information. Electronic fare payment is expanding from magnetic fare card use by the Washington, DC, METRO and San Francisco BART rail systems to systems that also accept commercial credit cards and other electronic transaction devices. Electronic toll collection systems are being installed both in urban areas and on rural roadways.

B. ITS and ISTEA: The Development of a National Umbrella

Up until 1991, many jurisdictions across the country were implementing advanced transportation technologies, but without any formal national coordination, standards, or strategic direction. In 1991, Congress enacted the Intermodal Surface Transportation Efficiency Act of 1991, which restructured federal transportation programs and, for the first time, established a federal advanced technology program under the title "Intelligent Vehicle-Highway Systems" (IVHS). In the law, Congress established national goals for the IVHS program, required USDOT to develop a strategic plan for IVHS development and implementation, and authorized a USDOT grant program for IVHS planning and operational testing. The term IVHS was later changed to Intelligent Transportation Systems (ITS).

In 1992 IVHS America (now known as ITS America) developed the Strategic Plan for Intelligent Vehicle-Highway Systems (IVHS) in the United States, which established the goals and objectives for a national ITS program. At the same time, the United States Department of Transportation further defined the goals, milestones, and objectives of the national ITS program with its Intelligent Vehicle-Highway System Plan. This effort was followed by the development of a program, called simply the ITS Plan, by the National Highway Traffic Safety Administration to reduce traffic accidents, injuries, and fatalities.

From these efforts the United States Department of Transportation and ITS America developed the National ITS Program Plan in 1995. The National ITS Program Plan is the current guidance for the development of ITS. Specifically, it describes the national ITS program, ensures that the intermodal aspects of ITS are considered, guides investment decisions, promotes coordination between the public and private sectors, provides a strong focus on ITS deployment, provides assistance in local policy decisions, and facilitates a national program assessment.

C. The ITS National Structure

ITS embodies an array of technologies, but the challenges it poses are not solely technical. Organizational, institutional, and legal issues must be resolved before significant implementation can take place. ITS will require cooperation among all levels of local, state, and federal government, the private sector, and academia. For ITS to succeed, participants must together

- agree on an overall mission and direction
- provide stable funding and management
- develop public/private partnerships
- adopt appropriate standards and protocols
- educate transportation professionals, decision makers, and the public.

Below are descriptions of the major ITS players and their respective responsibilities in accomplishing these tasks.

ITS America

The lead role in the design of a national program of ITS research, development, and deployment belongs to the Intelligent Transportation Systems Society of America (ITS America). Its mission is to stimulate interest and activity in ITS and to foster and coordinate the needed public/private/academic partnerships. ITS America is a forum in which the private and public members of the ITS community can meet to reach consensus and take action to accelerate implementation of the technology. As a Federal Advisory Committee to the U.S. Department of Transportation, it helps guide the federal government's ITS activities and advises the U.S. Department of Transportation on establishing program priorities.

Federal Government

The federal government provides a national perspective to ITS. Federal spending is the required catalyst for private and local spending. The U.S. Department of Transportation has the key responsibility for encouraging and coordinating the development of ITS technology in conjunction with state and local governments, private industry, and academia. The U.S. Department of Transportation commissions research, funds demonstrations and operational tests, assures the uniformity of evaluations, encourages implementation, and ensures that systems are nationally compatible when required.

The Federal Highway Administration's Joint Program Office has been designated the lead agency for the ITS program. Other key U.S. Department of Transportation offices involved in advanced technology are the National Highway Traffic Safety Administration, the Federal Transit Administration, the Federal Railroad Administration, and the Research and Special Programs Administration.

State and Local Government

State and local governments are responsible for building, operating, and maintaining surface transportation systems, as well as for managing traffic. This makes their participation in ITS fundamental to its success. If state and local governments ignore or reject advanced technology, it will fail.

The state owns the Interstate highways, U.S. highways, and other state highways. Local governments own arterials and local roads. Many transit systems are owned by either state or local governments or by multi-jurisdictional agencies. State and local governments will install, maintain, and operate the ITS infrastructure, or they will possibly contract out these functions to the private sector. State and local governments in neighboring jurisdictions must find new ways to cooperate in order to develop and install advanced technology. Moreover, when systems will reach across jurisdictional boundaries, cooperation will be required to operate them.

Academia

Academia will help by assessing the current state of likely technological improvements and by performing basic and applied research and development and operational tests. Universities must also develop academic programs that will educate a new type of transportation professional, one schooled in the disciplines and concepts fundamental to ITS. These include, for example, communications, computer science, systems engineering, and institutional studies. In other words, academia must develop new concepts and knowledge germane to ITS and must integrate new academic disciplines with transportation.

Private Sector

The private sector's role in ITS will be fundamental. Industry will make by far the largest investment in ITS, but only given the promise of profits. The private sector is in the best position to understand the marketing of ITS because it will develop the technologies that will make ITS products and services a reality. Advanced technology will be a significant business opportunity for auto makers and for companies in the electronics, computer, communications, and information industries.

Although significant private investment will be required for ITS, government funding is also needed to encourage the private sector to develop consumer products and services that have potential for significant public benefit, and to make the infrastructure responsive to these new technologies.

III. ITS Planning in Washington

A. Background

Washington has started to implement ITS. Application of advanced technologies to Washington's transportation system is not a recent occurrence. In the 1960s some of the parts of what is now called ITS, coordinated traffic signal systems and closed circuit television cameras, were already in use on Washington roads and highways. During the '70s, '80s and early '90s, actuated and interconnected traffic signals, ramp metering, radio traffic advisory reports, programs such as FAME (Freeway and Arterial Management Effort), and demonstration projects such as HELP (Heavy vehicle Electronic License Plate) all promoted implementation of technologies on Washington's transportation system. Use of advanced technologies helps the state, counties, and cities control traffic on their roadways and allows public transportation providers to manage their systems. These technologies often provide information to the system managers that, if accessible in a timely manner, can aid system users in making travel choices and improve the efficiency of the whole system. The opportunity to use data collected for ATMS to improve ATIS is a synergy that will not happen without planning. The formal planning to capture the benefits of this synergy began in 1992.

B. Venture Washington - Strategic Plan

In 1992, the WSDOT sponsored a multi-jurisdictional effort called Venture Washington to develop a strategic plan to implement IVHS in Washington State. Guided by WSDOT and the IVHS Resource Group, which included local government representatives, consultants developed a strategic plan that included a public information program. Completed in 1993, the strategic plan has two dimensions.

First, the plan describes five program elements embraced as part of IVHS implementation in Washington. The five program elements are Public Transit Transportation Demand Management, Traveler Information, Traffic Management, Freight and Fleet Management, and Additional Services. Of the six national ITS areas, Washington's program elements embrace five: advanced traffic management systems, advanced traveler information systems, advanced rural transportation systems, advanced public transportation systems, and commercial vehicle operations. The plan does not, at this time, recommend that advanced vehicle control systems, or the highway investments needed to support these “smart” cars, be an active part of Washington's ITS program.

Second, the plan recognizes that the state of Washington encompasses a unique blend of geographical regions, and the plan presents a staging of needs that differs for each region. The five geographic categories are the Central Puget Sound, Spokane, Vancouver, other urban areas, and intercity/rural. The plan concentrates the use of ITS in the most highly congested urbanized areas, where the largest return on investment will be available in the near term. The plan also recognizes that in the long term all areas of the state can benefit from ITS so applications for small urban and rural areas are included. The strategic plan addresses the next 20 years and beyond. Many of the actions proposed by the plan are continuations of work already under way. Other applications proposed by the plan will not be operational for many years.

The Venture Washington strategic plan represents the first step in the deployment of advanced transportation technology within the state. The next step is to pinpoint problems along particular transportation corridors and to recommend specific technological solutions to solve these problems. This process is taking shape through corridor analysis projects. These projects are identifying specific current and future problems along important statewide roadway corridors and then developing detailed project prospectuses for the construction and deployment of technological solutions to these problems. The recommended projects that emerge from these corridor studies will be programmed through the state's budget process to provide funding for eventual construction and deployment. Throughout this process, research and investigation will provide the necessary knowledge and experience to proceed wisely with each project. Each project will be built upon the foundation of systems already in place and will be a step toward our future transportation system.

C. Venture Washington - Short Range Action Plan

Using the Venture Washington strategic plan as a base, the WSDOT developed a Short Range Action Plan for implementing advanced transportation technology. The program areas developed for the action plan are:

- comprehensive traffic management
- coordinated communications
- extensive traveler information systems
- roadway performance monitoring
- efficient traffic control systems
- alternatives to single occupancy vehicles
- improved safety

- enhanced commercial vehicle operations
- transportation corridor analysis.

For each of these program areas, projects have been identified at three levels of technological risk. These levels are evaluation, testing or proof of concept, and deployment. Deployment, the lowest level of technological risk, uses proven technologies. These projects are funded through normal budget processes. The second level of risk involves demonstration or field test projects. These projects test technologies to confirm the benefits that can be derived from them. The funding for demonstration projects normally leverages state funds with other funds from variety of sources. These are primarily federal but include local, transit, and private sector sources as well. The third risk level involves projects to evaluate unproven technologies to determine whether theoretically possible technologies have cost-effective, practical application. These projects are normally funded as academic research or through research and development ventures of private sector firms.

The complete version of the Venture Washington Short Range Action Plan can be found in Appendix B. This lists Washington State Department of Transportation's ITS goals for the state; the current projects that are underway, completed, or deployed; and the envisioned next steps for the program. The Short Range Action Plan is dynamic, intended to change as needs are realized, lessons are learned, and technology changes. Any policy adopted on the application of advanced technology will help shape the Short Range Action Plan as it changes.

IV. Issues, Discussion, and Policy Recommendations

The application of advanced technologies to transportation programs in Washington raises some policy issues that need to be addressed. There are four main issues:

- Washington's commitment to ITS
- partnerships
- risk management
- protection of citizen privacy

Although these issues are not necessarily unique to Washington and do not represent a comprehensive list of potential issues on a national scale, they are the most important here and drive the need to develop state policy on ITS. The following sections describe each of these issues and recommend policy statements to guide ITS implementation in Washington.

A. Washington's Commitment to ITS

Discussion

It is clear that advanced transportation technology has both proven and potential benefits for travelers in Washington. It will maximize the return on our existing infrastructure investment, will make the system more "user friendly," and will provide traditional transportation benefits such as improved mobility, safety, economic competitiveness, environmental quality, and reduced vehicle operating and infrastructure costs. However, existing transportation programs may not promote ITS implementation for a number of reasons. These are outlined below.

ITS: The Role of Government versus Individual Control and Privacy

A primary concern over ITS technology implementation is that these systems require government agencies to collect information and manage of transportation systems, at a time when government's role in many areas is being questioned. Although government's role in traffic operations has been accepted in the past, many new ITS technologies require information about individuals, their travel patterns and their vehicles which raise privacy concerns. As vehicle control technologies advance, additional questions will arise regarding the role of government or corporations in controlling how individual vehicles operate on the system. These issues of control and privacy have no easy solution. As these technologies advance continuing public dialogue will be necessary to ensure that citizens are comfortable with new roles for government and with the selected methods of deployment.

Single Jurisdiction Focus

To date, ITS applications have been implemented largely by individual jurisdictions. The state has implemented freeway management systems; cities and counties have individually applied advanced technologies to their arterial signal systems; and transit agencies have implemented fleet locator systems. However, traffic operates across jurisdictions. In order to gain further effectiveness from ITS technologies, and to optimize service to the traveling customer. government and private entities will have to work together to implement systems across jurisdictional boundaries. Most existing transportation programs, with their-single jurisdictional focus, do not promote the implementation of projects that have more than one owner. Some early pilot projects have been facilitated by special federal grants, but ongoing multi-jurisdictional implementation of these programs must rely on jurisdictions either pooling funds from existing funding sources or creating new cross-jurisdictional funding programs.

Two examples exist of cross-jurisdictional transportation project funding in Washington. In 1990, the Transportation Improvement Board was created to fund multi-jurisdictional congestion and economic development projects. In 1991, Congress enacted the Intermodal Surface Transportation Efficiency Act (ISTEA), which contained a Surface Transportation Program. An operating principle of this Surface Transportation Program is multi-jurisdictional project selection, carried out by Metropolitan Planning Organizations. Washington has been moving, toward increased multi-jurisdictional project selection processes, but most funding programs remain jurisdiction-specific, and there is no multi-jurisdictional program oriented toward traffic operation.

Construction/expansion focus

Another issue is that transportation programs have historically been oriented toward construction and expansion activities. Operational improvement projects have not received equal attention.

There are several reasons that may explain this. First, benefits from operational improvement projects have been less clearly proven than those from traditional transportation improvements. Methods for measuring these benefits have improved over time, so operational improvements are becoming more acceptable. Second, operational systems usually require an up-front capital investment. These are followed by ongoing operational costs, which are often largely due to rapidly evolving electronic components and computer control systems. Finally, transportation agencies, especially during the Interstate era, have had a culture of expansion, often with little expertise in or attention paid to system management. However, limited transportation budgets have changed agencies emphasis to doing more with less, leading to an increased focus on operational solutions to transportation problems.

With better measurement of operational benefits, a better understanding of the life-cycle costs of these systems, and concern with doing more for less, operational improvements will continue to become more important aspects of our transportation programs.

Customer Service Orientation

Many ITS applications move beyond traditional transportation “hardware,” providing travelers and their vehicles with information that will make their trips safer and more convenient. Knowing what the customer wants, and tailoring the ITS program to changing customer demands, will require changes in the way that transportation agencies operate. Information on customer demands will need to come from direct surveys, focus groups, and other customer contact. as well as keen monitoring of privately marketed products that distribute ITS information for customer convenience. Embracing ITS technology will require transportation agencies to expend the resources and develop the skills necessary to both measure customer demands and respond quickly to those demands.

Conclusion

The benefits of implementing advanced technologies on our transportation systems outweigh the costs and the risks. Our transportation institutions and financing arrangements should be adjusted to promote ITS implementation in Washington as a solution to transportation problems and as a service to the transportation customer.

Policy Recommendations

- Aggressively pursue the application of advanced technology to transportation systems in Washington.
- Continue WSDOTs, lead role in coordinating the statewide implementation of ITS technology, working collaboratively with cities, counties, transit agencies, other state agencies, and the private sector, and consistent with the state ITS strategic plan, "Venture Washington."
- Place a higher priority and greater level of commitment, across all transportation agencies in Washington, on transportation programs that improve operational efficiency

through advanced technology. Operational improvements should be given consideration equal to that given to infrastructure expansion in meeting mobility needs.

B. Partnerships

Discussion

For many of the state and national ITS projects and programs currently underway, both public and private organizations are cooperating to develop, deploy and evaluate new applications. The role of the private sector is essential in the national program, and in Washington State as well.

Private Partners

First, the private sector has the expertise to determine products desired by the public and to produce and market those products at attractive prices. The in-vehicle devices related to ITS are being developed, produced, and marketed by the private sector. Similarly, devices that enable individuals to receive current, useful traveler information (for example, bus arrival times, freeway congestion at certain locations, winter mountain pass conditions) are, and will continue to be, primarily by private sector products. Car radios, personal computers connected to the Internet, and television are examples of such products and systems. As new types of useful information become available and new products and techniques for delivering that information are developed, the private sector will continue to invest in product design, evaluation, production facilities, and marketing.

Second, the private sector has developed, fully understands, and has already deployed most of the existing ITS technology, but for applications other than transportation. Personal computers, cellular phones, high-speed communication networks, geographic locator systems, and smart cards for fee payments are examples of ITS technologies, but the devices have been fully proven and extensively deployed for other purposes. Private industries thorough understanding of these technologies is essential for modifying and deploying them quickly and effectively for transportation systems.

Third, the private sector is willing to invest in developing and modifying devices and systems where potential new markets and opportunities exist. This investment can be beneficial and complementary to public investment in ITS research, development, and deployment. Transportation is a subject of significant public interest and impact, and it constitutes a significant market opportunity for private firms. Inclusion of private partners in specific projects can provide a portion of the required funding. Because the private partners will invest only in areas that have potential; this is not only a method of acquiring funds but also an indication of project viability.

In recognition of the strong role of the private sector in ITS development and deployment, the federal ITS program emphasizes the role of the private sector, and federal funds strongly encourage private participation in individual projects. Financial participation, e.g., investment, is specifically sought.

Partnerships with private companies are governed by a substantial amount of state and federal law. Such laws are designed to assure fair competition and to prevent the misuse of public funds. As the WSDOT and other agencies proceed with ITS projects, a careful review of individual contracts and agreements to assure compliance with these laws and to protect the public interest will continue to be required.

Public Partners

A premise of the federal ISTEA legislation and the Washington State Transportation Policy Plan is that transportation systems connect intermodally and interjurisdictionally. Shippers and travelers take advantage of city streets, state highways, intercontinental air and water routes, rail lines, and various forms of public transportation to reach their destinations. It is not of major interest or consequence to shippers and travelers which government entity owns or operates the facilities on which they travel. Therefore federal, state, city, county, and special-purpose districts that own and operate transportation facilities must collaborate to effectively deploy ITS technology and to realize its benefits.

Among the agencies that have a significant role in ITS deployment are state law enforcement and regulatory agencies such as the Washington State Patrol, the Department of Licensing and the Traffic Safety Commission. In addition, city and county transportation agencies, law enforcement agencies and public transportation agencies have major roles. Ports can have significant roles in some CVO that directly affect freight movement and the avoidance of passenger bottlenecks. Federal agencies clearly include the USDOT but can also include, in some instances, the US Immigration Service and Customs, when international border crossings are involved.

Again, the federal ITS program encourages partnerships among various federal, state, and local agencies, and USDOT provides assistance in establishing these agreements where federal agencies are involved.

Coordination Efforts

The WSDOT has recognized the need for partners. both public and private, and the requirements for partnerships set forth by the USDOT in the federal ITS program. WSDOT is actively participating in the establishment of an organization called ITS Washington. This organization, chartered under the auspices of ITS America, will provide a forum in which participants can explore opportunities, identify partners for specific tests and implementation activities, and identify solutions to obstacles.

Conclusions

Partnerships among public agencies are essential for achieving the maximum benefits from ITS technologies, and such partnerships should be aggressively pursued.

Partnerships between the public sector and private companies can substantially increase the speed and effectiveness of ITS technology development and deployment, and should be aggressively pursued.

Policy Recommendations

- Transportation agencies in Washington should:
    - Be aggressive in forming partnerships among state, federal, and local agencies where relevant. Such partnerships assure integrated applications across modes and jurisdictions, speed deployment, and leverage the investment of each individual agency.
    - Seek dedicated funding and grants to implement integrated ITS applications through partnerships among public agencies.
    - Be aggressive in seeking and forming partnerships with private companies that have technological resources and knowledge applicable to ITS applications. Such partnerships provide access to the creativity, technological ability, and marketing prowess of the private sector; leverage public investment; and speed deployment of ITS applications**.** If necessary, seek changes in statute to allow WSDOT to receive revenues from partnerships with private companies.
    - Protect the public interest by promoting competition among private sector providers.
    - Require a significant benefit to the public in any public/private technology partnership.

C. Risk Management

Discussion

ITS technologies range from those that have been fully tested and proven in applications around the country and the world to applications that are in the stages of conceptual research and proof of concept. Within this range, many ITS technologies have been well researched and some have been field tested in limited applications. As the state of Washington develops and deploys these technologies, some level of uncertainty is involved in some applications. The uncertainty may involve benefits, costs, and operational effectiveness. A rational strategy for managing the uncertainty of new technology and of new approaches to proven technology is required.

Exploratory Research

Research and experimentation are needed to explore initial concepts and to determine technical feasibility, potential applications and possible benefits. Generally, this type of research is performed by universities or national laboratories and funded at the national and/or international level. Some of the Advanced Vehicle Control Systems (AVCS) program elements are in this phase of exploration and development. The private sector--notably auto manufacturers, communications companies and computer companies-- have a definite interest in and financial commitment to these early research findings. California has also been a leader in this area, exploring control and vehicle management technology and highway management methods.

Applied Research

After specific applications have proven feasible and when significant benefits appear probable in specific areas, an applied research project, sponsored locally, is often appropriate. Applied research is meant to tailor the application to local conditions and to permit local experts to evaluate potential uses. The experiment or study should be thorough and objective and should directly involve those who would use the technology if it was implemented. The “users” include state and local traffic engineers as well as travelers and shippers as appropriate.

If applied research proves successful, the next rational step is a limited field test to see how the technology operates in the field and to generate an objective assessment of capital and operating costs, benefits, and public acceptance. This limited field trial can also form a basis for determining staff training needs, if any.

Implementation

Finally, as a concept is successively proven to be technically feasible, locally beneficial and operationally practical in successive stages, a full implementation can be programmed with considerable confidence in the effectiveness and benefits, while accurately estimating capital or initial costs as well as ongoing maintenance and operational costs.

Federal Perspective

At each step in the process described above, minimum investments are made so that if the concept proves unsuccessful, too expensive, or unsuited to local/regional needs, it can be abandoned at minimum cost. On the other hand, as the technology or concept is successively analyzed and refined, practical and objective assessments and adaptations to local conditions can be made, and the uncertainty associated with new technology can be reduced or eliminated.

The federal ITS program recognizes this uncertainty and supports the approach described above to reduce and/or eliminate it. The USDOT funds conceptual, exploratory research to a significant extent and awards research funding to universities, private research organizations, and national laboratories for this sort of research. Progress reports and research results are disseminated in various ways, often through technical papers and presentations in forums such as meetings of ITS America and the Transportation Research Board (TRB).

The USDOT also provides supplemental funding to state and local transportation agencies to do evaluations, field tests, and applied research on the emerging technologies that seem most promising. Again, results are widely disseminated so that the entire transportation community can stay abreast of developments.

Finally, the USDOT provides funding for accelerated implementation in test cases around the country; substantial matching funds are also required from state and local sources for these deployments, but the USDOT provides funding for objective evaluations and for workshops, publications, and other methods of disseminating the results of these projects. The recent awards to WSDOT for projects such as SWIFT, PuSHME, and Travelaid are examples of this type of program.

The intent of this federal program structure is to substantially accelerate the research, development, and practical application of new ITS technology. The program provides funding incentives to tailor the technology to local needs and conditions to widely disseminate study and field test results, and to thereby reduce the uncertainty of deploying these technologies while still implementing them as quickly as possible.

Conclusion

The current national ITS technology program, in which the federal government has a strong role in developing concepts through research and implementation of promising or proven technologies at the state and local levels, provides opportunities for developing, improving and implementing new technology quickly, but with minimum uncertainty (risk) to state and local agencies.

Policy Recommendations

- Transportation agencies in Washington should minimize the uncertainty and risk in deploying new ITS technology by pursuing the following strategies:
  - Aggressively pursue the implementation of applications that have proved effective through research, demonstration projects, and broadscale deployment elsewhere.
  - Demonstrate applications supported by substantial research and indications of strong demand, but whose benefits have not yet been fully documented; seek federal and other funding to maximize the benefits of state and local funds in proceeding with such demonstrations.
  - Monitor applications and projects nationwide that have the potential to create substantial benefits for travelers, shippers, and transportation agencies.
  - WSDOT should seek to involve relevant staff in the national ITS program to both stay informed of the newest technologies and to shape the development of these technologies to assure that they will provide maximum benefit to the state.

D. Protection of Citizen Privacy

Discussion

Since some ITS systems collect, use, and electronically store information to effectively manage traffic and inform travelers, questions regarding access to that information. and thus personal privacy, have been raised.

For example, automatic toll collection systems require that information regarding the time and date that a vehicle passed a toll station be retained for billing and bill verification purposes. However, that record could be used for secondary purposes, such as law enforcement investigations. Questions arise about this secondary use: Under what conditions should the electronic data files be made available to law enforcement officials? What prior consent is required before an individual is issued an automatic toll collection sensor? Can other agencies, public and private, access the data files under Freedom of Information principles?

At the national level, ITS America is developing Fair Information and Privacy Principles. These are designed to respond to the growing concern that privacy issues are being ignored in a rush to deploy Intelligent Transportation Systems solutions. The following principles have been adopted by ITS America in 'draft final' form and will go to the organization's Legal Issues community before full incorporation. Below is a summary of the principles.

Individual Centered. ITS must recognize and respect the individual's interests in privacy and the use of information in systems.

Visible. Intelligent transportation information systems will be built in a manner "visible" to individuals. In other words, individuals should be fully informed about the data collected and how those data will be used.

Comply. ITS will comply with state and federal laws governing privacy and information use.

Secure. All ITS information systems will use data security technology and audit procedures appropriate to the sensitivity of the information.

Law Enforcement. ITS will have an appropriate role in enhancing travelers' safety and security interests, but absent consent, government authority, or appropriate legal process, information identifying individuals will not be disclosed to law enforcement. ITS systems should not be used as a surveillance means for enforcing traffic laws, although individuals are concerned about public safety. Persons who voluntarily participate in ITS programs or purchase ITS products have a reasonable expectation that they will not be "ambushed" by information they are providing.

Relevant. ITS will only collect personal information that is relevant for ITS purposes.

Secondary Use. ITS information coupled with appropriate individual privacy protection may be used for non-ITS applications.

Freedom of Information. Federal and state Freedom of Information Act obligations require disclosure of information from government maintained databases. Database arrangements should balance the individual's interest in privacy and the public's right to know.

ITS America says that- the principles are “advisory, intended to educate and guide transportation professionals, policy makers and the public as they develop fair information and privacy guidelines for specific intelligent transportation projects.” The organization also recommends that “enforceable provisions for safeguarding privacy in their contracts and agreements” be included in ITS deployments.

Conclusion

Transportation agencies in Washington State should design, construct, and operate ITS technologies in a manner that protects the privacy of individuals.

Policy Recommendations

- WSDOT and other transportation agencies in the state should follow the guidance provided by ITS America in its draft Fair Information and Privacy Principles when developing, implementing and operating ITS Systems.
- WSDOT should actively work with the State Attorney General to assure that current state law and guidance regarding Freedom of Information and individual privacy issues are fully understood, and that safeguards are incorporated in ITS applications. If necessary, WSDOT should propose changes to statute to protect citizen privacy when using ITS applications.
- WSDOT should monitor developing privacy standards. assist in developing those standards, and support standards that ensure the privacy of travelers.

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APPENDIX A
ITS USER SERVICES

User services define the capabilities that ITS will provide to customers. The national ITS Community planning activities currently identify 29 user services in seven categories. While still evolving, these user services collectively define near-, mid-, and long-term ITS capabilities

Travel and Traffic Management

- *En-Route Driver Information.* Improves convenience and efficiency with driver advisories and in-vehicle signing.
- *Traveler Services Information.* Provides a reference directory or "yellow pages" of service information.
- *Route Guidance.* Provides travelers with instructions on how to efficiently reach their destinations.
- *Incident Management.* Helps officials quickly identify incidents and implement a set of procedures to minimize their effects on traffic.
- *Traffic Control.* Manages the movement of traffic on streets and highways.
- *Emissions Testing and Mitigation.* Provides area-wide pollution information for monitoring air quality and for framing air quality improvement strategies.

Public Transportation Management

- *En-Route Transit Information.* Provides information to travelers using public transportation while they are on their trips.
- *Personalized Public Transit.* Flexibly routes transit vehicles, offering more convenient service to customers.
- *Public Travel Security*. Creates a more secure environment for public transportation patrons and operators.
- *Public Transportation Management.* Automates operations, planning, and management functions of public transit systems.

Commercial Vehicle Operations

- *Commercial Vehicle Electronic Clearance.* Facilitates domestic and international border clearance, minimizing stops.
- *Automated Roadside Safety Inspection.* Focuses on improving safety in commercial vehicle operations.
- *Commercial Vehicle Administrative Processes.* Enables electronic purchasing of credentials and automated mileage and fuel reporting.
- *On-Board Safety Monitoring.* Senses the safety status of a commercial vehicle, cargo, and driver.
- *Commercial Fleet Management.* Provides communications between drivers and dispatchers for efficient routing.
- *Hazardous Material Incident Response.* Provides immediate notification of an incident and immediate request for assistance.

Electronic Payment

- *Electronic Payment Services.* Allows payment for transportation related transactions without cash.

Emergency Management

- *Emergency Vehicle Management.* Keeps track of available resources and directs them to incidents, reducing response time.
- *Emergency Notification and Personal Security*. Provides immediate notification of an incident and immediate request for assistance.

Travel Demand Management

- *Pre-Trip Travel Information.* Provides information for selecting transportation modes that best suit travelers' needs.
- *Ride Matching and Reservation.* Helps increase the attractiveness of shared-ride transportation.
- *Demand Management awl Operations.* Manages access to roadways, supporting policies and regulations such as the 1990 Clean Air Act Amendment.

Advanced Vehicle Control and Safety Systems

- Longitudinal Collision Avoidance. Prevents head-on and rear-end collisions with other vehicles and pedestrians.
- *Lateral Collision Avoidance.* Prevents collisions by preventing vehicles from leaving their own lane and entering an adjoining lane occupied by another vehicle.
- *Intersection Collision Avoidance.* Prevents collisions involving right-of-way violations at intersections.
- *Vision Enhancement for Crash Avoidance*. Improves the driver's ability *to* see the roadway and obstacles.
- *Safety Readiness.* Provides warnings regarding the condition of the driver, vehicle, and roadway infrastructure.
- *Pre-Crash Restraint Deployment.* Anticipates an imminent collision and activates passenger safety mechanisms before the collision.
- *Automated Highway Systems.* Fully automates vehicles on instrumented highways, significantly improving today's safety, efficiency, and comfort standards.

APPENDIX B
VENTURE WASHINGTON SHORT RANGE ACTION PLAN

In order to plan for the future the Washington State Department of Transportation has developed a strategic plan for implementing advanced transportation technology. Venture Washington is the program that will make the strategic plan a reality. This ITS strategic plan addresses the next 20 years and beyond. Many of the actions planned are continuations of work already under way. Other planned applications will take many years before they are operational.

The ITS strategic plan recognizes that the state of Washington comprises a unique blend of geographical regions, and it is structured to address the differing needs of each.

The Venture Washington strategic plan represents the first step in the deployment of advanced transportation technology within the state. The next step is to pinpoint problems along particular transportation corridors and to recommend specific advanced transportation technology solutions to solve these problems. This process will be done through the studies of the state's major ground transportation corridors. The solutions will then be programmed into the state's budgeting process to provide funding for eventual construction and deployment. Throughout this process, research and investigative efforts will provide the necessary knowledge and experience to proceed wisely with each project. And each built upon the foundation of a system already in place, will be a step toward our future transportation system.

COMPREHENSIVE TRAFFIC MANAGEMENT

Complete and extend our data collection and surveillance, Control and Driver (SC&DI) information systems.

Goals

- Expand and complete the Seattle area SC&DI system, including the fiber optic communication system.
- Install SC&DI systems and fiber optic-based communications systems in Tacoma and Vancouver.
- Install the first elements of a wireless SC&DI system in the Spokane area. This will be eventually expanded to a complete regional SC&DI system.
- Install solar powered and other stand alone systems, such as cellular call boxes and data stations and wireless closed circuit television to provide comprehensive and real-time information on selected rural roadway sections.

Current or Completed Efforts

Evaluation Studies/Research Projects

- *Improve Congestion Prediction Algorithm* used predictive techniques to improve ramp control algorithms and *Improve Error Detection and Incident Detection Using Prediction Techniques and Video Imaging* improved identification of bad detector data and improved our knowledge of the relationship of volume and lane occupancy to traffic speed.
- *Improve Error Detection for Induction Loop Detectors Using Correlation Techniques* improved induction loop accuracy and has led to a possible incident detection algorithm.
- *Investigation of Automatic Vehicle Location Systems for Traveler Information* used Metro Transit Automatic Vehicle Location data to improve information available to travelers and transportation managers
- *Options for Monitoring Traffic Congestion in Washington's Urban Area* developed recommendations on alternatives for implementing traffic congestion monitoring systems.
- *Incident Response Evaluation* will look at the effectiveness of the state's incident response teams.

Technology Test/Proof-of-Concept Projects

- “Autoscope” and “Mobilizer” *Video Detection Projects* demonstrated technology *to* replace or supplement loop detectors for data collection.
- *Ramp Control via Neural Network Control* developed and tested a new ramp metering algorithm by using an artificial neural network congestion predictor and a multi variable control system and Fuzzy *Logic Ramp Metering* project will test this ramp metering algorithm both by using models and in the field.
- *Investigation of GPS and GIS for Traveler Information* investigated the feasibility of combining the advanced technologies of both vehicle location and digital geographic information systems to produce a better tool for real-time traffic monitoring.
- *Incident Management Framework Demonstration* demonstrated a procedure for developing an incident management plan for the Tacoma area

Deployment

- *Improved Travel Time Estimates* improved the process of estimating speeds from loop data.
- *Test and Analysis of AVI for Congestion Management and Travel Information is* testing a loop-based Automatic Vehicle Identification system prototype on the North I-5 corridor using Community Transit buses.
- *Incident Response Data Base* will develop a database to be used in evaluating incident response measures developed and implemented in the Seattle area. The database will be used statewide.

- *Incident Response Guide* developed the procedures for the statewide incident response program.
- *In-Vehicle Signing and Variable Speed Limit IVHS Demonstration*, known as Travel Aid will improve safety on a 4-mile section of I-90 across Snoqualmie Pass by implementing one of the first rural traffic management systems in the nation.

The Next Steps

- Complete the *North Seattle ATMS Integrated Signal System Project*.
- Develop an Advanced Traffic Management System (ATMS) plan for the Vancouver, Washington, region.
- Develop an Advanced Traffic Management System plan for the Spokane region.
- Implement a Port of Tacoma Advanced Traffic Management System.
- Demonstrate a rural SC&DI system in the Centralia area to detect delays from construction, incidents, and weather.

COORDINATED COMMUNICATIONS

Design and install a statewide communications system to enable exchange of data and video between Surveillance, Control and Driver Information (SC&DI) systems and to support statewide ITS projects.

Goals

- Link the Tacoma and Seattle area SC&DI systems.
- Link the Vancouver and Portland SC&DI systems.
- Complete the following studies and implement the recommendations for the:
  - Seattle to Spokane Corridor Study
  - Seattle to Vancouver, BC, Corridor Study
  - Portland to Boise Corridor Study.

Current or Completed Efforts

Evaluation Studies/Research Projects

- *Seattle to Portland Intercity IVHS Corridor/Statewide IVHS Plan* has identify ITS needs and develop a communications plan for the I-5 corridor from Seattle *to* Portland.
- *Investigation of Two-Way Wireless Digital Information for ATIS/ATMS Development* developed a framework in which to understand, select, and apply wireless data communications technology to ITS.

- *IVHS-Network and Data Fusion will* generalize from specific, regional issues investigated in other, related projects by creating key network and fusion components that are transferable to other regions and countries.
- The *I-5 Seattle to Vancouver BC & I-90 Seattle to Spokane Intercity Urban/Rural ITS Corridor* projects will identify ITS needs and develop a communications plan for the respective corridors.

Technology Test/Proof-of-Concept Projects

- *IVHS Backbone Design and Demonstration will* design, construct and demonstrate an architecture for a regional fiber optic ITS backbone for the Puget Sound area.
- *Traffic Data Acquisition and Distribution*, or TDAD, will provide a regional multi-agency data base of traffic information to permit jurisdiction to better work together when planning transportation improvements.

The Next Steps

- Maintain and enhance the ITS communications backbone between WSDOT's Seattle area Traffic System Management Center, the University of Washington, and Puget Sound area cities.
- Develop proposals with Washington State Patrol for statewide corridor communications systems.

EXTENSIVE TRAVELER INFORMATION SYSTEMS

Deliver roadway information to users in homes, offices, shopping areas, recreational sites, and en-route.

Goals

- Provide pre-trip traveler information to a variety of delivery systems to include telephone, television, radio, computer, and in-vehicle devices.
- Provide en-route traveler information to a variety of platforms to include cellular phone, radio, transportable computers, and in-vehicle devices. This information may be

delivered by various carriers, including wireless phone, radio sub-carrier, and other broadcast media.

Current or Completed Efforts

Evaluation Studies/Research Projects

- *Demonstration of ATIS/ATMS Data Fusion in a Regional IVHS and Impact Assessment of Advanced Traveler Information Systems in the State of Washington*, assessed advanced traveler information systems.

Technology Test/Proof-of-Concept Projects

- *Real-Time Traveler Information System*, known at Traffic Reporter, will provide delivery of the system for public use and will evaluate the system under actual use.

The Next Steps

- Complete the *SWIFT Operational Test of En-route Driver and Transit Information Delivery*.
- Consider the results of the *Herald Operational Test* of an AM sub-carrier, being conducted by ENTERPRISE, for application within Washington.
- Develop a multi-modal traveler information center and test it at transportation hubs statewide.
- Test the feasibility and determine the use ability of delivering traffic surveillance video over the Internet.
- Establish *Intermodal Terminal Information Kiosks* at rail stations along the 1-5 corridor.
- Develop an advanced Seattle to Portland I-5 Corridor Traveler Information System.

ROADWAY PERFORMANCE MONITORING

Establish a performance monitoring system that will use data collected from around the state.

Goals

- Equip bus fleets with Automatic Vehicle Identification(AVI) and Automatic Vehicle Location(AVL) systems to function as data probes.
- Equip a sample population of passenger vehicles to function as probes.
- Establish consistent monitoring of truck volumes and movements.

Current or Completed Efforts

Evaluation Studies/Research Projects

- *Travel Time and Vehicles as Probes Research,* an Enterprise project, will investigate using vehicles tagged for AVI to replace or supplement current data collection methods.
- *Options for Monitoring Traffic Congestion in Washington's Urban Area* developed recommendations on alternatives for implementing traffic congestion monitoring systems.

Technology Test/Proof-of-Concept Projects

- Autoscope" and "Mobilizer" *Video Detection Projects demonstrated* technology *to* replace or supplement loop detectors for data collection.

Deployment

- *Test and Analysis of AV7 for Congestion Management and Travel Information is* testing a loop-based AVI system prototype on the North I-5 corridor using Community Transit buses.
- *Community Transit Arterial System Area—Wide Priority will* use buses as probe vehicles *to* collect arsenal traffic information.

The Next Steps

- Develop an AVI standard for the Puget Sound region.
- Investigate the use of Metro Transit's AVL system for providing arterial travel times.

EFFICIENT TRAFFIC CONTROL SYSTEMS

Encourage regional coordination of traffic operations.

Goals

- Share traffic data and video among agencies.
- Coordinate traffic signals on arterials across jurisdictional boundaries and with freeway traffic management systems.
- Coordinate incident detection and response across jurisdictional boundaries.

Current or Completed Efforts

Deployment

- *North Seattle Advanced Traffic Management System (ATMS) will* develop a central database to share both freeway and arterial traffic control data among jurisdictions in the Seattle to Everett corridor.

The Next Steps

- Secure funding for ATMS systems for the areas east and south of Seattle to mirror the efforts of the ongoing North Seattle ATMS project.
- Implement the recommendations for ATMS projects developed in the *Seattle to Portland Corridor Study*.
- Design, deploy and evaluate a *Pierce County Advanced Traffic Management System.*

FOSTER USE OF ALTERNATIVES TO SINGLE OCCUPANCY VEHICLES

Apply advanced technology to encourage transit use, provide ride sharing incentives, and facilitate use of alternative modes.

Goals

- Provide regional transit traffic signal priority.
- Provide real-time transit and ride sharing information to commuters at home before their trips, at transit centers, and en-route.
- Provide comparative travel time information for general purpose lanes and high occupancy vehicle lanes.
- Investigate applications of advanced technology to improving non-motorized transportation.

Current or Completed Efforts Evaluation **Studies/Research Projects**

- *Impact of Driver-Controlled Traffic Lights on Kitsap County Transit* evaluated the use of Opticom traffic light equipment on traffic lights in the city of Bremerton for transit priority.
- *HOV Lane Usage Analysis and Evaluation Tool* developed a methodology for evaluating HOV lane use and *HOV Lane Evaluation and Monitoring* produced the first annual HOV system evaluation based on the developed methodology.

Technology Test/Proof-of-Concept Projects

- *Bellevue Smart Traveler: Using Traveler Information to Reduce Downtown SOV Commuting will* produce, implement, and test a Traveler Information Center prototype designed to increase the use of transit and paratransit by downtown Bellevue office workers.
- “Autoscope” and “Mobilizer” *Video Detection Projects* demonstrated technology to replace or supplement loop detectors for data collection, and *Volpe Video License Plate Project* tested the use of video cameras to observe vehicle license plates for computing travel times.

Deployment

- *Test and Analysis of AVI for Congestion Management and Travel Information is* testing a loop-based Automatic Vehicle Identification (AVI) system prototype on the North I-5 corridor using Community Transit buses.
- *Increasing Awareness of Transportation Options Through Riderlink Project will* produce, implement, and test a Traveler Information Center prototype designed *to* increase the use of transit and paratransit.
- *Riderlink* provides ride share information on Metro bus route schedules and maps, ride matching services, HOV lane use, and ferry schedules over the internet.

The Next Steps

- Implement SWIFT Smart Traveler, the dynamic ride sharing component of the Seattle Wide-area Information for Travelers (SWIFT) operational test project.
- Enable SWIFT portable computer device to provide transit and traffic congestion information.
- Work with Metro Transit on its Trip Planning Project.
- Begin Metro Transit and Community Transit Advanced Traffic Management System *Arterial System Area-wide Priority* (ASAP) transit priority projects.

IMPROVED SAFETY

Increase traveler safety.

Goals

- Establish a statewide emergency Mayday system.
- Develop automatic incident detection and response systems.
- Promote the development of innovative in-vehicle technology to reduce rear-end, sideswipe, and run-off-the-road accidents

Current or Completed Efforts

Evaluation Studies/Research Projects

- *NEXRAD: NEXt Generation Weather RADar is* investigating potential transportation applications for the new Doppler weather radar.
- *Seattle to Portland Intercity IVHS Corridor Study*, and *I-5 Seattle to Vancouver B C & I-90 Seattle to Spokane Intercity Urban/Rural ITS Corridor Study will* identify ITS solutions to potential safety problems along these important corridors.

Deployment

- *In-Vehicle Signing and Variable Speed Limit IVHS Demonstration*, known as Travel Aid will improve safety on a 40-mile section of I-90 across Snoqualmie Pass by displaying variable speed limits and other safety messages based on traffic and roadway conditions.

The Next Steps

- Completion of the *Pushme Mayday Operational Test* of emergency traveler communications systems.
- Look at the results of the Colorado Mayday Test, being conducted for ENTERPRISE, for application within Washington.
- Test a system *to* provide corridor weather information to motorists using the Seattle to Portland corridor, as recommended in the *Seattle to Portland IVHS Corridor and Communication Study*.

ENHANCED COMMERCIAL VEHICLE OPERATIONS

Increase the efficiency of commercial goods movements throughout the state.

Goals

- Develop paper less and automated systems for permitting, weighing, and safety inspections.
- Share permitting and credential databases between adjacent states.
- Support national efforts to develop hazardous materials tracking systems.
- Support the development of innovative in-vehicle technology to increase truck operations safety.

Current or Completed Efforts

Evaluation Studies/Research Projects

- *Truck Brake Condition Safety Research* is investigating ways to predict heavy truck brake failure in time to allow the driver to take action.
- *Investigation of Truck Restrictions* investigated various truck restrictions on the state's freeways, recommended demonstration of the most viable restrictions, implemented the selected restrictions, and evaluated the results.
- *Washington State Ferries Static/Variable Message Signage* is looking at ways to improve communicating real time ferry vessel arriving and departure times and terminal wait times to vehicles as they approach terminals.

Deployment

- *HELP/Crescent Project* implemented ways to improve truck mobility along the West Coast and including border crossings with Canada.
- *Western States Transparent Borders Project* studied and recommended ways to remove the barriers that limit the implemented of ITS that could improve truck transport in seven western states (WA, OR, ID, MT, WY, NV, & UT).

The Next Steps

- Install weigh-in motion stations in conjunction with recommendations of the HELP project.
- Conduct a study of ways to improve freight movement through congested corridors.

Appendix A.4

Washington State Department of Transportation Transportation and Communication Plan

Final Draft

Washington State Transportation

Policy Plan

Subcommittee on
Telecommunications and Transportation Linkages

Report to
the State Transportation Policy Plan
Steering Committee

June 14, 1994

The Washington State Transportation Policy Planning Process

The Washington State Transportation Policy Plan is an ongoing consensus based process established in 1988 by the state Transportation Commission to help shape and direct state, regional, and local -policy decisions about Washington's future transportation system. Led by a steering committee comprised of diverse private and public interests from all around the state, the process conducts in-depth policy analysis into various current and emerging transportation issues; facilitates public review and comment on preliminary policy proposals and action strategies; and submits annual Commission recommendations to the Washington State legislature.

This policy study background report presents the findings and preliminary recommendations of a technical subcommittee convened in 1994 in support of the State Transportation Policy Plan Steering Committee. The report forms the basis for policy proposals that will be distributed for public review. Following state Transportation Commission adoption, final policy recommendations will be reported to the state legislature in 1995.

For additional- information about the Washington State Transportation Policy Plan process, or to obtain additional copies of this document, please contact:

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I. Introduction

Traditionally transportation has meant moving people and goods. Most of us think of transportation as the way we get to where we want to go -- by walking, driving, biking, or taking the bus. We also think of transportation as how the goods we buy or depend on for work get to stores and businesses. But, what about the movement of information? Is this a form of transportation? Increasing access to information over wires, cables and airways through phones, computers, faxes, radios, and TVs means that increasingly people do not have to tTave1 to access some jobs or services. We can now bring work to people instead of transporting people to work. This suggests that we need to evolve our traditional concept of transportation beyond just personal and freight mobility. We should begin to envision a "transportation system that provides safe, efficient, dependable and rapid accessibility for people, goods, and *information* to desired destinations."*

The Transportation Commission recognized these emerging issues and questions and asked the Telecommunications and Transportation Linkages Subcommittee of the State Transportation Policy Plan Steering Committee to investigate the current and potential linkages between transportation and telecommunications and recommend state transportation policies in this area. The subcommittee began by exploring this topic through investigating the following questions (in addition to the ones covered above):

- What is the role of traditional transportation providers in facilitating current and future telecommunications technologies?
- What impact will telecommunications improvements have on existing transportation systems?
- What actions or policies should the providers of traditional traveller services take or follow to prepare for the future?

In the popular press, a wide range of topics are covered under telecommunications. Real-time video telephones, 500 channel, interactive television, Vice President Gore's vision of an "Information Superhighway" networking personal, corporate and government computers worldwide are among some of the topics that come to mind. The field is broad and difficult to fully comprehend. To become better educated on the topic of telecommunications, and the potential linkages and impacts to transportation, the subcommittee listened to presentations from several noted experts representing the following businesses and organizations:

- Microsoft
- AT&T
- Governor's Telecommunications and Information Policy Work Group
- Regional Public Telecommunications Council
- Washington Department of Information Services

<u>Transportation Policy Plan for Washington State. 1990 Report to the Legislature.</u> one of the several descriptions of the preferred transportation future adopted by the Washington State Transportation Commission.

- Washington State Energy Office
- Washington State Utilities and Transportation Commission
- Office of the Superintendent of Public Instruction
- Washington State Department of Community, Trade and Economic Development
- Washington State department of Transportation

All of the organizations presented information on current and future telecommunications applications and stimulated subcommittee discussion of linkages and impacts to transportation. The subcommittee quickly learned that technology in the telecommunications industry is rapidly evolving. Because of this evolution, the linkages between telecommunications and transportation will grow and are envisioned to be significant, but the exact technology that will be dominant cannot be determined.

Several visions of future impacts of telecommunications on transportation are possible. The speed of technological changes, the convergence of applications in communications, electronics and computers, and the reduction in costs of using telecommunications in the entertainment, marketing, education, and medical industries allow many possible future outcomes with no specific outcome being most likely. This report provides a summary of the technologies discussed by the subcommittee and presents policy recommendations linking telecommunications and transportation that can endure uncertain technological outcomes.

II. Definitions and Current Statutes

Definitions of *telecommunications* and the *telecommunications industry* are difficult to pin down. Luckily, however, through state law there is a starting point. In Washington state law, telecommunications is defined as the transmission of information by wire, radio, optical cable, electromagnetic, or other similar means. As used in this definition, "information" means knowledge or intelligence represented by any form of writing, signs, signals, pictures, sounds, or any other symbols.

Mergers, joint ventures and technological convergence have made the telecommunications industry so dynamic that it can be difficult to define. Yet for the purpose of this report, telecommunications industry is best defined as an industry which includes telecommunications facility providers such as local telephone, long distance, cable and competitive access companies and also software and service providers who help develop the applications that make these facilities work.

The telecommunications industry has basically been independently developed by private industry to this point with some state and federal regulation. Current state policy on telecommunications contained in state statutes (RCW 80.36) pertains to the Utilities and Transportation Commission regulatory powers. The statute declares that it is the policy of the state to:

- Preserve affordable universal telecommunications service;
- Maintain and advance the efficiency and availability of telecommunications service;

- Ensure that customers pay only reasonable charges for telecommunications service;
- Ensure that rates for noncompetitive telecommunications services do not subsidize the competitive ventures of regulated telecommunications companies;
- Promote diversity in the supply of telecommunications services and products in telecommunications markets throughout the state; and
- Permit flexible regulation of competitive telecommunications companies and services.

The subcommittee did not make specific recommendations in this report regarding price regulation or changes to the current authority of the Utilities and Transportation Commission.

III. Current and Emerging Trends in Telecommunications

Historically, the various modes of service delivery in the telecommunications industry have had distinct differences in technologies and purposes. Telephones have been common carriers of voice communication; broadcast television and cable television offered one-way video communication including entertainment and educational programming. Today, new communications technologies are allowing the simultaneous transmission of vast amounts of voice, data, and video signals, blurring the distinctions between formerly distinct markets for fixed telephone, cellular phone, cable, and other services. Undoubtedly, new technologies increasing the speed of information exchange on the information superhighway will continue to change the way people perform day-to-day activities. Billions of dollars worldwide have been and will continue to be spent on research and development of advanced telecommunications systems in an earnest effort to provide what people desire: mobility and instant access to messages, data and information. With new technologies quickly becoming basic elements of everyday life, performing common everyday tasks will require the ability to change and adapt to new technologies.

Discussed below are several telecommunications technologies that were described to the subcommittee. Each of these technologies can have the effect of creating transportation cost savings. Elements such as time, gas, vehicle wear-and-tear, impacts on the environment, personal stress levels, and decreased productivity are direct and indirect costs of traveling people encounter on a daily basis. With the aid of telecommunications technologies, those costs may be dramatically reduced.

Videoconferencing as described to the committee, allows two-way visual communication in real time, across great distances, just as if the interaction was in person. As currently used, videoconferencing requires individuals to go to specifically equipped locations to fully participate in the process. In Washington state, Washington Interactive Television (WIT) is already operational. The Washington State Department of Transportation and the Washington State Department of Labor and Industries have already made use of WIT to reach as many employees as possible simultaneously with news of changes in their agencies. WIT also allows access to local access television channels. Videoconferencing can reduce state and corporate transportation and travel costs.

Distance learning is another technology that also increases the ability to avoid long distance transportation costs. The subcommittee learned from a representative of the Superintendent of Public Instruction that an electronic network for distance learning (ideanet) is currently operational in Washington state. Increased use of distance learning could reduce the cost of travel in education, making better use of students' and teachers' time while expanding the ability of highly qualified instructors to teach a widely dispersed group of students. This technology can also serve to expand services to the economically disadvantaged and the physically disabled who could not otherwise attend class.

With the same goal in mind as distance learning, *distance medicine* may allow more efficient processing of information between medical professionals, patients, hospitals, and other institutions regardless of the miles between them. As proposed, distance medicine could reduce the need for long vehicle trips while increasing service to residents of rural areas with difficult access. Distance medicine can provide contact between provider and patient when miles or weather might normally prohibit communication. This technology can increase the ability of highly qualified specialists to review the diagnoses of more distance general practitioners. An application of distance medicine is currently being used in medical education in Washington state.

Teleshopping, defined here as direct retail marketing on television, is a growing part of the telecommunications industry. Shopping channels provide cable TV customers the opportunity to acquire a large variety of merchandise by calling 1-800 telephone numbers and using credit cards as a medium for payment. With some shopping malls situated where they are not easily accessible to individuals who live in outlying areas, teleshopping can be a viable and convenient method of shopping. Also shopping malls are not open 24 hours a day but shopping channels can be tuned in at any time of day. Merchandise ordered by phone is then delivered by carrier services such as UPS, Federal Express, etc. This technology changes transportation patterns from intermittent passenger vehicle stops and freight delivery at retail outlets to freight delivery directly to residential areas.

Cellular phones are now used as more than just a wireless version of an average telephone or a part of the equipment of a virtual office (defined later). Some parents use cellular phones as a form of daycare knowing they can be contacted anywhere by a child who is home alone. Others use the phones as an aid in emergency situations such as car accidents, caused by mechanical failures or inclement weather. Cellular phones may also have an effect on total vehicle miles traveled since destinations can be changed in route.

Facsimile (Fax), the use of fax machines has become a common business practice over the past five years. There is no direct evidence of how much transmission and reproduction of business papers over phone lines have increased or decreased overnight parcel and first class mail usage or the transportation costs of those services.

Internet is a worldwide network of all sizes of computers linked together that has increased in popularity. Estimates made in April 1994 determined the Internet connected 20 million users and thousands of networks in over 50 different countries. Millions of home computers are possible connections, only a modem phone call away. Internet allows quick retrieval of information and reduces the need for mail or parcel service to get business or research reports. Some subcommittee *members used the Internet to participate in the development of policy recommendations contained in this report.*

Electronic Data Interchange (EDI) is transmission of data from computer to computer between two organizations so that manual data entry is eliminated. One application of this technology is the exchange of billing and payment information between business parties and their banks. An example of limited EDI is electronic funds transfer (EFT) used to make automatic payroll deposits. Automatic deposits by EFI reduce the need for trips to banks, data entry by banks and return mailing of checks to originating banks through Federal Reserve Banks.

Information Kiosks An example of this technology being developed in Washington state is the Washington-Information Network a citizen access pilot project to allow citizens improved access and one-stop shopping for government services by providing automated self-service kiosks that allow continuous access to government information and services. Types of information initially being included in this project are licensing renewal information from the Department of Licensing and job search and labor market information from the State Employment Security Department.

Several possible technologies that increase the capabilities of current bandwidths, wires and cables to carry information have been theorized and if proven cost effective could reduce the need for large investments in infrastructure while still allowing increased rates of information flow for expanded use of telecommunications services.

One technology that has been theorized is two-way interactive visual/voice technology. The technology involved in interactive television means individuals could watch live television cable programming and have the capability to transmit a data signal back on the cable, creating a setting for an interactive dialogue. Microsoft and TCI are currently installing the system hardware to enable a pilot project using interactive television in the Seattle metro area. Interactive television provides an opportunity for people to attend and respond to questions at public hearings without leaving their home or office. Meanwhile, communication and public involvement for the individual citizen will be faster, easier, and more effective. Interactive television could also allow shopping by making choices on screen and sending orders back over the same transmission line without the need for making a telephone call.

Personal Communication Services (PCS) have been defined as a nation wide **system of** small-area low-power digital wireless services that enable people to phone or send data messages to or from small personal communicators regardless of where an individual is located. Currently, phone numbers are generally tied to a location or an area. With a PCS system, one phone number would be all that is required to reach a specific individual at any location in the country.

Personal Digital Assistants (PDA's) are hand-held wireless communicators/personal computers/calendars. It is theorized that within three to five years this technology could be developed to automatically integrate and filter information.

Virtual reality is currently viewed as an entertainment medium with the ability to put a "theme park" in your living room. Virtual reality may also allow a potential home buyer to walk through houses before construction or allow a medical student to practice medical procedures before attempting them on a real patient.

Telecommunications technologies are changing so rapidly that individuals and organizations often find themselves adopting a new technology even as they are still adjusting to an existing one. Technologies that may become integral parts of an information exchange system in the future are developing at an increasingly fast pace.

How state government will interact with these new technologies is already under study. The Governor has formed a Telecommunications and Information Policy Work Group. The Work Group is developing principles, goals and action steps for state government's roles in telecommunications and information technology. To ensure coordination between the Work Group and the Subcommittee, members of the Work Group were included on the Subcommittee from the beginning. The Work Group's vision for the future could include the telecommunications technologies described in this section.

IV. Changing Home and Work Environments

Many of the telecommunications technologies discussed in this paper will in some way affect home or work environments. Emerging technologies in telecommunications focus on access to services and information. This focus makes the geographic distance between some workers and their jobs or businesses and their customers almost inconsequential. One question is: How will the workplace itself change? Partially in response to telecommunications technology changes, the work scenario where an employee is expected to be at the same desk from eight to five each day may no longer be typical. Many of the work environment changes will have the impact of reducing travel or at least changing travel patterns during normal commute hours.

The current most common example of a changing work environment, ***telecommuting*** involves the use of telephones and sometimes computers to enable employees to do some of their work at locations other than traditional workplaces. Although this report puts an emphasis on telecommunications, it should be noted that telecommuting is not limited to advanced technologies and any work performed (even using simply paper, pencil, and telephone) away from a central office may be considered telecommuting. Several different modes of telecommuting have been identified: home/central office, satellite/central office and neighborhood telework center/central office.

The first mode of telecommuting is defined as an employee working at home for a part of the workweek and keeping in contact with the central office, other employees, and customers or clients using phones, computers, or fax. When not telecommuting, the employee has a central office work station.

The second mode of telecommuting involves the use of satellite or branch offices. This mode is defined as when, for some part of the work week, an employee commutes to an office of the same organization closer to home. The employee only goes to the central office on certain "core" days reducing work related travel.

Another type of telecommuting entails using a neighborhood telework center that may or may not have office equipment and that may be used by employees of several different

organizations at the same time. Workers use equipment available at the site or just use the workspace with the ability to plug in portable equipment. Workers can use this arrangement to access specialized office equipment necessary for certain jobs but not cost effective to have available full time in a telecommuting office space. A current example of this type of telecommuting center available in several cities across the nation is Kinkos copy centers that have fax, copy and computers for use and are considering implementing videoconferencing facilities.

A new concept related to the changing work environment is ***proximate commuting***. Under proximate commuting, when an individual employee is employed by an organization with several worksites where the individual's job could be done, the employee would commute to the worksite located nearest the individual's home. This concept could reduce the length of commute trips and alleviate some traffic congestion. Proximate commuting raises several work relationship questions including:

- How does this affect employee - supervisor interactions?
- How to adjust union work rules, for example, seniority in job selection?
- What happens when an employee changes residences?

Another concept currently being implemented by some major employers is the ***virtual office***. The virtual office refers to an office where the "building" does not exist. Employees are connected to one another in "cyberspace," that is through electronic equipment. This reduces travel to a central office location and stresses home or car offices where employees are connected to one another by modems or other computer links and use phones and fax machines.

Another candidate for the definition ***virtual office*** is the use of new telecommunications software applications that allow multiple people to work on the same document from several remote locations while viewing full motion interactive video of the other participants, thus allowing the same interactions as a single workplace while saving on vehicle trips, emissions, and the costs of a central office building.

All modes of telecommuting can reduce traffic congestion, gasoline consumption and vehicle emissions connected to a person's employment. Telecommuting can also increase the number of jobs accessible in rural areas. All of the new work environments reduce work related transportation energy consumption and can reduce office facilities costs.

With changes in work environments resulting in less time spent and miles commuting, more time is available for other things in life like family and friends. One question that is unresolved is: Will more family and recreational time mean more travel?

Telecommunications cannot substitute for all types of non-work related travel, but certainly some shopping, education, and personal business can be reduced through access to information through telecommunications.

V. Telecommunications and Transportation Linkages

As telecommunications evolves, there appear to be new and stronger links emerging between that industry and transportation—in the way transportation providers use and facilitate other's use of new technology. Areas of direct linkage include:

1. ***Improved Access to Transportation Decision Making***
   Using telecommunications technology (Internet and public access television, as examples), increases citizen access to transportation decision making processes while, at the same time, it reduces the cost for individual citizens to participate.
2. **Telecommunications and Travel Substitution**
   Using telecommunications technology to avoid travel while still accessing the information necessary for work or other pursuits like education and shopping.
3. **Improved Efficiency of Traditional Transportation Services**
   Using telecommunications technology to improve the efficiency of traditional transportation services, such as providing real time traveler information systems to improve commute times and reduce energy use.
4. ***Coordinated Development of Telecommunications and Transportation***
   Allowing telecommunications providers use of transportation rights-of-way and designing traditional transportation facilities to accommodate telecommunications usage.

The subcommittee's findings, proposed policy recommendations and action strategies are presented in each of these areas in the following pages.

1. Improved Access to Transportation Decision making
Improvements in telecommunications technologies continue to present opportunities to transportation agencies and providers that can allow citizens improved access to transportation decision making processes. Statewide, public agencies are faced with the task of creating new and easy ways to allow citizens opportunities for early and continuous involvement in public policy development and capital facilities planning. For transportation, this is reinforced through the Intermodal Surface Transportation Efficiency Act which requires increased efforts by state transportation agencies to involve the public in long range transportation plan. By making interactions between agencies and citizens viable, ideas and concerns can be exchanged more effectively.

The expected benefits from using telecommunications technologies include:

- Easier and more widespread access for citizens to become involved in the transportation decision making processes.
- Improved and less costly communications between and among policy makers for different modes or jurisdictions.

- Reduced individual citizen's participation costs.
- More acceptable long range transportation investment plans because of increased public understanding.

Proposed Policy Recommendations

- Transportation agencies should utilize evolving state-of-the-art telecommunications applications to improve citizen access to transportation decision making processes and to enhance internal and interagency communications on transportation policy and planning issues.

Action Strategies

- The Washington State Department of Transportation should take a leadership role among transportation agencies and providers in applying new telecommunication technologies by:

  Evaluating and using telecommunications technology in transportation public involvement activities and events;

  Using teleconferencing technology for internal statewide communications;
  Implementing electronic meeting technology to facilitate statewide transportation policy and planning processes;

  Documenting and communicating to other transportation agencies the challenges and successes in using new telecommunications technology; and

  Developing methods and procedures to manage, assess and incorporate increased citizen responses in decision making processes.

2. Telecommunications and Travel Substitution

It is becoming increasingly apparent that when using telecommunications services, individuals can and will substitute the electronic transmission of information or services for travel to acquire the same information or service. Telecommunications provides an alternative travel mode, but it is a mode that is characterized more by access to technology and information than physical mobility.

Electronic access to information and services coupled with the ability to telecommute reduces the need of some employees to live close to their workplace. Without the requirement to live close to their workplace or to travel during normal commute hours, individuals have a much larger area within which to make their choice of residences. The impact of telecommunications on transportation is two sided. On one side**,** telecommunications allows the telecommuter, who now has the ability to accomplish work without being at a physical workplace, to decrease travel particularly during peak travel hours. On the other side, by releasing people from the bonds of physical space, the continued spread of residential housing may be encouraged.

However, there are greater forces then telecommunications affecting residential sprawl development. Continued spread of residential housing is a problem for many reasons which are being addressed through the growth management process. While it is true the cost of physical facilities to provide high levels of telecommunications services in dispersed areas is high relative to providing service in urban areas, the costs of providing water, sewage, transportation or education facilities are all relatively greater than the cost of providing the electricity and telecommunications services necessary for telecommuting in dispersed areas.

New technologies used in telecommunications could affect all facets of individual travel behavior. Distance, timing, and speed of both commute and noncommute trips can change. Telecommuting can reduce travel during peak commuter travel hours and thereby reduce congestion and vehicle emissions. Teleshopping can reduce the number of retail shopping trips. Travel substitution through the use of telecommunications can help reach transportation policy goals of improving personal and freight mobility through reducing congestion and contribute to environmental protection and energy conservation.

As people adopt and adapt to different applications of telecommunications technology their choice of transportation alternatives including if they should make a trip, when to travel, and what mode to use will affect the transportation system in ways that are outside current transportation forecast models.

Proposed Policy Recommendations

- Telecommunications is a mode of transportation. The transportation system should provide safe, efficient, dependable and rapid accessibility for people, goods and *information* to desired destinations.
- Transportation agencies should encourage the use of telecommunications technologies for telecommuting, teleshopping and videoconferencing as alternatives to vehicle travel.

Action Strategies

- Washington State Department of Transportation should require that telecommunications be included as an alternative in Major Metropolitan Transportation Investment Analysis guidelines for Metropolitan Planning Organizations.
- Telecommuting should continue to be instituted by private businesses and governmental agencies, where appropriate, as a commute trip reduction option that helps to manage congestion, increase energy conservation, and reduce air pollution.
- State agencies should continue to use telecommunications as an option for meeting commute trip reduction goals. State agencies should specifically report commute vehicle miles of travel reduced and worker productivity gains resulting from the use of telecommunications as a way of illustrating to other employers its effectiveness.
- Local land use regulations should allow low traffic generating businesses that use telecommunications and information services to locate in non-commercial areas.
- Regional Transportation Planning Organizations and the Washington State Department of Transportation should review regional and local comprehensive plans and comment and

request modifications if necessary to allow low traffic generating businesses that use. telecommunications and information services to locate in noncommercial areas.

- As people become more knowledgeable of and gain access to telecommunications technology there will be increased demands for access to data and information to support travel substitution decisions. Transportation agencies should advocate broad based access to information by citizens who will have access to different types of computers.
- The Washington State Department of Transportation should facilitate access to information and databases under the freedom of information act that is consistent with maintenance of the security of databases and requirements for privacy of personal data.
- The Washington State Department of Transportation should employ an advocate whose primary responsibility would be to promote telecommunications as a travel alternative and support continued growth and productivity in the telecommunications industry.
- The Washington State Energy Offices and the Washington State Department of Transportation, working with local government representatives should develop guidelines for siting Telework centers.

3. Improved Efficiency of Traditional Transportation Services

Not only does telecommunications have current and future technologies to bring improvements in the workplace or reduction in transportation needs, but there are also possibilities for direct applications of telecommunications technology in providing traditional transportation services. Intelligent Vehicle Highway Systems (IVHS) employ advanced technologies to improve the operation of our highway and public transportation system. Transportation areas with current IVHS activities in Washington state include: Traffic Management Systems, Traveler Information Systems, Public Transit/Transportation Demand Management, and Freight and Fleet Management. Each of these are described below.

Traffic Management Systems. Freeway and Arterial Management Effort (FAME) is a transportation research and implementation program aimed at developing and implementing strategies to mitigate urban congestion and provide mobility.

Traveler Information Systems. Several initiatives are underway in Washington state to improve traveler information, particularly information for commuters. Traveler information systems are an essential user service within the IVHS program since they translate information on traffic conditions and travel options into a format easily accessed and understood by travelers. Among the most recent efforts in the Puget Sound Region are included such projects as the Flow System Map, (which provides congestion information on the Seattle area's primary freeway routes on a graphic display) the Traffic Reporter, (a PC-based graphical, interactive, traveler information system to meet information needs of Seattle area commuters) and five other projects: the Bellevue Smart Traveler, SCOTTE Traveler Information System, Travelaid, Automated Rider Information System, and Geographic Information System/Global Positioning System for traveler's information.

Public Transit. IVHS technologies applied to public transit have the objective of increasing productivity and efficiency for this element of the transportation system. These applications can potentially reduce uncertainties around public transit by providing real-time information to travelers, traffic controllers, and dispatchers to transit vehicles, drivers, and even central maintenance or security personnel. Information gathered electronically is communicated to those in need of it to facilitate their decision. As an example, a transit rider waiting at a transfer center could check a television screen listing the next estimated arrival time for their route similar to what currently is possible in airports.

In Washington state, the focus is on improving transit travel times and providing information to passengers. In addition, it is recognized that transit vehicles themselves can provide feedback on key system information. Among the public transit, IVHS projects underway or being developed in Washington state are projects such as Transit Signal Priority where transit operation can be enhanced through signal priority and preemption techniques. This is in instances where HOV lanes or queue by-passes are not warranted. Another IVHS technology being applied to public transit are vehicles equipped to act as data system "enhancements." Benefits include feedback that can be used to provide transit operations and travelers with schedule adherence information and information that may provide lane-specific operating conditions to the Traffic Systems Management Center. The Automatic Vehicle Locator (AVL) System also plays an important role in providing traveler information and enhancing the collection of transportation information.

Freight and Fleet Management. Washington state is involved in two initiatives to improve the efficiency and productivity of motor carriers. Both efforts are multi-state in scope. One program addresses institutional coordination and collaboration to reduce or eliminate barriers to more efficient and effective administration of trucking regulations, taxation, and roadway safety and weight enforcement. The second target is to deploy advanced, automated techniques and technologies for roadside truck weight, safety, and operating credentials verification.

Proposed Policy Recommendations

- Transportation agencies should implement advanced telecommunications technologies sud1 as intelligent vehicle highway and transit systems to:
  - Improve safety, traffic efficiency and fuel efficiency;
  - Provide real-time traveler information;
  - Improve public transit reliability; and
  - Reduce the regulatory impact on motor carriers.

Action Strategies

- The Washington State Department of Transportation should coordinate with the Federal Highway Administration, the Federal Transit Administration, National Traffic Safety Administration, Washington State Traffic Safety Commission, counties, cities and transit agencies to implement the *IVHS Strategic Plan for Washington State.*

4. Coordinated Development of Telecommunications and Transportation

The Governor's Telecommunications and Information Policy Work Group will develop action steps based on its principles and goals. The Goals developed by the Governor's Work Group may affect transportation agencies as state agencies -- like all agencies -- and not necessarily in roles as transportation service providers and regulators.

The public owners of transportation rights-of-way are in a position to influence competition in the telecommunications industry. Transportation right-of-way is a valuable asset in the provision of telecommunications facilities. Currently local jurisdictions have the authority to manage the use of their right-of-way by telecommunications companies and others. There is no current Washington state statute that specifies telecommunications right-of-way management standards for local jurisdictions.

Transportation agencies traditionally have their own telecommunications networks. For example, the Washington State Patrol and the Washington State Department of Transportation have wireless networks to communicate with troopers and maintenance workers to facilitate response times to such things as traffic accidents or roadway hazards.

Not only can traditional transportation providers improve transportation services with telecommunications technology, but transportation providers can also be important facilitators to aid availability of telecommunication services. This facilitation could include:

- Allowing the use of transportation rights-of-way for cable, wire and wireless companies;
- Aiding in infrastructure improvement by serving as an anchor customer; and
- Providing opportunities to use telecommunications services on transportation facilities (use of modems and fax on ferries or passenger trains, as examples).

Proposed Policy Recommendations

- Transportation agencies should design transportation facilities and support the sharing of rights-of-way and telecommunications resources within their rights-of-way in support of state telecommunications policies.
- Transportation agencies should actively support the coordination of their telecommunications systems with other state and local systems to aid in emergency response, natural disaster relief, and to minimize duplication in telecommunication system development.

Action Strategies

- Transportation agencies should assess, support, and implement, where appropriate, the recommendations of the Governor's Telecommunications and Information Policy Work Group.
- The Washington State Energy Office in partnership with the Washington State Department of Transportation should communicate and coordinate with alltransportation

agencies to implement and support, where applicable, the telecommunications policy goals of the Governor's Work Group.

- When planning transportation projects, the Washington State Department of Transportation, counties and cities should coordinate with telecommunications companies.
- Transportation agencies should design transportation facilities to allow uninterrupted telecommunications services during natural disasters.
- Transportation agencies should design transportation facilities to incorporate telecommunications facilities that aid emergency responses.

Appendix A

Telecommunications and Transportation Linkages Subcommittee Members

Judith Merchant, **Chair**	Director, Washington State Energy Office
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Debra Brunton	Microsoft Corporation
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Appendix B

List of References

Assessment of Travel Adjustments Due to Telecommuting, Oak Ridge National Laboratory, July 1992, draft; 32 pages. An analysis of travel logs completed by telecommuters and comparison groups.

Evaluation of the Puget Sound Telecommuting Demonstration: Survey Results and Qualitative Research, University of Washington, September 1992, draft; 101 pages plus appendix. A summary of the survey analysis and qualitative research conducted by the University of Washington.

Puget Sound Telecommuting Demonstration: An Interim Report, Washington State Energy Office, April 1992, Out of print; 27 pages. A mid-term report on the demonstration process and preliminary research results.

Puget Sound Telecommuting Demonstration Case Studies, Washington State Energy Office, July 1992, draft; 38 pages. Three case studies of participating organizations, focusing on energy and cost impacts of telecommuting.

Puget Sound Telecommuting Focus Group Report: How Telecommuting Works in Organizations, Washington State Energy Office, May 1992, draft; 28 pages. A summary of focus groups held for telecommuters, supervisors, and co-workers to explore the effects of telecommuting.

IVHS Strategic Plan for Washington State, JHK & Associates and the Washington State Department of Transportation, November 1993, 231 pages. Principal objective of this study was to prepare a statewide strategic plan for applying IVHS technologies on the statewide surface transportation system.

Appendix C

Glossary of Terms

Analog: the standard method of transmitting a radio phone call. The call is converted into electrical impulses that travel in the form of radio waves, which are "analogs" - or analogous - to the sound waves of the original voice.

Cell: the basic geographic unit that gave cellular its name. A cellular network in a city or county is carved into "cells", each of which is equipped with a radio transmitter/receiver. These cells vary in size, depending upon terrain and capacity demands. A computer at the network's switching office monitors each call, handing it off to another cell and at another frequency as needed.

Cellular Digital Packet Data (CDPD): a new method of transmitting data over the cellular network. It places the message in digital electronic "envelopes" and sends it at high speed through underused radio channels or between pauses in cellular phone conversations. CDPD, which will send data as much as eight times faster than regular cellular delivery, is being introduced in some markets in 1994.

Digitalization: the translation of information into a binary language of zeros and ones which can be processed and stored by computers, and transmitted in greater quantities over cable and telephone lines as well as the airwaves.

Electronic Mail (E-mail): software that allows users on a network to exchange information.

Fibre Optics: very thin strands of glass used to carry light signals generated by laser transmitters.

Intelligent Vehicle Highway System (IVHS): the application of advanced technology to improve the operation of our highway and public transportation system. Application of IVHS can help manage congestion, improve safety, and provide travelers with timely information.

Microcells: units smaller than cells, by which future personal communications services networks will be divided. PCS microcellular networks will employ thousands of tiny radio transceivers in myriad microcells.

Off-Peak: the period during which systems have the largest increased capacity.

Peak: highest-usage period of the business day, when a system (transportation, cellular etc..) carries the most traffic.

Telecommuting: partial or complete substitution of telecommunications services for transportation to a conventional workplace.

Telematics: the linkage of telecommunications and computer technologies which allows two-way access to massive databases of text, voice, and video information.

Voice Mail: a computerized answering service like those in offices that automatically answers a cellular call. It will play a greeting in the users voice and record a message. After the message is received it can be deleted, saved or forwarded to someone else's voice-mail system.

Wireline: a cellular-phone carrier owned by the company that also operates the regular local phone service in a given market. Customers who use the wireline cellular carrier operate on the cellular network's B-band.

Appendix A.5

New Jersey Legislation on Public-Private Partnering

A-2560 PAMPHLET LAW 1997, CHAPTER 136
APPROVED JUNE 27, 1997.

AN ACT concerning transportation projects, amending P.L.1966, c.301, P.L.1986, c.56, P.L.1979, c.150 and P.L.1995, c.108 and supplementing Title 27 of the Revised Statutes.

C.27:1D-1 Findings, declarations relative to transportation projects.

l. The Legislature finds and declares that:

a. A safe and efficient transportation system is essential to the economic and social well-being of the State and its people, and is a sound economic investment opportunity for both private and public resources.

b. The use of public-private transportation initiatives would enhance the ability of the State to provide a safe and efficient transportation system through use of alternate funding sources and private sector efficiencies; supplement the State's transportation resources in order to allow the State to use its limited resources for other needed projects; and encourage and promote business and employment opportunities for the citizens of New Jersey.

C.27:1D-2 Definitions relative to transportation projects.

2. As used in this act:

"Commissioner" means the Commissioner of Transportation.

"Corporation" means the New Jersey Transit Corporation.

"Department" means the Department of Transportation.

"Demonstration project" means a transportation project selected by the commissioner pursuant to section 3 of this act.

"Developer" means a public or private entity or consortia thereof selected by the public partner from among proposers to develop a demonstration project.

"Intelligent transportation systems" mean the equipment, facilities, property, information management and communications resources which are necessary or desirable for the advancement, management, or operation of a multi-modal transportation network.

"Project agreement" or "demonstration project agreement" means a contract or agreement entered into by the commissioner with a developer providing the terms and conditions under which the developer shall undertake a demonstration project.

"Public highways" means public roads, streets, expressways, freeways, parkways, motorways and boulevards, including bridges, tunnels, overpasses, underpasses interchanges, rest areas, express bus roadways, bus pullouts and turnarounds, park-ride facilities, traffic circles, grade separations, intelligent transportation systems, traffic control devices, the elimination or improvement of crossings of railroads and highways, whether at grade or not at grade, and any facilities, equipment, property, rights of way, easements and interests therein needed for the construction, improvement, and maintenance of highways, or intelligent transportation systems.

“Public partner” means the Department of Transportation or the New Jersey Transit Corporation as the case may be.

Public transportation project" means, in connection with public transportation service. passenger stations. shelters and terminals. automobile parking facilities. ramps, track connections, signal systems, power systems, information and communication systems, roadbeds, transit lanes or rights of way, equipment storage and servicing facilities' bridges, grade crossings, rail cars, locomotives, motorbuses and other motor vehicles, maintenance and garage facilities, revenue handling equipment and any other equipment, facility or property useful for or related to the provision of public transportation service.

"Transportation project" means, in addition to public highways and public transportation projects, any equipment, facility or property useful or related to the provision of any ground, waterborne or air transportation for the movement of people and goods.

C.27:1D-3 Selection of demonstration projects.

3. a. Commencing with the fiscal year beginning after the effective date of this act and for the next four succeeding fiscal years, the commissioner is authorized to select up to seven transportation projects from the list of transportation projects for which monies have been appropriated in the annual appropriations acts for those five fiscal years to serve as demonstration projects. No more than seven demonstration projects shall be selected by the commissioner pursuant to this act.

b. Selection by the commissioner of demonstration projects pursuant to subsection a. of this section which are public transportation projects shall be made with the approval of the board of the corporation.

c. If a transportation project is not listed in the annual appropriations acts, the commissioner may submit that project as a demonstration project to the Legislature for approval. The commissioner shall make the submission to the Legislature to the President of the Senate and the Speaker of the General Assembly on a day when both houses are meeting. The President and the Speaker shall cause the date of submission to be entered upon the Senate Journal and the Minutes of the General Assembly, respectively. Unless the project as described in the submission is disapproved by adoption of a concurrent resolution to this effect by the affirmative vote of a majority of the authorized membership of both houses within the time period prescribed in this subsection, the project shall be deemed approved and the public partner shall be authorized to undertake the project. The time period shall commence on the day of submission and expire on the forty-fifth day after submission or for a house not meeting on the forty-fifth day, on the next meeting day of that house.

d. Notwithstanding the provisions of this section to the contrary, demonstration projects shall be subject to the approval of the Joint Budget Oversight Committee or its successor.

C.27:1D-4 Solicitation of proposals by public partner.

4. a. A public partner is authorized to solicit proposals in the five fiscal years after the effective date of this act, as provided in subsection a. of section 3 of this act, from developers to plan, design, construct, equip, operate, finance, improve and maintain, or any combination thereof, demonstration projects selected by the commissioner pursuant to section 3 of this act.

b. A public partner shall select proposals for negotiation of demonstration project agreements based on the overall benefit to the State, the qualifications and financial strength of the proposer, the proposer's responsiveness to the public partners requirements, the total project cost to he incurred by the public partner, the nature of project financing, the revenues to be generated by the project on behalf of and in support of the State, the impact of any direct or indirect user fees and any other evaluation criteria the public partner deems appropriate. The public partner shall negotiate with one or more proposers to reach a project agreement in the best interests of the State, except that in the event that a private developer, private entity or private consortia benefits from the use of public monies for the construction of a demonstration project pursuant to this act, the project agreement with the developer shall provide that any construction contract entered into by the developer, a private entity or private consortia, to effectuate the agreement shall conform to those requirements concerning advertisement pre-qualification, bid and award provided for by law for construction contracts entered into by the department or corporation, as the case may be.

c. Any power possessed by a public partner pursuant to this act or any other act or any function performed by the department or the corporation, as the case may be, with respect to transportation projects may be used by that public partner to facilitate the planning, designing, construction, equipment, financing, improvement, maintenance and operation, or any combination thereof, of demonstration projects selected pursuant to this act. Project agreements entered into pursuant to this act may provide for full reimbursement to the State for services rendered by the public partner or other State entities or agencies or for the provision of revenues generated to the State. The public partner is authorized to enter into financing, funding, and credit agreements on such terms as the commissioner deems favorable to the State to promote the purposes of this act. All credit agreements entered into by the public partner pursuant to this act shall be subject to concurrence by the State Treasurer.

d. A project agreement entered into pursuant to this act shall provide for a public involvement and information process to apply to each demonstration project. The purpose of the public involvement and information process shall be to disseminate and provide information about the demonstration project to the public, prospective project users, and the residents of communities affected by the project, and to establish a formal means by which interested persons may comment upon the project and make suggestions.

e. Upon entering into a project agreement pursuant to this act, the public partner shall publish a notice in a newspaper circulating in the county in which the demonstration project will be located describing the project and the responsibilities of the developer and the public partner with respect to the project. If a demonstration project will be located in more than one county or have a regional impact, the notice shall also be published in a publication circulating in the region in which the demonstration project will be located.

C.27:1D-5 Financial conditions; arrangements of projects.

5. a. The department's financial participation in any demonstration project undertaken pursuant to this act shall be subject to legislative appropriation. The corporation's financial participation in any demonstration project undertaken pursuant to this act shall be subject to the availability of funds. Participation by a public partner may take the form of loans or such other financial credit arrangements as may be appropriate to advance an approved project. Agreements entered into pursuant to this act to facilitate such participation shall provide that such loans or other credit arrangements made by the public partner shall yield a reasonable return and be

amortized over the term of such agreement, or such lesser period as may be agreed to by the parties.

b. A project agreement entered into pursuant to this act shall provide for the allocation of ownership, leasehold, and other property interests in demonstration projects.

c. The project agreement may authorize the developer to set and impose rents, fares or user fees for use of a facility constructed by it and may require that over the term of the agreement, the rent, fare or fee revenues received by the developer be applied to repayment of the developer's capital outlay costs, interest expense, costs associated with operations, fare or user fee collection, facility management, reimbursement of the States project review and oversight costs, repayment of loans, revenues to the State, technical and law enforcement services, and a reasonable return on investment to the developer.

d. The project agreement shall specify the manner in which rents, fares or user fees are to be established or revised, the procedures for receiving public comment on the establishment or revision of fares or user fees, including the holding of a public hearing thereon, and the procedures by which the public partner shall oversee the establishment or revision of fares or user fees provided, however, that no fares or user fees shall be subject to oversight unless the developer receives public; monies for 10 percent or greater of its operating expenses.

C.27:1D-6 Laws applicable to demonstration projects.

6. Traffic and other laws applicable on the State transportation system shall be enforceable, as appropriate, on demonstration projects constructed by and leased by a developer pursuant to this act.

C.27:1D-7 Demonstration projects subject to State, federal laws.

7. a. Demonstration projects selected pursuant to this act shall be designed, constructed, operated and maintained in accordance with all applicable environmental requirements and all other applicable State and federal laws and regulations necessary to the protection of the public health, safety and welfare.

b. Unless determined otherwise by the corporation, in its sole discretion, the plans and specifications for each demonstration project shall comply with the corporation's standards for public transportation projects.

c. Unless determined otherwise by the commissioner, in his sole discretion, the plans and specifications for each transportation project other than public transportation projects shall comply with the department's standards for transportation projects.

C.27: 1D-8 Immunities, defenses applicable to demonstration projects.

8. All absolute and qualified immunities and defenses provided to public entities and public employees by the "New Jersey Tort Claims Act," N.J.S.59: 1-1 et seq., the "New Jersey Contractual Liability Act," N.J.S.59:13-1 et seq., and any other law shall apply to all interests held and activities performed by the department, the corporation and other State agencies in connection with the demonstration projects selected pursuant to this act.

C.27:1D-9 Public partner may defend, indemnify.

9. a. The public partner may agree to defend and indemnify any person, who, pursuant to a written agreement with the public partner entered into in accordance with this act, designs, constructs, operates, maintains, leases or otherwise holds an interest in a demonstration project, against claims, causes of action, demands, costs or judgments against that person arising as a direct result of the design, construction interest, operation or maintenance of that demonstration project. The public partner is authorized to reach agreements to defend and indemnify a person upon the terms and limitations the public partner deems reasonable and appropriate.

b. A determination by the public partner to defend and indemnify pursuant to this section does not bar, reduce, limit or affect any remedies which the public partner may have to enforce the agreement between the public partner and the developer to assert a claim for damages to which the public partner may be entitled arising out of the developer's failure to perform the agreement, or for the recovery of funds expended for the defense of the developer if the defense was undertaken in response to a claim or cause of action brought against the developer which is proven to have arisen from gross negligence, willful misconduct, fraud, intentional tort, bad faith or criminal conduct.

c. No one other than the person operating, maintaining, leasing or otherwise holding an interest in the demonstration project pursuant to an agreement with the public partner has the right to enforce any agreement for defense or indemnification between that person and the public partner.

10. Section 5 of P.L.1966, c.301 (C.27:1A-5) is amended to read as follows:

C.27:1A-5 Additional functions, powers, duties of commissioner.

5. The commissioner, as head of the department, shall have all of the functions, powers and duties heretofore vested in the State Highway Commissioner and shall, in addition to the functions, powers and duties vested in him by this act or by any other law:

(a) Develop and maintain a comprehensive master plan for all modes of transportation development, with special emphasis on public transportation. Such plan shall be revised and updated at least every five years;

(b) Develop and promote programs to foster efficient and economical transportation services in the State;

(c) Prepare plans for the preservation, improvement and expansion of the public transportation system, with special emphasis on the coordination of transit modes and the use of rail rights of way, highways and public streets for public transportation purposes;

(d) Enter into contracts with the New Jersey Transit Corporation for the provision and improvement of public transportation services;

(e) Coordinate the transportation activities of the department with those of other public agencies and authorities;

(f) Cooperate with interstate commissions and authorities, State departments, councils, commissions and other State agencies, with appropriate federal agencies, and with interested private individuals and organizations in the coordination of plans and policies for the development of air commerce and air facilities;

(g) Make an annual report to the Governor and the Legislature on the department's operations, and render such other reports as the Governor shall from time to time request or as may be required by law;

(h) Promulgate regulations providing for the charging of and setting the amount of fees for certain services performed by and permits issued by the department, including but not limited to the following:

(1) Providing copies of documents prepared by or in the custody of the department;

(2) Aeronautics permits;

(3) Right-of-way permits;

(4) Traffic signal control systems;

(I) Develop and promote programs for the presentation improvement and expansion of freight railroads, with special emphasis on the use of rail rights of way for the purpose of providing rail freight service;

(j) Develop and promote a program to ensure the safety and continued operation of aviation facilities in New Jersey:

(k) Enter into agreements with a public or private entity or consortia thereof to provide for the development of demonstration projects through the use of public-private partnerships pursuant to sections 1 though 9 of P.L. 1997. c. 136, (C.27: 1 D-1 et seq.): and

(1) Do any and all thing’s necessary, convenient or desirable to effectuate the purposes of

P l .1966.c.301 (C.27: 1A-1 et seq.) and to exercise the powers given and granted in that act.

11. Section 2 of P.L.1986, c.56 (C.27:1A-5.1) is amended to read as follows:

C.27:1A-5.1 Rail freight authority.

2. The commissioner, pursuant to subsection (I) of section 5 of P.L. 1966, c.301 (C.27: 1 A-5), may:

a. Plan, design, construct, equip, operate, improve and maintain, either directly or by contract with any public or private entity, a railroad, subway, street traction or electric railway, or connecting roadways and facilities for the purpose of carrying freight in this State or between this State and points in other states;

b. Acquire by purchase, condemnation, lease, gift or otherwise, on terms and conditions and in the manner he deems proper, any land or property, real or personal, tangible or intangible, which he may determine is reasonably necessary for the purposes of this section;

c. Lease as lessor, sell or otherwise dispose of, on terms and conditions which he may prescribe as appropriate, real and personal property, including tangible or intangible property and consumable goods; or any interest therein, to any public or private entity in the exercise of his powers and the performance of his duties under this section, and may, in order to provide or encourage adequate and efficient rail freight service, lease or otherwise permit the use or occupancy of property without cost or at a nominal rental;

d. Upon declaration by him that there are no other prospects for competitive bidding, make, negotiate or award any purchase, contract or agreement pursuant to this section without advertisement.

12. Section 5 of P.L.1979, c.150 (C.27:25-5) is amended to read as follows:

C.27:25-5 Powers and duties of corporation.

5. In addition to the powers and duties conferred upon it elsewhere in this act, the corporation may do all acts necessary and reasonably incident to carrying out the objectives of this act, including but not in limitation thereof the following:

a. Sue and be sued;

b. Have an official seal and alter the same at pleasure;

c. Make and alter bylaws for its organization and internal management and for the conduct of its affairs and business;

d. Maintain an office at such place or places within the State as it may determine;

e. Adopt, amend and repeal such rules and regulations as it may deem necessary to effectuate the purposes of this act which shall have the force and effect of law; it shall publish the same and file them in accordance with the "Administrative Procedure Act," P.L.1968, c.410 (C.52:14B-1 et seq.) with the Director of the Office of Administrative Law:

f. Call to its assistance and avail itself of the service of such employees of any federal, State, county or municipal department or agency as it may require and as may be available to it for said purpose:

g. Apply for, accept and expend money from any federal, State, county or municipal agency or instrumentality and for and private source: comply with federal statutes, rules and regulations and qualify for and receive all forms of financial assistance available under federal lass to assure the continuance of, or for the support or improvement of public transportation and as may be necessary for that purpose to enter into agreements, including federally required labor protective agreements;

h. Plan, design, construct, equip, operate, improve and maintain, either directly or by contract with any public or private entity, public transportation services, capital equipment and facilities or any parts or functions thereof, and other transportation projects or any parts or functions thereof, which may be funded under section 3 of the federal Urban Mass Transportation Act of 1964, Pub.L.88-365 (49 U.S.C. s.1602), or any successor or additional federal act having substantially the same or similar purposes or functions; the operation of the facilities of the corporation, by the corporation or any public or private entity, include appropriate and reasonable limitations on competition in order that maximum service may be provided most efficiently to the public;

I. Apply for and accept, from appropriate regulatory bodies, authority to operate public transportation services where necessary;

j. Purchase, lease as lessee, or otherwise acquire, own, hold, improve, use and otherwise deal in and with real or personal property, or any interest therein, from any public or private entity wherever situated;

k. Lease as lessor, sell or otherwise dispose of on terms which the corporation may prescribe, real and personal property, including tangible or intangible property and consumable goods, or any interest therein, to any public or private entity, in the exercise of its powers and the performance of its duties under this act. In order to provide or encourage adequate and efficient public transportation service, the corporation may lease or otherwise permit the use or occupancy of property without cost or at a nominal rental;

l. Restrict the rights of persons to enter upon or construct any works in or upon any property owned or leased by the corporation, except under such terms as the corporation may prescribe; perform or contract for the performance of all acts necessary for the management, maintenance and repair of real or personal property leased or otherwise used or occupied pursuant to this act;

m. Establish one or more operating divisions as deemed necessary. Upon the establishment of an operating division, there shall be established a geographically coincident advisory committee to be appointed by the Governor with the advice and consent of the Senate. The committee shall consist of county and municipal government representatives and concerned citizens, in the number and for such terms as may be fixed by the corporation, and shall advise the corporation as to the public transportation service provided in the operating division. At least two members of each advisory committee shall be public transportation riders, including but not limited to urban transit users and suburban commuters as appropriate. One public member from the board of the corporation shall serve as a liaison to each advisory committee;

n. Set and collect fares and determine levels of service for service provided by the corporation either directly or by contract including, but not limited to, such reduced fare programs as deemed appropriate by the corporation; revenues derived from such service may be collected by the corporation and shall be available to the corporation for use in furtherance of any of the purposes of this act;

o. Set and collect rentals, fees, charges or other payments from the lease, use, occupancy or disposition of properties owned or leased by the corporation; such revenues shall be available to the corporation for use in furtherance of any of the purposes of this act;

p. Deposit corporate revenues in interest bearing accounts or in the State of New Jersey Cash Management Fund established pursuant to section 1 of P.L. 1977 c.281 (C.52:18A-90.4);

q. Delegate to subordinate officers of the corporation such powers and duties as the corporation shall deem necessary and proper to carry out the purposes of this act;

r. Procure and enter into contracts for any type of insurance and indemnify against loss or damage to property from any cause, including loss of use and occupancy, against death or injury of any person, against employees' liability, against any act of any member, officer, employee or servant of the corporation whether part-time, full-time, compensated or noncompensated, in the performance of the duties of his office or employment or any other insurable risk. In addition, the corporation may carry its own liability insurance:

s. Promote the use of public transportation services, coordinate ticket sales and passenger information and sell, lease or otherwise contract for advertising in or on the equipment or facilities of the corporation;

t. Adopt and maintain employee benefit programs for employees of the corporation including but not limited to, pension, deferred compensation, medical disability, and death benefits, and which programs may utilize insurance contracts, trust funds, and any other appropriate means of providing the stipulated benefits, and may involve new plans or the continuation of plans previously established by entities acquired by the corporation;

u. Own, vote, and exercise all other rights incidental to the ownership of shares of the capital stock of any incorporated entity acquired by the corporation pursuant to the powers granted by this act;

v. Enter into any and all agreements or contracts, execute any and all instruments, and do and perform any and all acts or things necessary, convenient or desirable for the purposes of the corporation, or to carry out any power expressly or implicitly given in this act;

w. Notwithstanding the provisions of section 17 of P.L.1979, c.150 (C.27:25-17) or any other law to the contrary, (1) issue operating grant anticipation notes which shall be secured and retired from operating assistance grants authorized under section 9 of the federal Urban Mass Transportation Act of 1964, Pub.L.88-365 (49 U.S.C. s.1602), or any successor or additional federal act having substantially the same or similar purposes or functions and (2) issue capital grant anticipation notes which shall be secured and retired from capital assistance grants authorized under section 3 or section 9 of the federal Urban Mass Transportation Act of 1964, Pub.L.88-365 (49 U.S.C. s.1602), or any successor or additional federal act having substantially the same or similar purposes or functions. As used in this subsection, "operating grant anticipation notes" or "capital grant anticipation notes" (hereinafter referred to as "notes") means credit obligations issued in anticipation of these grants. The notes shall be authorized by a resolution or resolutions of the corporation, and may be issued in one or more series and shall bear the date, or dates, bear interest at the rate or rates of interest per annum, be in the denomination or denominations, be in the form, carry the conversion or registration privileges, have the rank or priority, be executed in such manner as the resolution or resolutions require. The notes may be sold at public or private sale at the price or prices and in the manner that the corporation determines. The notes of the corporation, the sale or transfer thereof, and the income derived therefrom by the purchasers of the notes, shall, at all times, be free from taxation for State or local purposes, under any law of the State or any political subdivision thereof. Notes may be issued under the provisions of P.L.1979, c.150 (C.27:25-1 et seq.) without obtaining the consent of any department, division, commission, board, bureau or agency of the State, and without any other proceedings, conditions, or things which are specifically required by P.L.1979, c.150 (C.27:25-1 et seq.). The notes issued pursuant to P.L.1979, c.150 (C27:25-1 et seq.) shall not in any way create or constitute any indebtedness, liability or obligation of the State or of any political subdivision thereof or of the corporation, except as provided herein.

The notes shall be payable solely from (1) note proceeds, to the extent not disbursed to the corporation, (2) grant payments if, as, and when received from the federal government, and (3) investment earnings on note proceeds, to the extent not disbursed to the corporation. Each note shall contain on its face a statement to the effect that the corporation is obligated to pay the principal thereof or the interest thereon only from these grants to the corporation and from the proceeds of the notes and investment earnings on the proceeds of the notes, to the extent not disbursed to the corporation, and that neither the faith and credit nor the taxing power of the State or of any political subdivision thereof or of the corporation is pledged to the payment of the principal and interest on these notes. Neither the members of the corporation’s board nor any person executing the transactions are personally liable on those notes nor are they otherwise liable for their actions; and

x. Enter into agreements with a public or private entity or consortia thereof to provide for the development of demonstration projects through the use of public-private partnerships pursuant to sections 1 through 9 of P.L.1997.c.136 (C.27:1D-1 et seq.).

13. Section 12 of P.L.1995, c.108 (c.27:1B-21.5) is amended to read as follows:

C.27:1B-21.5 Duties of commissioner, loans, conditions; reports.

12. a. Notwithstanding the provisions of any other law to the contrary, the commissioner is authorized to enter into agreements with public or private entities or consortia thereof for the loan of federal funds appropriated to the department for the purpose of financing all, or a portion of, the costs incurred for the planning, acquisition, engineering, construction, reconstruction, repair and rehabilitation of a transportation project by that public or private entity or consortia thereof.

b. The commissioner, with the approval of the State Treasurer, shall establish rules and regulations governing the qualifications of the applicants, the application procedures, the criteria for awarding loads, and the standards for establishing the amount, terms and conditions of each loan. The rules and regulations shall provide that the term of the loan agreement shall be consistent with terms and conditions as provided by applicable federal law.

c. Loans granted pursuant to this section shall be considered an investment or reinvestment of Special Transportation Fund funds within the meaning of subsection a. of section 21 of P.L.1984, c.73 (c.27:1B-21). Payments of interest and principal on loans granted pursuant to this section shall be credited to a special subaccount of the Special Transportation Fund and may be used for financing authorized projects. Monies appropriated from the special subaccount pursuant to this section shall be in addition to the total State amount authorized to be appropriated in a fiscal year pursuant to section 8 of P.L.1987, C.460 (c.27:1B-21.1).

d. Each loan made pursuant to this section shall require the specific approval of the joint Budget Oversight Committee, except for those loans agreed to by the commissioner as part of an agreement for a demonstration project approved pursuant to P.L.1997, c.136 (C.27:1D-1 et al.). The Chairman of the Joint Budget Oversight Committee may request periodic reports from the commissioner on the status of any or all loans. The commissioner shall provide reports so requested on a timely basis.

e. Transportation projects which are the subject of a loan agreement entered into pursuant to this section shall be included in the annual report of the proposed projects prepared pursuant to section 22 of P.L.1984, c.73 (C.27:1B-22) for the fiscal year in which the loan amount for those projects is to be appropriated.

14. This act shall take effect immediately.

Appendix A.6

New York State Law on Toll Collection Violations

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CHAPTER 98

AN ACT agreeing with the State of New York with respect to rules and regulations for the control of traffic on vehicular crossings operated by the Port Authority of New York and New Jersey and supplementing P.L.1950, c.192 (C.32: 1-154.1 et seq.).

BE IT ENACTED by the Senate and General Assembly of the State of New Jersey:

C.32:1-154.2a Liability of vehicle owner for noncompliance with toll collection regulations.

1. Notwithstanding any other provision of law and in accordance with the provisions of section 3 of this act, an owner of a vehicle may be held liable for failure of an operator thereof to comply with the toll collection regulations of the Port Authority of New York and New Jersey (hereinafter called Port Authority). The owner of a vehicle shall be liable pursuant to this section if such vehicle was used or operated with the permission of the owner, express or implied, in violation of the toll collection regulations of the Port Authority, and such violation is evidenced by information obtained from a photo-monitoring system; provided, however, that no owner of a vehicle shall be liable where the operator of such vehicle has been convicted of a violation of those toll collection regulations for the same incident.

C.32:1-154.2b Definitions relative to control of traffic on vehicular crossings.

2. As used in this act:

"Lessee" means any person, corporation, firm, partnership, agency, association or organization that rents, leases or contracts for the use of one or more vehicles and has exclusive use thereof for any period of time.

"Lessor" means any person, corporation, firm, partnership, agency, association or organization engaged in the business of renting or leasing vehicles to any lessee under a rental agreement, lease or other agreement which provides that the lessee has exclusive use of the vehicle for any period of time.

"Operator" means any person, corporation, firm, partnership, agency, association, organization or lessee that uses or operates a vehicle with or without the permission of the owner, and an owner who operates the owner's vehicle.

"Owner" means any person, corporation, partnership, firm, agency, association, lessor or organization which, at the time a vehicle is operated in violation of the toll collection regulations of the Port Authority: is the beneficial or equitable owner of the vehicle; or has title to the vehicle; or is the registrant or co-registrant of the vehicle registered with the Division of Motor Vehicles in the Department of Transportation of this State or registered with any other state, territory, district, province, nation or other jurisdiction; or uses the vehicle in its vehicle renting or leasing business; and includes a person entitled to the use and possession of a vehicle subject to a security interest in another person.

"Photo-monitoring system" means a vehicle sensor installed to work in conjunction with a toll collection facility which automatically produces one or more photographs, one or more microphotographs, a videotape or other recorded images of each vehicle at the time the vehicle is used or operated in violation of the toll collection regulations of the Port Authority.

"Port Authority" means the Port Authority of New York and New Jersey.

"Toll collection regulations" means the traffic regulations for interstate vehicular crossings operated by the Port Authority as set forth in P.L.1950, c.192 (C.32: 1-154.1 et seq.) and in chapter 774 of the laws of New York of 1950, and specifically that section of the laws which prohibits traffic in or upon vehicular crossings operated by the Port Authority except upon the payment of such tolls and other charges as may from time to time be prescribed by the Port Authority and which further makes it unlawful for any person to refuse to pay, or to evade, or to attempt to evade the payment of such tolls or other charges.

"Vehicle" means every device in, upon, or by which a person or property is or may be transported or drawn upon a highway, except devices used exclusively upon stationary rails or tracks.

C.32:1-154.2c Imposition of liability.

3. a. The liability set forth in section 1 of this act shall be imposed upon an owner for a violation by an operator of the toll collection regulations of the Port Authority occurring within the territorial limits of the State of New Jersey in the same manner as a violation of section 2 of P.L.1950, c.192 (C.32: 1 - 154.2) and the punishment for such violation shall be as set forth in section 16 of P.L.1950, c.192 (C.32:1-154.16).

b. An owner who is a lessor of a vehicle operated in violation of the toll collection regulations of the Port Authority shall not be liable for the violation of the toll collection regulations if the lessor submits a copy of the rental, lease or other contract document covering that vehicle on the date of the violation, with the name and address of the lessee clearly legible to the Port Authority and to the court or other entity having jurisdiction over the violation in a timely manner. Failure to provide such information in a timely manner shall render the lessor liable for the penalty prescribed by this section. Where the lessor complies with the provisions of this subsection, the lessee of such vehicle on the date of the violation shall be deemed the owner of the vehicle for purposes of this section and shall be subject to liability for the violation of the toll collection regulations of the Port Authority.

c. A certified report of an employee or agent of the Port Authority reporting a violation of the toll collection regulations and any information obtained from a photo-monitoring system shall be deemed records kept in the ordinary business of the Port Authority and shall, when relevant, be made available for inspection and admission into evidence in a proceeding concerning a violation of the toll collection regulations, but shall not be deemed public records for the purpose of P.L.1963, c.73 (C.47: 1 A- I et seq.) or the common law of access to public records; nor shall any such information be discoverable by any person, entity or governmental agency; nor shall it be admissible in evidence in any civil, criminal or administrative proceeding not directly related to a violation of the toll collection regulations.

C.32: 1-154.2d Power to proceed against violators unaffected.

4. Nothing in this act shall be construed as limiting the power of the Port Authority to proceed against an owner or operator of vehicle for violation of its toll collection regulations as provided in P.L.1950, c.192 (C.32:1-154.1 et seq.).

C.32: 1-154.2e Power to establish, assess tolls unaffected.

5. Nothing in this act shall be construed as extending or diminishing the authority of the Port Authority to establish or assess tolls for interstate vehicular crossings

C.32:1-154.2f Effective date.

6. This act shall take effect upon the enactment into law by the State of New York of legislation having an identical effect with section I of this act, but if the State of New York shall have already enacted such legislation, this act shall take effect immediately.

Approved August 6, 1996

Appendix A.7

New Jersey Law on Video Images and Toll Collection Violations

Government News Network
GovNet-10437B 04-10-97 0l:0lp
S-801 Advance Law 1997 c.59 04-02-97

sec. 1 - 5
C.27:12B-18.2 To
27: 12B-18.6 sec.
6- 10 C.27:23-34.1
To 27:23-34.5 sec.
11 - 15
C.27:25A-21.1 To
27:25A-21.5

P.L. 1997, CHAPTER 59, approved April 2, 1997
Senate Committee Substitute (Second Reprint) for
Senate, No. 801

AN ACT concerning toll collection enforcement and supplementing Title 27 of the Revised Statutes.

BE IT ENACTED by the Senate and General Assembly of the State of New Jersey:

1. As used in sections 1 through 5 of P.L. ____, c. ____ (C. ____) (now pending before the Legislature as this bill):

"Authority" means the New Jersey Highway Authority established by section 4 of P.L.1952, c.16 (C.27: 12B-4).

"Lessee" means any person, corporation, firm, partnership, agency, association or organization that rents, leases or contracts for the use of a vehicle and has exclusive use of the vehicle for any period of time.

“Lessor" means any person, corporation, firm, partnership, agency, association or organization engaged in the business of renting or leasing vehicles to any lessee under a rental agreement, lease or other contract that provides the lessee with the exclusive use of the vehicle for any period of time.

"Operator" means the term "operator" as defined in R.S.39: 1 - I .

"Owner" means the term "owner" as defined in R.S.39: 1-1.

"Toll collection monitoring system" means a vehicle sensor, placed in a location to work in conjunction with a toll collection facility, that produces one or more photographs, one or more microphotographics, a videotape or other recorded images, or a written record, of a vehicle at the time the vehicle is used or operated in a violation of the toll collection monitoring system regulations. The term shall also include any other technology that identifies a vehicle by photographic, electronic or other method.

"Toll collection monitoring system regulations" means the regulations authorized and adopted pursuant to section 2 of P.L.____, c. _____ (C. _____) (now pending before the Legislature as this bill) that prohibit a vehicle from making use of any project except upon the payment of such tolls as may from time to time be prescribed by the authority and that further makes it a violation subject to a civil penalty for any person to refuse to pay, to evade, or to attempt to evade the payment of such tolls, if the violation is recorded by a toll collection monitoring system as defined in this section [2][and in any regulation adopted by the authority pursuant to section 2 of P.L. ____, c. ____ (C. ____) (now pending before the Legislature as this bill)][2].

"Vehicle" means the term "vehicle" as defined in R.S.39:1-1

2. a. The authority may, in accordance with the “Administrative Procedure Act,” P.L.1968, c.410 (C.52:14B-1 et seq.), adopt toll collection monitoring system regulations. [2]The regulations shall include a procedure for processing toll violations and for the treatment of inadvertent violations.[2] A person who violates the regulations shall be liable to a civil penalty of not less than $50 nor more than $200 per violation. The penalty shall be enforced pursuant to "the penalty enforcement law," N.J.S.2A:58-1 et seq.

b. Except as provided in subsection b. of section 3 of P.L. ____, c. ____ (C. ____) (now pending before the Legislature as this bill), an owner of a vehicle shall be jointly and severally liable for the failure of an operator of the vehicle to comply with the toll collection monitoring system regulations. The owner of a vehicle shall be liable if such vehicle was used or operated by the operator with the express or implied permission of the owner when the violation of the toll collection monitoring system regulations was committed, and the evidence of the violation is obtained by [visual observation,] a toll collection monitoring system [or any other method of identification of vehicles]. An owner of a vehicle shall not be liable if the operator of the vehicle has been identified and charged with a violation of section 18 of P.L.1952, c.16 (C.27:12B-18) for the same incident.

[2]c. A toll collection monitoring system acquired or operated by. or under contract to, the authority shall be so designed that it does not produce one or more photographs. Microphotographs, a videotape or other recorded image or images of the face of the operator or any passenger in a motor vehicle.[2]

3. a. If a violation of the toll collection monitoring system regulations is committed as evidenced by [2][visual observation,][2] a toll collection monitoring system [2][or any other method of identification of vehicles][2], the [2] [authority or the][2] agent of the authority may send [1][a notice] an advisory and payment request[1] [2]within 30 days of the date of the violation[2] to the owner of the vehicle by regular mail at the address of record for that owner with the Division of Motor Vehicles in the Department of Transportation or with any other motor vehicle licensing authority of another jurisdiction, providing the owner with the opportunity to resolve the matter prior to the issuance of a summons and complaint that charges a violation of the toll collection monitoring system regulations. The [1][notice] advisory and payment request[1] shall contain sufficient information to inform the owner of the nature, date, time and location of the alleged violation. The [2][authority] agent[2] may require as part of the [1][notice] advisory and payment request[1] that the owner pay to the [2][authority or its][2] agent the proper toll and a reasonable administrative fee that shall not exceed $25 [2]per violation[2]. If the owner fails to pay [1][to] the[1] required toll and fee [2]within 60 days of the date the advisory and payment request was sent[2], the owner shall be subject to liability 'on the [2][31st] 61st[2] day following the date [2][of the violation[1]] the advisory and payment request was sent[2] for the violation of the toll collection monitoring system regulations by the vehicle operator.

b. An owner of a vehicle who is a lessor of the vehicle used in violation of the toll collection monitoring system regulations of the authority shall not be liable for the violation of the regulations if the lessor submits to the authority, in a timely manner, a copy of the rental agreement, lease or other contract document covering that vehicle on the date of the violation, with the name and address of the lessee clearly legible to the authority and to the court having jurisdiction over the violation. If the lessor fails to provide the information in a timely manner, the lessor shall be held liable for the violation of the regulations. If the lessor provides the required information to the authority, the lessee of the vehicle on the date of the violation shall be deemed to be the owner of the vehicle for the purposes of sections I through 5 of P.L. ____, c. ____ (C. ____) (now pending before the Legislature as this bill) and the toll collection monitoring system regulations and shall be subject to liability for the violation of the regulations.

c. A certified report of an employee or agent of the authority reporting a violation of the toll collection monitoring system regulations and any information obtained from a toll collection monitoring system [2][or other method of identification of vehicles][2] shall be available for the exclusive use of the authority and any law enforcement official for the purposes of discharging their duties pursuant to sections 1 through 5 of P.L. ____, c. ____ (C. ____) (now pending before the Legislature as this bill) and the toll collection monitoring system regulations. Any such report or information shall not be deemed a public record under P.L. 1963, c.73 (C.47: 1 A-l et seq.) or the common law concerning access to public records. The certified reports and information shall not be discoverable [1]as a public record[1] by any person, entity or governmental agency, nor shall they be [1][admissible] offered[1] in evidence in any civil, criminal or administrative proceeding, not directly related to a violation of the toll collection monitoring system regulations. [2] However, in the event that. notwithstanding the provisions of subsection c of section 2 of this act, a recorded image of the face of the operator or any passenger in a motor vehicle is produced by the toll collection monitoring system, that image shall not be used by the authority for any purpose nor shall the image or any record or copy thereof be transmitted or communicated to any person, governmental, non-governmental or judicial or administrative entity.[2]

d. A complaint and summons charging a violation of the toll collection monitoring system regulations shall be on a form prescribed by the Administrative [1][Office] Director[1] of the Courts [1]pursuant to the Rules Governing the Courts of the State of New Jersey[1] The authority may authorize [2]by regulation[2] an employee or agent [1]to be a complaining witness[1] to make, sign, and [1][issue] initiate[1] complaints and [1]to issue[1] summonses in the name of the authority [1]on behalf of the State of New Jersey. pursuant to the Rules Governing the Courts of the State of New Jersey[1]. The complaints and summonses may be made on information based upon evidence obtained [2][by visual observation,][2] [1]by[1] a toll collection monitoring system [2][or [1]by[1] any other method of identification of vehicles][2], the toll collection monitoring system record and the records of the Division of Motor Vehicles in the Department of Transportation or of any other state, province, or motor vehicle licensing authority.

Service may be made by [1][regular or certified mail or by other][1] means provided by the Rules Governing the Courts of the State of New Jersey [1][and the service shall have the same effect as if the complaint and summons were served personally][1].

[1][The original complaint and summons and the] [2][The[1]] Except as provided in subsection c. of this section, the[2] recorded images produced by a toll collection monitoring system [2][or other method used for identification of vehicles][2] shall be considered an official record kept in the ordinary course of business and shall be admissible in a proceeding for a violation of any toll collection monitoring system regulations.

e. The municipal court of the municipality wherein a toll collection monitoring system record was made [1][, or wherein the defendant may reside according to the records of the

Division of Motor Vehicles in the Department of Transportation or of any other state, province or motor vehicle licensing authority,][1] shall have jurisdiction to hear violations of the toll collection monitoring system regulations. Violations shall be enforced and penalties collected pursuant to "the penalty enforcement law", N.J.S.2A:58-1 et seq. A proceeding and a judgment arising therefrom shall be pursued and entered in accordance with the provisions of N.J.S.2B:12-1 et seq. and the Rules Governing the Courts of the State of New Jersey.

In addition to the civil penalty that may be assessed by a court [1]having jurisdiction[1] for a violation of the toll collection monitoring system regulations, a court [1][having jurisdiction over the violation][1] [2][may] shall[2] require the [2][owner] defendant[2] to pay the proper toll and [2]may require the defendant[2] to pay a reasonable administrative fee that shall not exceed $25 [2]per violation[2] [1]if the authority has previously sent an advisory and payment request to the defendant[1]. [1][Payment of any penalty or assessment imposed by a court shall be made to the court or judicial officer having jurisdiction over the proceeding and shall be remitted to the authority within 60 days following the payment.] Following[1] collection and distribution of the fees set forth in section 11 of P.L. 1953. c.22 (C. 22A:3-4). any [2][penalties.][2] tolls and administrative fees imposed and collected by the court for a violation of the toll collection monitoring system regulations shall be promptly remitted to the authority by the court.[1] [2]The civil penalty shall be distributed pursuant to the penalty enforcement law, N..l.S 2A 58-1 et seq.[2]

4. Nothing in sections I though 5 of P.L. ___, c. ____ (C. ____) (now pending before the Legislature as this bill) shall be construed as limiting the power of the authority as provided in P.L. 1952, c.16 (C.27:12B-1 et seq.) to proceed against an operator of a vehicle for a violation of the authority's toll collection regulations, or as prohibiting or limiting the enforcement of a violation of the motor vehicle and traffic laws as set forth in Title 39 of the Revised Statutes 2except that an operator of a vehicle charged with a violation of section 18 of P.L.1952. c.16 (C.27: 12B- 18) shall not be liable for the civil penalty provided in subsection a. of section 2 of this act for the same incident[2].

5. Nothing in sections 1through 5 of P.L. ____, c. ____ (C. ____) (now pending before the Legislature as this bill) shall be construed as extending or diminishing the power of the authority to establish and assess tolls on projects of the authority.

6. As used in sections 6 through 10 of P.L. ____, c. ____ (C. ____) (now pending before the Legislature as this bill):

"Authority" means the New Jersey Turnpike Authority established by section 3 of P.L.1948, c.454 (C.27:23-3).

"Lessee" means any person, corporation, firm, partnership, agency, association or organization that rents, leases or contracts for the use of a vehicle and has exclusive use of the vehicle for any period of time.

"Lessor" means any person, corporation, firm, partnership, agency, association or organization engaged in the business of renting or leasing vehicles to any lessee under a rental agreement, lease or other contract that provides the lessee with the exclusive use of the vehicle for any period of time.

"Operator" means the term "operator" as defined in
R. S.39: 1 -1.

"Owner" means the term "owner" as defined in
R.S.39: 1-1.

"Toll collection monitoring system" means a vehicle sensor, placed in a location to work in conjunction with a toll collection facility, that produces one or more photographs, one or more microphotographics, a videotape or other recorded images, or a written record, of a vehicle at the time the vehicle is used or operated in a violation of the toll collection monitoring system regulations. The term shall also include any other technology that identifies a vehicle by photographic, electronic or other method.

"Toll collection monitoring system regulations" means the regulations authorized and adopted pursuant to section 7 of P.L. , c. (C.) (now pending before the Legislature as this bill) that prohibit a vehicle from making use of any project except upon the payment of such tolls as may from time to time be prescribed by the authority and that further makes it a violation subject to a civil penalty for any person to refuse to pay, to evade, or to attempt to evade the payment of such tolls, if the violation is recorded by a toll collection monitoring system as defined in this section [2][and in any regulation adopted by the authority pursuant to section 7 of P.L. ___, c. ___ (C. ___) (now pending before the Legislature as this bill)][2].

"Vehicle" means the term "vehicle" as defined in
R.S.39: 1-1.

7. a. The authority may, in accordance with the "Administrative Procedure Act," P.L.1968, c.410 (C.52: 14B- 1 et seq.), adopt toll collection monitoring system regulations. [2]The regulations shall include a procedure for processing toll violations and for the treatment of inadvertent violations.[2] A person who violates the regulations shall be liable to a civil penalty of not less than $50 nor more than $200 per violation. The penalty shall be enforced pursuant to the "penalty enforcement law," N.J.S.2A:58-1 et seq.

b. Except as provided in subsection b. of section 8 of P.L. ___, c. ___ (C. ____) (now pending before the Legislature as this bill), an owner of a vehicle shall be jointly and severally liable for the failure of an operator of the vehicle to comply with the toll collection monitoring system regulations. The owner of a vehicle shall be liable if such vehicle was used or operated by the operator with the express or implied permission of the owner when the violation of the toll collection monitoring system regulations was committed, and the evidence of the violation is obtained by [2][visual observation,][2] a toll collection monitoring system [2][or any other method of identification of vehicles used to commit violations][2]. An owner of a vehicle shall not be liable if the operator of the vehicle has been identified and charged with a violation of section [2][1 of P.L. 1951, c.264 (C.27:23-25)] 10 of P.L. 1951, c.264 (C.27:23-34)[2] for the same incident.

2c. A toll collection monitoring system acquired or operated by. or under contract to, the authority shall be so designed that it does not produce one or more photographs, Microphotographs, a videotape or other recorded image or images of the face of the operator or any passenger in a motor vehicle.[2]

8. a. If a violation of the toll collection monitoring system regulations is committed as evidenced by [2][visual observation,][2] a toll collection monitoring system [2][or any other method

of identification of vehicles][2], the [2][authority or the][2] agent of the authority may send[1] [a notice] an advisory and payment request[1] [2]within 30 days of the date of the violation[2] to the owner of the vehicle by regular mail at the address of record for that owner with the Division of Motor Vehicles in the Department of Transportation or with any other motor vehicle licensing authority of another jurisdiction, providing the owner with the opportunity to resolve the matter prior to the issuance of a summons and complaint that charges a violation of the toll collection monitoring system regulations. The [1][notice] advisory and payment request[1] shall contain sufficient information to inform the owner of the nature, date, time and location of the alleged violation. The [2][authority] agent[2] may require as part of the [1][notice] advisory and payment request[1] that the owner pay to the [2][authority or its][2] agent the proper toll and a reasonable administrative fee that shall not exceed $25 [2]per violation[2]_. If the owner fails to pay [1][to] the[1] required toll and fee [2]within 60 days of the date the advisory and payment request was sent2, the owner shall be subject to liability 'on the [2][31st] 61st[2] day following the date [2][of the violation[1]] the advisory and payment request was sent[2] for the violation of the toll [1][collections] collection[1] monitoring system regulations by the vehicle operator.

b. An owner of a vehicle who is a lessor of the vehicle used in violation of the toll collection monitoring system regulations of the authority shall not be liable for the violation of the regulations if the lessor submits to the authority, in a timely manner, a copy of the rental agreement, lease or other contract document covering that vehicle on the date of the violation, with the name and address of the lessee clearly legible to the authority and to the court having jurisdiction over the violation. If the lessor fails to provide the information in a timely manner, the lessor shall be held liable for the violation of the regulations. If the lessor provides the required information to the authority, the lessee of the vehicle on the date of the violation shall be deemed to be the owner of the vehicle for the purposes of sections 6 through 10 of P.L. ___, c. ____ (C. ____) (now pending before the Legislature as this bill) and the toll collection monitoring system regulations and shall be subject to liability for the violation of the regulations.

c. A certified report of an employee or agent of the authority reporting a violation of the toll collection monitoring system regulations and any information obtained from a toll collection monitoring system [2][or other method of identification of vehicles][2] shall be available for the exclusive use of the authority and any law enforcement official for the purposes of discharging their duties pursuant to sections 6 through 10 of P.L___ , c. ___ (C. ___) (now pending before the Legislature as this bill) and the toll collection monitoring system regulations. Any such report or information shall not be deemed a public record under P.L. 1963, c.73 (C.47: 1 A-1 et seq.) or the common law concerning access to public records. The certified reports and information shall not be discoverable 'as a public record' by any person, entity or governmental agency, nor shall they be [1][admissible] offered[1] in evidence in any civil, criminal or administrative proceeding, not directly related to a violation of the toll collection monitoring system regulations.[2] However, in the event that, notwithstanding, the provisions of subsection c. of section 7 of this act, a recorded image of the face of the operator or any passenger in a motor vehicle is produced by the toll collection monitoring system, that image shall not be used by the authority for any purpose nor shall the image or any record or copy thereof be transmitted or communicated to any person, governmental, non-governmental, or judicial or administrative entity.[2]

d. A complaint and summons charging a violation of the toll collection monitoring system regulations shall be on a form prescribed by the Administrative [1][Office] Director[1] of the Courts [1]pursuant to the Rules Governing the Courts of the State of New Jersey[1]. The authority may authorize [2]by regulation[2] an employee or agent [1]to be a complaining witness[1] to make, sign, and [1][issue] initiate[1] complaints and [1]to issue[1] summonses in the name of the authority [1]on behalf of the State of New Jersey, pursuant to the Rules Governing the Courts of the State of New Jersey[1]. The complaints and summonses may be made on information based upon evidence obtained [2][by visual observation,][2] [1]by[1] a toll collection monitoring system [2][or [1]by[1] any other method of identification of vehicles][2], the toll collection monitoring system record and the records of the Division of Motor Vehicles in the Department of Transportation or of any other state, province, or motor vehicle licensing authority.

Service may be made by [1][regular or certified mail or by other][1] means provided by the Rules Governing the Courts of the State of New Jersey [1][and the service shall have the same effect as if the complaint and summons were served personally][1].

[1][The original complaint and summons and the][2] [The[1]] Except as provided in subsection c. of this section, the[2] recorded images produced by a toll collection monitoring system [2][or other method used for identification of vehicles][2] shall be considered an official record kept in the ordinary course of business and shall be admissible in a proceeding for a violation of any toll collection monitoring system regulations.

e. The municipal court of the municipality wherein a toll collection monitoring system record was made [1][, or wherein the defendant may reside according to the records of the Division of Motor Vehicles in the Department of Transportation or of any other state, province or motor vehicle licensing authority,][1] shall have jurisdiction to hear violations of the toll collection monitoring system regulations. Violations shall be enforced and penalties collected pursuant to "the penalty enforcement law", N.J.S.2A:58-1 et seq. A proceeding and a judgment arising therefrom shall be pursued and entered in accordance with the provisions of N.J.S.2B:12-1 et seq. and the Rules Governing the Courts of the State of New Jersey.

In addition to the civil penalty that may be assessed by a court [1]having jurisdiction[1]for a violation of the toll collection monitoring system regulations, a court [1][having jurisdiction over the violation][1] [2][may] shall[2] require the [2][owner] defendant[2]to pay the proper toll and [2]may require the defendant[2] to pay a reasonable administrative fee that shall not exceed $25 [2]per violation[2] [1]if the authority has previously sent an advisory and payment request to the defendant[1]. [1][Payment of any penalty or assessment imposed by a court shall be made to the court or judicial officer having jurisdiction over the proceeding and shall be remitted to the authority within 60 days following the payment.] Following collection and distribution of the fees set forth in section 11 of P.L.1953. c.22 (C.22A:3-4), any [2][penalties.][2] tolls and administrative fees imposed and collected by the court for a violation of the toll collection monitoring system regulations shall be promptly remitted to the authority by the court.[1] [2]The civil penalty shall be distributed pursuant to the penalty enforcement law, N.J.S.2A:58-1 et seq.[2]

9. Nothing in sections 6 though 10 of P.L. _, c. _ (C.) (now pending before the Legislature as this bill) shall be construed as limiting the power of the authority as provided in P.L.1951, c.264 (C.27:23-25 et seq.) to proceed against an operator of a vehicle for a violation of the authority s toll collection regulations, or as prohibiting or limiting the enforcement of a violation of the motor vehicle and traffic laws as set forth in Title 39 of the Revised Statutes [2]except that an operator of a vehicle charged with a violation of section 10 of P.L. 1951. c.264 (C.27:23-34) shall not be liable for the civil penalty provided in subsection a. of section 7 of this act for the same incident[2].

10. Nothing in sections 6 through 10 of P.L. ___, c. ___ (C. ___) (now pending before the Legislature as this bill) shall be construed as extending or diminishing the power of the authority to establish and assess tolls on turnpike projects of the authority.

11. As used in sections 11 through 15 of P.L. , c. (C.) (now pending before the Legislature as this bill):

"Authority" means the South Jersey Transportation Authority established by section 4 of P.L.1991, c.252 (C.27:25A4).

"Lessee" means any person, corporation, firm, partnership, agency, association or organization that rents, leases or contracts for the use of a vehicle and has exclusive use of the vehicle for any period of time.

Lessor means any person, corporation, firm, partnership, agency, association or organization engaged in the business of renting or leasing vehicles to any lessee under a rental agreement, leases or other contract that provides the lessee with the exclusive use of the vehicle for any period of time.

"Operator" means the term "operator" as defined in R.S.39: 1-1.

"Owner" means the term "owner" as defined in R.S.39: 1-1.

"Toll collection monitoring system" means a vehicle sensor, placed in a location to work in conjunction with a toll collection facility, that produces one or more photographs, one or more microphotographics, a videotape or other recorded images, or a written record, of a vehicle at the time the vehicle is used or operated in a violation of the toll collection monitoring system regulations. The term shall also include any other technology that identifies a vehicle by photographic, electronic or other method.

"Toll collection monitoring system regulations" means the regulations authorized and adopted pursuant to section 12 of P.L. ___, c. ___ (C. ____) (now pending before the Legislature as this bill) that prohibit a vehicle from making use of any project except upon the payment of such tolls as may from time to time be prescribed by the authority and that further makes it a violation subject to a civil penalty for any person to refuse to pay, to evade, or to attempt to evade the payment of such tolls, if the violation is recorded by a toll collection monitoring system as defined in this section [2][and in any regulation adopted by the authority pursuant to section 12 of P.L. ___, c. ___ (C. ___) (now pending before the Legislature as this bill)][2].

"Vehicle" means the term "vehicle" as defined in R.S.39:1-1.

12. a. The authority may, in accordance with the "Administrative Procedure Act," P.L.1968, c.410 (C.52:14B-1 et seq.), adopt toll collection monitoring system regulations. [2]<u>The regulations shall include a procedure for processing toll violations and for the treatment of inadvertent violations</u>.[2] A person who violates the regulations shall be liable to a civil penalty of not less than $50 nor more than $200 per violation. The penalty shall be enforced pursuant to "the penalty enforcement law," N.J.S.2A:58-1 et seq.

b. Except as provided in subsection b. of section 13 of P.L.___, c. ____ (C. ____) (now pending before the Legislature as this bill), an owner of a vehicle shall be jointly and severally liable for the failure of an operator of the vehicle to comply with the toll collection monitoring system regulations [2][to comply with the regulations][2]. The owner of a vehicle shall be liable if such vehicle was used or operated by the operator with the express or implied permission of the owner when the violation of the toll collection monitoring system regulations was committed, and the evidence of the violation is obtained by [2][visual observation,][2] a toll collection monitoring system [2][or any other method of identification of vehicles][2]. An owner of a vehicle shall not be liable if the operator of the vehicle has been identified and charged with a violation of section 21 of P.L. 1991, c.252 (C.27:25A-21) for the same incident.

[2]c. A toll collection monitoring system acquired or operated by, or under contract to, the authority shall be so designed that it does not produce one or more photographs, microphotographs, a videotape or other recorded image or images of the face of the operator or any passenger in a motor vehicle.[2]

13. a. If a violation of the toll collection monitoring system regulations is committed as evidenced by [2][visual observation,][2] a toll collection monitoring system [2][or any other method of identification of vehicles][2], the [2][authority or the][2] agent of the authority may send [1][a notice] an advisory and payment request[1] [2]within 30 days of the date of the violation[2] to the owner of the vehicle by regular mail at the address of record for that owner with the Division of Motor Vehicles in the Department of Transportation or with any other motor vehicle licensing authority of another jurisdiction, providing the owner with the opportunity to resolve the matter prior to the issuance of a summons and complaint that charges a violation of the toll collection monitoring system regulations. The [1][notice] advisory and payment request[1] shall contain sufficient information to inform the owner of the nature, date, time and location of the alleged violation. The [2][authority] agent[2] may require as part of the [1][notice] advisory and payment request[1] that the owner pay to the [2][authority or its][2] agent the proper toll and a reasonable administrative fee that shall not exceed $25 [2]per violation[2]. If the owner fails to pay [1][to] the[1] required toll and fee [2]within 60 days of the date the advisory and payment request was sent[2], the owner shall be subject to liability 'on the [2][31st] 61St[2] day following the date [2][of the violation[1]] the advisory and payment request was sent[2] for the violation of the toll collection monitoring system regulations by the vehicle [1][operated] operator[1].

b. An owner of a vehicle who is a lessor of the vehicle used in violation of the toll collection monitoring system regulations of the authority shall not be liable for the violation of the regulations if the lessor submits to the authority, in a timely manner, a copy of the rental agreement, lease or other contract document covering that vehicle on the date of the violation, with the name and address of the lessee clearly legible to the authority and to the court having jurisdiction over the violation. If the lessor fails to provide the information in a timely manner, the lessor shall be held liable for the violation of the regulations. If the lessor provides the required information to the authority, the lessee of the vehicle on the date of the violation shall be deemed to be the owner of the vehicle for the purposes of sections 11 through 15 of P.L. ___, c. ___ (C. ___) (now pending before the Legislature as this bill) and the toll collection monitoring system regulations and shall be subject to liability for the violation of the regulations.

c. A certified report of an employee or agent of the authority reporting a violation of the toll collection monitoring system regulations and any information obtained from a toll collection monitoring system [2][or other method of identification of vehicles][2] shall be available for the exclusive use of the authority and any law enforcement official for the purposes of discharging their duties pursuant to sections 11 through 15 of P.L. ___, c. ___ (C. ___) (now pending before the Legislature as this bill) and the toll collection monitoring system regulations. Any such report or information shall not be deemed a public record under P.L. 1963, c.73 (C.47: lA-1 et seq.) or the common law concerning access to public records. The certified reports and information shall not be discoverable [1]as a public record[1] by any person, entity or governmental agency, nor shall they be [1][admissible] offered[1] in evidence in any civil, criminal or administrative proceeding, not directly related to a violation of the toll collection monitoring system regulations. [2]However, in the event that, notwithstanding the provisions of subsection c. of section 12 of this act a recorded image of the face of the operator or any passenger in a motor vehicle is produced by the toll collection monitoring system, that image shall not be used by the authority for any purpose nor shall the image or any record or copy thereof be transmitted or communicated to any person, governmental, non-governmental judicial or administrative entity.[2]

d. A complaint and summons charging a violation of the toll collection monitoring system regulations shall be on a form prescribed by the Administrative [1][Office] Director[1] of the Courts [1]pursuant to the Rules Governing the Courts of the State of New Jersey[1]. The authority may authorize [2]by regulation[2] an employee or agent [1]to be a complaining witness[1] to make, sign, and [1][issue] initiate[1] complaints and [1]to issue[1] summonses in the name of the authority [1]on behalf of the State of New Jersey. pursuant to the Rules Governing the Courts of the State of New Jersey[1]. The complaints and summonses may be made on information based upon evidence obtained [2][by visual observation,][2] [1]by[1] a toll collection monitoring system [2][or [1]by[1] any other method of identification of vehicles][2], the toll collection monitoring system record and the records of the Division of Motor Vehicles in the Department of Transportation or of any other state, province, or motor vehicle licensing authority.

Service may be made by [1][regular or certified mail or by other][1] means provided by the Rules Governing the Courts of the State of New Jersey [1][and the service shall have the same effect as if the complaint and summons were served personally][1].

[1][The original complaint and summons and the] [2][The[1]] Except as provided in subsection c. of this section, the[2] recorded images produced by a toll collection monitoring system [2][or other method used for identification of vehicles][2] shall be considered an official record kept in the ordinary course of business and shall be admissible in a proceeding for a violation of any toll collection monitoring system regulations.

e. The municipal court of the municipality wherein a toll collection monitoring system record was made [1][, or wherein the defendant may reside according to the records of the Division of Motor Vehicles in the Department of Transportation or of any other state, province or motor vehicle licensing authority,][1] shall have jurisdiction to hear violations of the toll collection monitoring system regulations. Violations shall be enforced and penalties collected pursuant to "the penalty enforcement law, N.J.S.2A:58-1 et seq. A proceeding and a judgment arising therefrom shall be pursued and entered in accordance with the provisions of N.J.S.2B: 12- 1 et seq. and the Rules Governing the Courts of the State of New Jersey.

In addition to the civil penalty that may be assessed by a court [1]having jurisdiction[1] for a violation of the toll collection monitoring system regulations, a court [1][having jurisdiction over the violation][1] [2][may] shall[2] require the [2][owner] defendant[2] to pay the proper toll and [2]may require the defendant[2] to pay a reasonable administrative fee that shall not exceed $25 [2]per violation[2] [1]if the authority has previously sent an advisory and payment request to the defendant[1]. [1][Payment of any penalty or assessment imposed by a court shall be made to the court or judicial officer having jurisdiction over the proceeding and shall be remitted to the authority within 60 days following the payment.] Following collection and distribution of the fees set forth in section 11 of P.L.1953, c.22 (C.22A:3-4), any [2][penalties.][2] tolls and administrative fees imposed and collected by the court for a violation of the toll collection monitoring promptly remitted to the authority by the court.[1] [2]The civil penalty shall be distributed pursuant to the "penalty enforcement :58-1 et seq.[2]

14. Nothing in sections 11 though 15 of P.L. ___,c. ___ (C. ___) (now pending before the Legislature as this bill) shall be construed as limiting the power of the authority as provided in P.L.1991, c.252 (C.27:25A-1 et seq.) to proceed against an operator of a vehicle for a violation of the authority's toll

collection regulations, or as prohibiting or limiting the enforcement of a violation of the motor vehicle and traffic laws as set forth in Title 39 of the Revised Statutes [2]except that an operator of a vehicle charged with a violation of section 21 of P.L.1991. c.252 (C.27:25A-21) shall not be liable for the civil penalty provided in subsection a. of section 12 of this act for the same incident2.

15. Nothing in sections 11 through 15 of P.L., c. (C.) (now pending before the Legislature as this bill) shall be construed as extending or diminishing the power of the authority to establish and assess tolls on expressway projects of the authority.

16. This act shall take effect immediately.

Clarifies law concerning electronic collection of tolls by State toll road authorities.

EXPLANATION - Matter enclosed in bold-faced brackets [thus] in the above bill is not enacted and intended to be omitted in the law.

Matter underlined thus is new matter.
Matter enclosed in superscript numerals has been adopted as follows:

[1]Senate floor amendments adopted November 7, 1996.
[2]Senate STR committee amendments adopted March 3, 1997.

Appendix A.8

Gary-Chicago-Milwaukee Traffic Information Access via the Internet Policy

Statement of Policy of GCM Traffic Information Access Via the Internet
Last updated: 6/24/97

In the interest of providing the public with accurate information to promote safety, convenience, and comfort of travelers, the Illinois Department of Transportation (the Department), in coordination with allied transportation providers and interests in the GCM Corridor, is making travel information available on the Internet. The GCM Corridor is a consortium of agencies responsible for transportation in the area from Milwaukee, Wisconsin to Gary, Indiana. It is guided by the departments of transportation of Illinois, Wisconsin and Indiana working with the US Department of Transportation.

Information made available will include traffic data, travel time information and incident data as well as planned road closures as the system is fully developed. The Department will make this information available for the Corridor in graphical and text formats on a number of Internet homepages.

The Department desires to disseminate timely and accurate information to the public and work with others who have similar interests. The Department will cooperate with adjacent states in the GCM Corridor to provide common information formats to serve the public via the GCM Homepage.

The information provided is presently made available without charge to individuals and companies. The Department has the right to discontinue this service for any reason without explanation. Individuals using information for personal purposes are not required to notify the Department. Any users of the information, who either directly or indirectly are providing information for a fee or reusing the information in any way, must register with the Department at:
ITS Program Office
Illinois Department of Transportation
120 West Center Court
Schaumburg, Illinois
Attention: Internet Registrar
Fax: 847-705-4803

Users should explain the proposed usage of the information including any contemplated advertising, and where the information will be displayed. The Department requires that information be displayed as provided to ensure proper credit to participating agencies in the GCM Corridor Coalition.

APPENDIX B

PROCEDURES AND OPERATING POLICIES

Appendix B.1

Texas Department of Transportation Kiosk Location Criteria

CRITERIA FOR KIOSK DEPLOYMENT AND DISTRIBUTION

The criteria for the deployment and distribution of kiosks for the TxDOT MDI is as follows:

TxDOT will deploy approximately 50 kiosks, approximately 35 indoor, and 15 outdoor. The City of San Antonio, VIA Metropolitan Transit and TxDOT will each receive 5 units.

TxDOT will advertise in the local newspaper and possibly in other San Antonio journals for distribution of the remainder kiosks. The advertisement will include the information that the kiosk will provide as well as inform prospective organizations of a public meeting to demonstrate the kiosks.

Criteria for selection

- State Colleges/Universities
- Military Bases (Base Exchange)
- Malls in excess of 500,000 sq. ft.
- Hotels 300+ rooms
- Top 10 Tourist Attractions
- Top 10 Private businesses (2000+ employees at one location)
- Other public locations with strong visibility

The recipient of a kiosk will provide space, accessibility, power and dmark (phone line) for the kiosk. The recipient will place the kiosk in a location that provides both visibility and security from vandalism. TxDot will be responsible for the monthly phone bill as well as the maintenance of the kiosk. The kiosk will not be altered or modified in anyway be the recipient. Selection will be based on the above criteria, geographic location as well as demographics. In the event that more kiosk are requested than the thirty-five available, distribution will be based on an even distribution of the city.

Top 10 Hotels (300 + rooms): (est. Distribution 9)

1. Marriott Rivercenter - 1000
2. Hyatt Regency - 631
3. Hyatt Regency Hill Country Resort - 500
4. Marriott Riverwalk - 496
5. Hilton Palacio Del Rio - 481
6. Adam's Mark Riverwalk - 410
7. Holiday Inn Select/Airport - 397
8. Hilton Hotel/Airport - 387
9. Crowne Plaza St. Anthony Hotel - 349

10 La Mansion Del Rio - 337

Top 12 Tourist Attractions: *(est. distribution 7)*

1. Riverwalk
2. Rivercenter Mall
3. Alamo
4. El Mercado
5 La Villita
6. Sea World
7. IMAX
8. Six Flags Fiesta Texas
9. . Missions/Historical
10. Zoo
11. North Star Mall
12. Hemisfair Park

Top 10 Private Sector-Employer (2,000 + employees - one location):
(est. distribution 4)

1. H.E.B. Grocery Co. - 13,000
2. USAA - 9,786
3. Methodist Healthcare System - 6,546
4. Baptist Health System - 5,098
5. Santa Rosa Health Care - 2,870
6. Six Flags Fiesta Texas – 2,700
7. Bill Miller Bar-B-Q Enterprises Inc. - 2,500
8. Southwest Research Institute - 2,456
9. Sea World of Texas - 2.175
10. Red McCombs Team - 2,000

Colleges*: (est. distribution 4)*

1. San Antonio College (SAC)
2. University of San Antonio (UTSA)
3. Palo Alto College (PAC)
4. St. Philps College
5. U.T. Health Science Center

Malls (not in order)*: test. distribution 7)*

1. Crossroads Mall - (711,231 sq. ft.)
2. Ingram Park Mall - (1.2 million sq. ft.)
3. North Star Mall - (1.3 million sq. ft.)
4. Central Park Mall -
5. Westlakes Mall - (400,000 sq. ft.)

6. Rolling Oaks Mall - (758,500 sq. ft.)
7 Windsor Park Mall - (1.1 million sq. ft.)
8 River Center Mall - (1,000,060 sq. ft.)
9. McCreless Mall -
10. South Park Mall - (680,000 sq. ft.)

Military Bases: (est. distribution 4)

1. Kelly AFB
2. Lackland AFB
3. Brooks AFB
4. Randolph AFB
5. Fort Sam Houston

Amusement Parks (# of visitors per year) (in category above)

1 . Sea World of Texas - confidential
2. Six Flags Fiesta Texas - confidential

source of information
SAN ANTONIO CONVENTION AND VISITOR BUREAU

Appendix B.2

Texas Department of Transportation Automatic Vehicle Identification Tag Distribution Plan

ATTACHMENT A

Distribution Plan

AVI Tags

1. Distribute AVI Tags to public sector MDI partners. Approximate numbers are:

A. Texas Department of Transportation	100
B. VIA Metropolitan Transit Authority	711
C. City of San Antonio-AII Public Agencies	2500
F. Center of Transportation Research	5
G. Texas Transportation Research Institute	5

2. Distribute AVI Tags to public sector agencies not participating in MDI

A. Local Fire Departments (Non San Antonio)	50
B. Local Police Departments (Non San Antonio)	100
C City Public Service (Local Utility Company	200
D San Antonio Water Service	200
E. University of Texas at San Antonio	50
F. Office of the Attorney General (Child Support)	5
G Department of Health	10
H Natural resource Conservation Commission	10
1. Department of Public Safety	20
J. Rehabilitation Commission	10
K. San Antonio River Authority	20
L. San Antonio State Hospital	5
M. Bexar County Sheriffs	50
N. Local School Districts	1,700

3. Place Stickers on the personnel vehicles of public sector employees on a voluntary basis. This will require a separate marketing campaign to alleviate any fears of public sector employees.

A. Texas Department of Transportation	880
B. VIA Metropolitan Transit Authority	1700
C. City of San Antonio-AII Public Agencies	10,000
F. Bexar County Sheriffs	l50
G. Texas Transportation Research Institute	15
H. Local Fire Departments (Non San Antonio)	50
1. Local Police Departments (Non San Antonio)	200
J. City Public Service (Local Utility Company	300
K. San Antonio Water Service	200
L. University of Texas at San Antonio	150
M. Office of the Attorney General (Child Support)	5
N. Department of Health	10
O. Natural resource Conservation Commission	10

P. Department of Public Safety	100
Q. Rehabilitation Commission	10
R. San Antonio River Authority	20
S. San Antonio State Hospital	5
T. Bexar County Sheriffs	150

4. Place Stickers on company owned vehicles and the personnel vehicles of private sector companies on a voluntary basis. This will require a separate marketing campaign contract.

A. Southwest Research Institute	2800
B. U.S.A.A.	10,000
C. Taxi Companies	500
F. Local Grocery Chains	2,000

Tags would be distributed to commercial fleet operations such as trucking Firms, insurance companies, taxicabs, and delivery services. Enlist several large San Antonio employers to distribute literature and/or tags to their employees with statements of support of the program. Obtain support of local community officials including Mayor. City Council. and Chamber of Commerce.

A contract will be awarded to an advertising firm to market and distribute AVI Tags.

A DISTRIBUTION CAMPAIGN WILL INCLUDE THE FOLLOWING:

1. **A presentation describing the project scope and purpose of vehicle tagging will be conducted before any sticker is placed on personnel vehicles and private sector employees**. Emphasis should be place on anonymity of the participating individuals. Explain how these drivers are contributing to the community by being a pan of this program.

2. After the individuals have been informed of the AVI Tags program, a request for participation will be made. Tags will be available to selected public agency personnel and selected private sector employees for free pickup immediately after the presentation.

3. Any personnel associated with the AVI Tag project will leave the presentation room and allow time for participating individuals to voluntarily and under anonymity take one AVI Tag with them to be placed on their personal vehicle.

4. AVI Tags distributors must determine the number of tags randomly distributed at each session.

5. A geographically diverse representation of the greater San Antonio metropolitan area.

6. A demographically diverse representation of the greater San Antonio metropolitan area.

7. Various Logos

Tags would have two or three main logos (such as Don't Mess with Texas, State emblem or any other TxDOT approved logos). **Approved logos include**:

Don't Mess with Texas	State of Texas emblem
Texas flag	You Booze, You Cruise, You Lose
	(environmentally friendly slogans)

8. Information Booths

Place information booths at public locations where people can obtain information about the tags. Booths could contain video, brochures, posters, and possibly event tags. Booths could be portable so that they could be placed at locations with major events (i.e., sporting events, rodeo, and Fiesta).

9. Volunteers would be at major events (sporting events, auto shows, TxDOT traffic safety events). **Distribute AVI Tags project literature to volunteer participants.**

10. Vehicle Registration Locations

Have contractor personnel at vehicle registration locations (i.e., Tax Assessor-Collector office, DMV, HEB) as people register their vehicles. **Distribute AVI Tags project literature to volunteer participants.**

11. Existing TxDOT Traffic Safety and Public Information Campaigns

Include AV1 Tags in Public Information and Traffic Safety events as give away items.

12. The contractor shall use specific lot numbers (tag range i.e. 0 - 5000) for each distribution method. This will enable TxDOT evaluate which distribution method is more successful. This evaluation will take place six months after distribution. This will allow TxDOT to distribute the AV1 tags in an efficient manner.

Appendix B.3

TransGuide Procedures for Scenario Execution

Demand Exceeds Capacity
Whether the scenario is scheduled, or a result of an alarm the operator may select if demand exceeds capacity.

This choice will determine whether traffic will be detoured to the frontage road and involve the traffic signal interface.

The Scenario

Once the three choices are answered the scenario will appear. The operator shall determine the validity of the scenario. A quick run through of the scenario shall be accomplished by the operator (manager) who is handling the scenario for proper message of both VMS and LCS. The operator (manager) shall determine the incident location, and add or delete equipment as necessary. In the case of equipment located after the incident the equipment shall be deleted (due to scenario covering a half mile range). Should a scenario be improper, the operator (manager) shall make necessary modification (see users guide) and take note and inform the shift manager of the discrepancies, for future database correction.

Response time is very critical, therefore the operator (manager) shall use the scenario if appropriate, and may schedule a scenario at the same location with a customize (more specific) scenario. Any time a modification is accomplished, the MANAGER IN THE ASSIGNMENT PLAN will make approval and determine which message is to be selected when a conflict occurs. There shall always be oral communication between the operator (manager) with the MANAGER IN THE ASSIGNMENT PLAN to explain the modifications. At all times the SHIFT MANAGER shall be notified of all scenarios implemented. The MANAGER IN THE ASSIGNMENT PLAN shall be responsible for all scenarios implemented, however; the SHIFT MANAGER who may act as the MANAGER IN THE ASSIGNMENT PLAN is ultimately responsible for all of OPERATIONS. The use of the RGB switch is strongly recommend to ensure that all scenarios are correct.

Special Scenarios
During ice conditions see ICE PLAN procedures.
During ozone actions days OZONE ACTIONS DAY procedures.

Scenario Priority
In the event that more than one type of incident, the scenario that impact traffic most shall be used (i.e. A construction scenario is implemented for a lane closure, and a major accident occurs. The scenario for major accident shall be implemented and the construction scenario shall be on Queue.)

Procedures for Scenario Execution
Whenever an incident is encountered, a scenario shall be used at all times to communicate with the field equipment. Only in the case when the Scenario Process has failed and may not be restarted due to circumstances that would be detrimental to Operations (Scenario Process fails during rush-hour or other scenario are in execution) shall messages be place on VMSs and LCSs manually for response due to an incident.

Scenario Classification
When an incident is encountered, the correct type of incident shall be selected:

Major Accident- An accident that will cause fifteen minutes of delay or longer.
Minor Accident- An accident that will cause less that fifteen minutes of delay.
OR A stalled vehicle on either the main lanes or shoulder.
Congestion-To be used in situations when congestion has occurred, not as a result of an accident.
Debris-shall be initiated in situations when debris is on the roadway and interferes with traffic.
Construction/Maintenance-To include schedule lane closures as well as inform motorist of maintenance on shoulders which may not have lane closures (guardrail repair).
Weather Conditions - These scenarios shall include water on roadway as well as Ice Plan (see Ice Plan Procedure for specific scenario information).

Lanes Affected
When responding to an incident as a result for an alarm, the scenario will only allow the lanes for that section to be selected. Shoulders shall appear on any scenario resulting from an alarm as well as from a scheduled scenario. Lanes are number one through six, the left lane being number one lane, however, on scenarios resulting from alarms only the number of lanes at the section will be highlighted, non-existing lanes will be grayed out, and may not be selected.

Scheduled scenario are scenarios that are initiated either by event that are scheduled (lane or ramp closures) or by responding to incidents before an alarm is generated. The format for a scheduled scenario follows in line with scenario development. First the user must type the section of freeway as it appears on the map (00lOW-574.385). At this point the scenario is similar to a scenario initialed by an alarm with the exception of lane are not specific (no lanes are grayed out).

Lane Control Signals (LCS)
The use of LCSs without a scenario is strictly prohibited with the exception of the scenario process failure. LCSs shall be executed as follows:

RED X When a lane(s) are closed. When possible two red x(s) shall be used prior to the actual incident.

YELLOW X Not to be used.

YELLOW SLANT ARROW A yellow slant left or right arrow is to be used prior to the two red x(s).

DOWN YELLOW ARROW Shall be used only for the following two circumstances.

1) During any scenario on connectors from one interstate to another that a read x or slanted yellow arrow would be inappropriate.

2) When an incident occurs on the shoulders. This is to include stalled vehicles that are dangerously near the mainlanes or people at their vehicle, or construction on shoulders. At no time shall a down yellow arrow be displayed to slow traffic or to display caution on the mainlanes.

GREEN DOWN ARROW Normal position.

Variable Message Signs (VMS)

The use of VMSs with out a scenario is strictly prohibited with the exception of the scenario process failure. VMS message shall follow the same ground rule as they apply for the development of scenarios. Customizing a VMS message for specific information is encouraged, however; the message must be approved by the **SHIFT MANAGER** and the modification must be from the scenario screen.

Appendix B.4

TransGuide Procedure for Control of Changeable Message Signs

TYPE 1 & TYPE 2 CHANGEABLE MESSAGE SIGNS - ACCIDENT MESSAGES

I. Each lane or lanes closed will result in 4 possible ACCIDENT scenarios:

1) MINOR ACCIDENT with DEMAND LESS THAN CAPACITY.
2) MINOR ACCIDENT with DEMAND GREATER THAN CAPACITY.
3) MAJOR ACCIDENT with DEMAND LESS THAN CAPACITY.
4) MAJOR ACCIDENT with DEMAND GREATER THAN CAPACITY.

II. <u>DEFINITIONS</u>:

MINOR ACCIDENT: Lane closed 15 minutes or less.
MAJOR ACCIDENT: Lane closed more than 15 minutes.
CAPACITY: "Maximum rate of flow that can be accommodated by a given traffic facility under prevailing conditions." - 1985 Highway Capacity Manual, Special Report 209.

III. Messages are based on 2 (two) possible situations for a driver when approaching a lane or lanes closed because of an accident:

1) There are NO EXITS between the driver and the closed lane(s).
2) There IS AN EXIT(s) between the driver and the closed lane(s).

When an EXIT(s) exists, the messages can be expanded to include the different types of conditions that the driver will be exiting on to:

a) CITY CROSS STREET - no frontage roads parallel to the main lanes.
b) FRONTAGE ROAD - where traffic can move parallel to the main lanes.
c) CONNECTOR - Freeway to Freeway

IV. The ACCIDENT MESSAGES are based on the combination of (I) and (III) above. For example, a MINOR ACCIDENT with DEMAND GREATER THAN CAPACITY and NO EXIT ramp between the driver and the closed lane has a different message than a MINOR ACCIDENT with DEMPND GREATER THAN CAPACITY and an EXIT RAMP between the driver and the closed lane(s).

V. Messages have been created to ALERT and INSTRUCT drivers at the following distances prior to an incident:

1) 0 MILES (the accident is less than 1/2 mile ahead)
2) 1/2 MILE
3) 1 MILE
4) 1 1/2 MILES
5) 2 MILES
6) 2 1/2 MILES
7) 3 MILES
(In some cases, greater distances will be used)

VI. MESSAGE CONTENT

A) Messages tell the driver:

1.) WHAT TYPE OF ACCIDENT they are approaching (MAJOR OR MINOR)
2) WHICH LANES are closed.
3) HOW FAR AWAY the accident is (MILES)
4) WHAT ACTION (if any) they should take.

B) The basic difference between a message for DEMAND LESS THAN CAPACITY and a message for DEMAND GREATER THAN CAPACITY is this:

DEMAND LESS THAN CAPACITY: The message is positive, telling the driver what to do.

DEMAND GREATER THAN CAPACITY: The message tells the driver what lane(s) is closed, and THEN gives instructions on what to do. This message will suggest that the driver take an ALTERNATE ROUTE or USE THE ACCESS RQAD if there is an exit ramp available. In this way, ADDITIONAL CAPACITY is being offered to the driver.

C) For COMPLETE CLOSURES of the Freeway, the message states that the Freeway is closed ahead (or gives the distance) and instructs all traffic to exit at a particular exit number or numbers, or to exit at the NEXT EXIT or NEXT EXITS, providing there is an exit between the driver and the closure of the freeway. Exit numbers are generally used instead of street names in order to address all drivers, not just those familiar with city street names.

VII) EXAMPLES OF MESSAGES

Situation 1:

- 2 Lane Freeway
- LEFT LANE CLOSED
- MAJOR ACCIDENT
- DEMAND LESS THAN CAPACITY
- Lane closed is less than 1/2 mile ahead
- No exit between driver and closed lane

MAJOR ACCIDENT LEFT LANE CLOSED USE RIGHT LANE

Situation 2:

- 2 Lane Freeway
- LEFT LANE CLOSED
- MAJOR ACCIDENT
- DEMAND LESS THAN CAPACITY
- Lane closed is lest than 1/2 mile ahead
- There IS an exit between driver and closed lane

MAJOR ACCIDENT 1 USE RIGHT LANE l

Situation 3:

- 2 Lane Freeway
- LEFT LANE CLOSED
- MAJOR ACCIDENT
- DEMAND GREATER THAN CAPACITY
- Lane closed is less than 1/2 mile ahead
- There is no exit between driver and closed lane

USE SAME-SIGN AS Situation 1

Situation 4:

- 2 Lane Freeway
- LEFT LANE CLOSED
- MAJOR ACCIDENT
- DEMAND GREATER THAN CAPACITY
- Lane closed is less than 1/2 mile ahead
- There IS an exit between driver and closed lane

MAJOR ACCIDENT LEFT LANE CLOSED	+	USE RIGHT LANE OR ALTERNATE ROUTE*	*OR ACCESS ROAD
1st flash		2nd flash	

Situation 5:
- 2 Lane Freeway
- LEFT LANE CLOSED
- MAJOR ACCIDENT
- DEMAND LESS THAN CAPACITY
- Lane closed is 1 mile ahead
- No exit between driver and closed lane

1st Flash		2nd Flash
MAJOR ACCIDENT 1 MILE	+	LEFT LANE CLOSED USE RIGHT LANE

Situation 6:
- 2 Lane Freeway
- LEFT LANE CLOSED
- MAJOR ACCIDENT
- DEMAND GREATER THAN CAPACITY
- Lane closed is 1 mile ahead
- There is no exit between driver and closed lane

USE SAME SIGNS AS Situation 5

Situation 7:
- 2 Lane Freeway
- LEFT LANE CLOSED
- MAJOR ACCIDENT
- DEMAND LESS THAN CAPACITY
- Lane closed is 1 mile ahead
- There IS an exit between driver and closed lane

MAJOR ACCIDENT 1 MILE USE RIGHT LANE

Situation 8:
- 2 Lane Freeway
- LEFT LANE CLOSED
- MAJOR ACCIDENT
- DEMAND GREATER THAN CAPACITY
- Lane closed is 1 mile ahead
- There IS an exit between driver and closed lane

1st flash		2nd flash	
MAJOR ACCIDENT LEFT LANE CLOSED 1 MILE	+	USE RIGHT LANE OR ALTERNATE ROUTE*	*OR ACCESS ROAD

VIII. Messages in advance of UPPER and LOWER freeway split

<u>Situation</u> 1:
- ACCIDENT ON UPPER LEVEL (not complete closure)
- MAJOR ACCIDENT
- DEMAND LESS THAN CAPACITY
- Upper/Lower split is less than 1/2 mile ahead

MAJOR ACCIDENT ON UPPER LEVEL USE CAUTION

<u>Situation</u> 2:
- ACCIDENT ON UPPER LEVEL (not complete closure)
- MAJOR ACCIDENT
- DEMAN.D GREATER THAN CAPACITY
- Upper/Lower split is less than 1/2 mile ahead

MAJOR ACCIDENT ON UPPER LEVEL	+	AVOID DELAY USE LOWER LEVEL
1st flash		2nd flash

<u>Situations 3 & 4</u>:
- COMPLETE CLOSURE OF UPPER LEVEL
- MAJOR ACCIDENT
- DEMAND LESS THAN CAPACITY <u>AND</u> GREATER THAN CAPACITY
- Upper/Lower split is less than 1/2 mile ahead

MAJOR ACCIDENT UPPER LEVEL CLOSED	+	USE LOWER LEVEL OR ALTERNATE ROUTE
1st flash		2nd flash

<u>Situation</u> 5:
- ACCIDENT ON UPPER LEVEL (not complete closure)
- MAJOR ACCIDENT
- DEMAND LESS THAN CAPACITY
- Upper/Lower split is 1 mile ahead

MAJOR ACCIDENT ON UPPER LEVEL 1 MILE

Situation 6:
- ACCIDENT ON UPPER LEVEL (not complete closure)
- MAJOR ACCIDENT
- DEMAND GREATER THAN CAPACITY
- Upper/Lower split is 1 mile ahead

1st flash		2nd flash
MAJOR ACCIDENT ON UPPER LEVEL 1 MILE	+	AVOID DELAY USE LOWER LEVEL

Situations 7 & 8:
- COMPLETE CLOSURE OF UPPER LEVEL
- MAJOR ACCIDENT
- DEMAND LESS THAN CAPACITY AND GREATER THAN CAPACITY
- Upper/Lower split is 1 mile ahead

1st flash		2nd flash
MAJOR ACCIDENT UPPER LEVEL CLOSED 1 MILE	+	USE LOWER LEVEL OR ALTERNATE ROUTE

IX. Messages for ACCIDENTS on EXITS, EXITS to RAMPS, and on RAMPS themselves have their own set of scenarios, similar to those scenarios used for accidents on the freeway itself. Following are examples:

1) ACCIDENTS ON EXIT TO CITY STREET OR FRONTAGE ROAD

Situations 1 and 2:
- COMPLETE CLOSURE OF EXIT
- MAJOR ACCIDENT
- DEMAND LESS THAN CAPACITY AND GREATER THAN CAPACITY
- Exit closed is less than 1/2 mile ahead

MAJOR ACCIDENT EXIT 568 CLOSED AHEAD

Situation 3:
- ONE LANE OF EXIT CLOSED
- MAJOR ACCIDENT
- DEMAND LESS THAN CAPACITY
- Lane closed is less than 1/2 mile ahead

MAJOR ACCIDENT ON EXIT 568 USE CAUTION

Situation 4:
- ONE LANE OF EXIT CLOSED
- MAJOR ACCIDENT
- DEMAND GREATER THAN CAPACITY
- Lane closed is less than 1/2 mile ahead

MAJOR ACCIDENT ON EXIT 568 1 MILE	+	USE CAUTION OR ALTERNATE ROUTE
1st flash		2nd flash

Situations 5 & 6:
- COMPLETE CLOSURE OF EXIT
- MAJOR ACCIDENT
- DEMAND LESS THAN CAPACITY AND GREATER THAN CAPACITY
- Lane closed is 1 mile ahead

MAJOR ACCIDENT EXIT 568 CLOSED 1 MILE

Situation 7:
- Lane closed is 1 mile ahead
- ONE LANE OF EXIT CLOSED
- MAJOR ACCIDENT
- DEMAND LESS THAN CAPACITY

MAJOR ACCIDENT ON EXIT 568 1 MILE

Situation 8:
- ONE LANE OF EXIT CLOSED
- MAJOR ACCIDENT
- DEMAND GREATER THAN CAPACITY
- Lane closed is 1 mile ahead

MAJOR ACCIDENT ON EXIT 568 1 MILE	+	USE CAUTION OR ALTERNATE ROUTE
1st flash		2nd flash

2) ACCIDENTS ON EXIT TO RAMP

Situations 1 and 2:
- COMPLETE CLOSURE OF EXIT TO RAMP
- MAJOR ACCIDENT
- DEMAND LESS THAN CAPACITY AND GREATER THAN CAPACITY
- Lane closed is less than 1/2 mile ahead

MAJOR ACCIDENT EXIT TO I-35 CLOSED AHEAD

Situation 3:
- ONE LANE OF EXIT TO RAMP CLOSED
- MAJOR ACCIDENT
- DEMAND LESS THAN CAPACITY
- Lane closed is less than 1/2 mile ahead

MAJOR ACCIDENT ON EXIT TO I-35 USE CAUTION

Situation 4:
- ONE LANE OF EXIT TO RAMP CLOSED
- MAJOR ACCIDENT
- DEMAND GREATER THAN CAPACITY
- Lane closed is Less than 1/2 mile ahead

MAJOR ACCIDENT ON EXIT TO I-35	+	USE CAUTION OR ALTERNATE ROUTE
1st flash		2nd flash

Situations 5 & 6:
- COMPLETE CLOSURE OF EXIT TO RAMP
- MAJOR ACCIDENT
- DEMAND LESS THAN CAPACITY AND GREATER THAN CAPACITY
- Lane closed is 1 mile ahead

MAJOR ACCIDENT EXIT TO I-35 CLOSED 1 MILE

Situation 7:
- ONE LANE OF EXIT TO RAMP CLOSED
- MAJOR ACCIDENT
- DEMAND LESS THAN CAPACITY
- Lane closed is 1 mile ahead

MAJOR ACCIDENT ON EXIT TO I-35 1 MILE

Situation 8:
- ONE LANE OF EXIT TO RAMP CLOSED
- MAJOR ACCIDENT
- DEMAND GREATER THAN CAPACITY
- Lane closed is 1 mile ahead

MAJOR ACCIDENT ON EXIT TO I-35 1 MILE	+	USE CAUTION OR ALTERNATE ROUTE
1st flash		2nd flash

3) ACCIDENTS ON RAMP ITSELF

Situations 1 & 2:
- COMPLETE CLOSURE OF RAMP
- MAJOR ACCIDENT
- DEMAND LESS THAN CAPACITY AND GREATER THAN CAPACITY

MAJOR ACCIDENT RAMP TO I-35 NORTH CLOSED

Situation 3:
- ONE LANE OF RAMP CLOSED
- MAJOR ACCIDENT
- DEMAND LESS THAN CAPACITY

MAJOR ACCIDENT ON RAMP TO I-35 N USE CAUTION

Situation 4:
- ONE LANE OF RAMP CLOSED
- MAJOR ACCIDENT
- DEMAND GREATER THAN CAPACITY

MAJOR ACCIDENT ON RAMP TO I-35 N	+	USE CAUTION OR ALTERNATE ROUTE
1st flash		2nd flash

X. Messages for CLOSED INTERSECTING FREEWAYS and ACCIDENTS ON INTERSECTING FREEWAYS

Situations 1 and 2:
- Driver is on I-35, approaching the exit to I-10, and there is a complete CLOSURE on I-10
- MAJOR ACCIDENT
- DEMAND LESS THAN CAPACITY AND GREATER THAN CAPACITY

MAJOR ACCIDENT I-10 WEST CLOSED	+	USE ALTERNATE ROUTE
1st flash		2nd flash

Situation 3:
- Driver is on I-35, approaching the exit to I-10, and there is an accident on I-10 (not a complete closure of I-10)
- MAJOR ACCIDENT
- DEMAND LESS THAN CAPACITY

MAJOR ACCIDENT ON I-10 WEST USE CAUTION

Situation 4:
- Driver is on I-35, approaching the exit to I-10, and there is an accident on I-10 (not a complete closure or I-10)
- MAJOR ACCIDENT

- DEMAND GREATER THAN CAPACITY

MAJOR ACCIDENT ON I-10 WEST	+	USE CAUTION OR ALTERNATE ROUTE
1st flash		2nd flash

X. Changeable Message Sign Locations

Changeable message signs are located prior to major interchanges and prior to upper/lower freeway splits. The locations are chosen to give drivers an option of exiting the freeway and using an alternated route before being committed to a closed section of freeway. The message can also warn a driver of an accident or complete closure on an intersecting freeway, allowing the driver to detour or use an alternate route. Messages are also used on the detour route to guide the driver back to his original route.

XI. Number of Changeable Message Signs

1) If DEMAND EXCEEDS CAPACITY, the use of 2 signs prior to the incident is attempted.
2) If the freeway is completely CLOSED, 3 prior signs is desirable if possible.

REFERENCES

1980 Texas Manual on Uniform Traffic Control Devices: Part II-C Warning Signs - Paragraph 2C-1 Part VI Construction L Maintenance - Paragraph 6A-1 Need for Standards"; Paragraph 6A-3 "Application of Standards"

Highway Design Division Operations and Procedures Manual 1-81: Capacity and Level of Service

TYPE 3 CHANGEABLE MESSAGE SIGN - ACCIDENT MESSAGES

I. Type 3 Changeable Message Signs are used on continuous frontage roads where there is an entrance ramp onto the adjacent freeway. They advise the driver as to the existence of an accident or a complete closure on the freeway. The message displayed is based on the MAJOR/MINOR and DEMAND/CAPACITY scheme used on the Type 2 Changeable Message Signs.

Examples of Messages:

Situation 1:
- MAJOR ACCIDENT on freeway
- DEMAND LESS THAN CAPACITY

ACCIDENT ON FREEWAY	+	ENTER WITH CAUTION
1st flash		2nd flash

Situation 2:
- MAJOR ACCIDENT on freeway
- DEMAND GREATER THAN CAPACITY

ACCIDENT ON FREEWAY	+	DO NOT ENTER
1st flash		2nd flash

Situation 3:
- MAJOR ACCIDENT on freeway
- FREEWAY CLOSED

FREEWAY CLOSED	+	DO NOT ENTER
1st flash		2nd flash

MESSAGES - RAMPS & INTERSECTING FREEWAYS

Following are examples of messages used for incidents on EXIT RAMPS, CONNECTOR RAMPS, and INTERSECTING FREEWAYS. The examples given are for MAJOR ACCIDENTS at 0 and 1/2 miles, but the format should be followed for all other types of incidents and other mileages.

MAJOR ACCIDENT MESSAGE - EXIT RAMP
(Exit to street or frontage road)
AT LEAST 1 LANE OPEN
O MILES

D<C	D>C
MAJOR ACCIDENT ON EXIT __ USE CAUTION	MAJOR ACCIDENT ON EXIT __ 1st flash
	USE CAUTION OR ALTERNATE ROUTE 2nd flash

MAJOR ACCIDENT MESSAGE - EXIT RAMP
(Exit to street or frontage road)
COMPLETE CLOSURE OF EXIT
0 MILES

D<C + D>C

MAJOR ACCIDENT EXIT __ CLOSED AHEAD

MAJOR ACCIDENT MESSAGE - EXIT RAMP

(Exit to street or frontage road)

AT LEAST 1 LANE OPEN

1/2 MILE

D<C

MAJOR ACCIDENT
ON EXIT __
½ MILE

D>C

MAJOR ACCIDENT
ON EXIT __
½ MILE

1st flash

USE CAUTION
OR
ALTERNATE ROUTE

2nd flash

MAJOR ACCIDENT MESSAGE - EXIT RAMP

(Exit to street or frontage road)

COMPLETE CLOSURE OF EXIT

1/2 MILE

D<C + D>C

MAJOR ACCIDENT
EXIT __ CLOSED
AHEAD

MAJOR ACCIDENT MESSAGE - EXIT RAMP TO CONNECTOR
(Exit to freeway to freeway connector)
AT LEAST 1 LANE OPEN
0 MILES

D<C

MAJOR ACCIDENT ON EXIT TO I-35 USE CAUTION

D>C

MAJOR ACCIDENT ON EXIT TO I-35

1st flash

USE CAUTION OR ALTERNATE ROUTE

2nd flash

MAJOR ACCIDENT MESSAGE - EXIT RAMP TO CONNECTOR
(Exit to freeway to freeway connector)
COMPLETE CLOSURE OF EXIT
O MILES

D>C + D>C

MAJOR ACCIDENT EXIT TO I-35 CLOSED AHEAD

MAJOR ACCIDENT MESSAGE - EXIT RAMP TO CONNECTOR
(Exit to freeway to freeway connector)
AT LEAST 1 LANE OPEN
1/2 MILE

D<C

MAJOR ACCIDENT
ON EXIT TO I-35
½ MILE

D>C

MAJOR ACCIDENT
ON EXIT TO I-35
½ MILE

1st flash

USE CAUTION
OR
ALTERNATE ROUTE

2nd flash

MAJOR ACCIDENT MESSAGE - EXIT RAMP TO CONNECTOR
(Exit to freeway to freeway connector)
COMPLETE CLOSURE OF EXIT
1/2 MILE

D<C + D>C

MAJOR ACCIDENT
EXIT TO I-35
CLOSED 1/2 MILE

MAJOR ACCIDENT MESSAGE - ON CONNECTOR RAMP ITSELF
AT LEAST 1 LANE OPEN
(Mileage is not used for this situation)

D<C

MAJOR ACCIDENT ON RAMP TO I-35 USE CAUTION

D>C

MAJOR ACCIDENT ON RAMP TO I-35 N

1st flash

USE CAUTION OR ALTERNATE ROUTE

2nd flash

MAJOR ACCIDENT MESSAGE - ON CONNECTOR RAMP ITSELF
COMPLETE CLOSURE OF RAMP
"Mileage is not used for this situation)

D<C + D>C

MAJOR ACCIDENT RAMP TO I-35 N CLOSED

1st flash

USE ALTERNATE ROUTE

2nd flash

MAJOR ACCIDENT MESSAGE – ACCIDENT ON INTERSECTING FREEWAY
(Mileage is NOT USED for this situation)

D<C

MAJOR ACCIDENT
ON I-10 WEST
USE CAUTION

D>C

MAJOR ACCIDENT
ON
I-10 WEST

1st flash

USE CAUTION
OR
ALTERNATE ROUTE

2nd flash

MAJOR ACCIDENT MESSAGE – CLOSED INTERSECTING FREEWAY
(Mileage is NOT USED for this situation)

D<C + D>C

MAJOR ACCIDENT
I-10 WEST
CLOSED

1st flash

USE

ALTERNATE ROUTE

2nd flash

LANE CONTROL SIGNALS

I. LANE CONTROL SIGNALS consist of the following displays:

1) ↓ - DOWN GREEN ARROW
2) X - RED X
3) ↓ – DOWN YELLOW ARROW
4) \ – SLANT RIGHT YELLOW ARROW
5) / – SLANT LEFT YELLOW ARROW

II. Usage of LANE CONTROL SIGNALS (LCS):

1) DOWN GREEN ARROW: Used over a lane that is open.
2) RED X: Used over a lane that is closed.
3) DOWN YELLOW ARROW: Used over a lane that has an accident on the shoulder that is adjacent to the lane. It will also be used in rare cases over a lane that will be closed ahead but where the freeway has an exit which reduces the number of lanes and then widens further ahead.
4) SLANT RIGHT YELLOW ARROW: Used over a lane that is closed ahead, prior to a RED X. This display is to instruct the driver to move to the right out of the lane.
5) SLANT LEFT YELLOW ARROW: Used over a lane that is closed ahead, prior to a RED X. This display is to instruct the driver to move to the left out of the lane.

III. LCS CONVENTIONS:

1) When 2 sets of Lane Control Signals are used, use (1) RED X preceded by (1) SLANT YELLOW ARROW
2) When 3 sets of Lane Control Signals are used, use (2) RED X displays preceded by (1) SLANT YELLOW ARROW.
3) When 4 sets of Lane Control Signals are used, use (2) RED X displays preceded by (2) SLANT YELLOW ARROW displays.
4) When 5 sets of Lane Control Signals are used, use (2) RED X displays preceded by (3) SLANT YELLOW ARROW displays.

IV. In the absence of any lane closures, the default displays will be ALL DOWN GREEN ARROWS.

V. The display will be constant (not a flashing display).

Appendix B.5

TransGuide Guidelines and Operating Procedures

GUIDELINES AND OPERATING PROCEDURES

The purpose of this document is to assist you in performing your duties in the Operations Room. It's not intended to be all inclusive as changes will be made as the situation or dynamics of thc Intelligent Transportation System evolves. Areas that involve Human Resource Policy, the Human Resource Policy Manual will take precedence. This manual in located in the Administrator's Office. Recommendations for improvement or updates to this document should be given to thc Shift Manager.

I. <u>GENERAL:</u>

1. Hours of Operations:

a. TransGuide System On-Line

1. **Weekdays:** 0430 to 0000
2. **Weekends and Holidays Listed Below:** 0600 to 0000

Hours may be extended due to special events or lane closures.

b. Personnel Duty Hours:

A work day schedule for all of operations excluding the Operations Manager will be a ten hour four day work week with three days off. There will be two shifts. These shifts will rotate three times a year in January, June and mid August. Personnel will be allowed to switch shifts with each other, however, managers in charge of these shifts must be notified of the changes. These shifts will consist of the following:

1. Weekdays:
0400 to 1430 Morning Shift Manager (half hour lunch)
0630 to 1730 morning shift (hour lunch)
0800 to 1900 evening shift (hour lunch)
1400 to 0030 Evening Shift Manager (half hour lunch)

2. Weekends:
0530 to 1530 Morning Shift Manager (*)
1430 to 0030 Evening Shift Manager (*)

3. Holiday Schedule:
The following holidays will have the same hours of operations as weekends, all other holidays will be treated as weekdays for both manning and hours of operations.

New Year's Day	**Thanksgiving Day**
Memorial Day	**Christmas Day**
Independence Day	**Washington's Birthday**
Labor Day	**Veterans Day**

*Lunch may be taken in either the operations room or break room with communications to the operations room by means of cordless phone. The SAPD dispatch must be in operations if lunch is taken in the break room. No time will be charged for lunch on weekends.

Lunch must be taken during weekday work. No modifications to the work or system hours will be made without the approval of the Operations Manager.

2. Coffee Breaks:

One fifteen minute coffee break will be allowed for every four hours worked. Coffee breaks will staggered so that operations is always manned.

3. Lunch breaks

Operations personnel are required to take a lunch break. Lunch breaks will be one hour for everyone with the exception of the Shift Manager, who will take 30 minutes. The lunch breaks will be staggered to maintain continuous support of operations.

4. Workstations

a. Workstations will be clean and free of newspapers, magazines, empty boxes scrap paper etc.
b. Nothing will be placed on top of the consoles.
c. No liquids will be brought into the operations room unless a spilled proof cup is used.
d. All personal property will be kept in your credenza, or out of sight. No personal property will be left laying around your workstation when your shift is over (sweaters, jackets etc.).
e. Telephone books, key maps and other work related material will be stored when not in use.
f. Workstation malfunctions will be e-mailed to the TxDOT shift manager. The shift manager will then enter the equipment on the maintenance report.
g. Smoking is not allowed in the building (see smoking policy). Tobacco users who dip or chew will not use the waste basket for purposes of spitting but will provide a suitable receptacle (spill proof) for their needs.
h. No games, radios, hand crafts, etc. will be taken into thc operations room.
i. Trash will be dumped at the end of each shift on weekends.

5. Vacation/Sick Leave/Overtime/Comp time/Holiday Policy

a. Vacation must be scheduled and approved by management prior to taking leave. As specified in the Human Resources Manual

b. Sick Leave - Employees must notify their shift manager as soon as possible when using sick leave. In addition, an employee shall send the immediate supervisor a written statement stating thc cause or nature of illness or disability after being absent from work for more than three consecutive working days.

c. Over Time (PAYABLE) will be paid when the following requirements are met:

1). When an employee works an excess of ten hours in one day to support lane closures, special events, hardware or software events or emergency situations when an employee is required to either stay after the shift has ended, or required to report to work and has satisfied their individual schedule for that work week.

2). Holidays will be paid hour for hour (non-FSLA) when an employee satisfies the minimum hour required for their individual scheduled week of the holiday (i.e. For an employee required to work 50 hours due to shift change, they will be paid 8 hours at their hourly rate and two hours at 1 1/2 rate for FSLA comp. time, FSLA-exempt employees will be paid 8 hours at their rate and gain two hours of regular comp. time).

3). Exceeding the weekly time requirements, as a result of another employee's absence.

d. Compensatory Time

1. When testing is done after the shift is completed.
2. When any of the above is worked and the time requirements have not been exceeded.
3. All other areas not mentioned and qualify for compensatory time.

e. Holidays: Employees that are scheduled to work

6. Dress and Grooming Guidelines

The guidelines for dress and grooming are appropriate business attire with emphasis on neatness, cleanliness and safety. Employees should present an image of business and professionalism.

Men are expected to wear slacks or colored jeans(no blue jeans), long or short sleeve shirts and neckties.
Women are expected to wear dresses, suits, slacks or colored jeans (no blue jeans), with long or short sleeve dress shirts or blouses.

7. Weekends and Holidays

The guidelines for dress during weekend and certain holidays shall be relaxed. While neatness is emphasized, jeans are allowed and no ties required. The following are holidays which Operations' dress code guidelines are relaxed. These holidays are subject to change:

NEW YEAR'S DAY
MARTIN LUTHER KING
WASHINGTON'S BIRTHDAY
TEXAS INDEPENDENCE DAY
SAN JACINTO DAY
MEMORIAL DAY
INDEPENDENCE DAY
LABOR DAY
VETERANS' DAY
THANKSGIVING DAY
DAY AFTER THANKSGIVING
CHRISTMAS EVE
CHRISTMAS DAY
DAY AFTER CHRISTMAS

8. Smoking

a Smoking is prohibited in the building.
b. Smoking is allowed in designated area only.
c. Smoke breaks are to be incorporated into the two fifteen minute coffee breaks allowed per day. The break period of 15 minutes may be broken into segments (Example: 3-five (5) minute smoking segments). There will be no separate coffee breaks and smoking breaks.
d. Designated smoking is located at the end of the wheelchair ramp in the front building and rear exit of the maintenance area

9. Security Code: Employees will be issued a personal code to permit them to enter restricted areas. Codes are to be kept confidential and in no way are they to give the code to another individual. There will be different security levels for each employee. Violating this policy will result in disciplinary actions taken against the employee.

10. ID Badges: Employees will be issued an ID badge and must wear it while in the building.

11. Signing In After Hours: All TransGuide operations employees entering the building after normal working hours (1800 - 0700 Weekdays and all day on Weekends) will be required to sign in at the security station regardless if they present their ID badge. Employees are to enter and exit the building through the front door at all times. All other doors are to be used as fire exits.

13. Parking: Parking slots will not be assigned, except for the Director of Transportation Operations, Traffic Management Engineer and Handicapped. Employees will park either on the side of the building or the back parking lot.

14. Phone Use: The telephones in the operations room are for official use only. However, personnel may use these phones on a limited basis for personal calls (incoming and outgoing). Abuse of this privilege will be determined by the Shift Manager and could lead to a revocation of this privilege.

15. **Scanning:** While in the operations room and not assigned to other duties, all operations personnel will be at their station scanning the highways for incidents.

II. OPERATIONAL:

1. Logging onto and Exiting the ATMS:

a. Logging onto ATMS:

Except for the Shift Manager, all operations personnel will log onto the system as an Operator regardless of their privileges and not change their status unless asked to do so by the Shift Manager or Manager in the Assignment Plan. This is primarily due to camera control. The Shift Manager or the Manager in the Assignment Plan are the only people who should have the ability to take control of the cameras during a shift. Since the Shift Manager or the Manager in the Assignment Plan are responsible for receiving and assigning alarms, they must be able to grab and release those cameras necessary for evaluating and executing those alarms. Their ability to do this is encumbered when everyone has the ability to grab cameras from someone else. If a camera is needed notify the Shift Manager or the manager in the assignment plan.

b. Logging Off ATMS:

To exit the ATMS smoothly, release all cameras from your monitors; and then close your camera screen. Second, from the TransGuide System Menu Bar click on **Admin** using the **left mouse** button. This will bring up a popup menu. From this menu select **Exit ATMS** using your **left** mouse button and your workstation will shut itself down. Then turn your video monitors off.

2. Camera Use

a. Camera Ownership:

Unless you are running a scenario you should only have active control of the camera you're scanning with. You should release ownership of all other cameras to allow other operators or managers to use. Have no more than three cameras up on your monitors at one time. One monitor should always be free to receive incident alarms.

b. Scanning:

When scanning, keep the camera on the highway and avoid scanning houses, buildings, etc. If a camera is needed that is displayed on LPTV, notify the Shift Manager or the Manager in the Assignment Plan to release that camera. The Manager can then change the LPTV output to another camera. When possible, reset your camera before releasing it. This is to ensure that the camera is not facing towards houses, etc.

c. Camera Presets:

Cameras are currently using two pre-sets, Reset and Preset 1. Reset returns the camera to its normal position along with reselling all of its variables, i.e., Pan/Tilt, Focus, Zoom, etc. With the exception of the "Y" camera, when a camera is in the Reset position it will be facing either East or North depending on the camera's address. Preset 1, rotates the camera to the opposite direction, i.e., West or South. Before releasing a camera always place it in the Reset position. This will insure it is in the proper position for another operator to retrieve. Camera presets will only be assigned by the Shift Manager or the Manager in the Assignment Plan. If a Camera is not responding to Reset or Preset notify the manager in charge.

d. Low Power Television (LPTV):

The manager in charge is responsible for placing cameras on the LPIV. The manager may delegate this to other operators. When placing cameras on LPIV, place the camera on the video wall and then on the corresponding LPIV. When removing them do the reverse.

e. White Balancing The Camera:

Before White Balancing the camera insure it is focused onto a **"White"** area (i.e., one of our overhead signs) and that it fills at least 30% of the lens. Then go to the configure screen and apply the A and B balance and then place it back on Normal and apply. Without focusing the camera on a white surface the camera will not properly balance itself. Do not place it on bridge columns, etc., these are not purely white and again the camera will not properly balance itself.

f. Receiving Alarms:

When you are sent an Alarm, you are expected to open it and scan the surrounding area. Don't assume that just because you are running a scenario, that any alarm in that area (which may be using the same camera) that there isn't another incident in the same area.

g. Running Scenarios:

When running a Scenario due to an incident, the potential for secondary incidents are high. Therefore, you need to continually scan the surrounding area for these secondary incidents.

3. Attached are Specific Duties and Responsibilities for:

a. Manager (Tab A)

b. Senior Operator (Tab B)

c. Operator (Tab C)

DAILY JOB DUTIES

Peak Traffic Periods

1. Operators will be assigned specific areas to monitor and to execute congestion scenarios.

2. Use all the cameras to scan the freeways within the assigned area to monitor traffic flow.

3. Respond to all incident alarms assigned to you and visually verify thc alarm to confirm if a true incident has occurred.

4. Execute congestion scenarios as required within the assigned area.

   a. Use the schedule scenario option if an alarm has not been generated by the system to execute congestion scenario.

   b. Once the alarm is assigned in the congested area, execute a scenario using the alarm.

   c. When an alarm is used to execute a scenario, as the condition of the alarm changes (normal, minor or major) the operator is prompted to verify the status of the incident. Use the camera to verify if the condition has actually changed and so you can cancel the scenario.

   d. When a congestion scenario is canceled that was executed as part of an incident alarm, instead of logging off the alarm the operator should retain the alarm and re-use it as thc condition of thc traffic becomes congested and requires another scenario to be executed.

   e. No lanes will be closed for congestion scenarios. Lanes will only be closed due to incidents (i.e. stalled vehicles, accidents, debris, etc.)

   f. No LCS's will bc used during congestion scenarios except when executing scenarios for an exit or entrance ramp of an interchange. Then the LCS's will be displaying DOWN YELLOW ARROWS over the appropriate lane.

Non-Peak Traffic Periods

1. Operators should scan the freeways within the project limits using all cameras. This helps us find and respond to incidents that will otherwise not be detected by the system such as stalled vehicles and accidents that occurred on the freeway and have moved off the roadway.

2. Perform practice exercises of scenario execution. This will help improve your response time when executing scenarios and will familiarize you with the location and orientation of the field equipment. Practice items are:

a. Adding equipment to scenarios.

b. Detecting equipment to scenarios.

c. Edit messages on a CMS or LCS.

d. Review scenarios for accuracy.

3. Review project map and compare the placement of the field equipment on the map with location and orientation the equipment in the field.

4. Enter new and update lane closure data as received from maintenance and construction personnel. All data should always be accurate.

5. Develop, input and review new scenarios as new areas are added to the system.

6. Execute and monitor lane closure scenarios while work is being performed.

a. Operators will be assigned specific lane closures.

b. Select a camera(s) where the work is going to be performed, this will aid you in selecting the address and the proper equipment for the scenario. And always have a camera on a monitor prior and until the last cone has been picked up by the barricade personnel.

c. Select the scenario lane address to execute. The scenario should be executed when the first cone is placed on the roadway.

d. Review the scenario for accuracy making sure that enough equipment and the proper equipment is being used. There should be no mistakes with the scenarios, since the operators will have enough time to proof read the scenario prior to it being executed. Ask the managers for help if needed.

7. Scan the freeways for stalled vehicles and execute scenarios.

a. When executing a scenario for a stalled vehicle on a shoulder, the set of LCS's just before the vehicle should be use and a DOWN YELLOW ARROW should be displayed over the lane adjacent to the shoulder (right or left).

b. CMS's should only be used for a stalled vehicle only when the vehicle is blocking a lane or ramp and if the vehicle is to close to the lane.

8. Perform other duties as assigned by the supervisor.

Camera Use

1. Ownership of the camera control of unused cameras should always be released. Unused cameras are defined as cameras not being used to scan the freeways or being used for an incident. By releasing ownership of camera control will allow other operators and managers to use the cameras for an incident or scan the freeways.

2. A maximum of three monitors could be used at one time. The operators should always have one monitor available, so when an alarm is assigned to the operator the camera assigned to the alarms can be displayed on the available monitor. An available monitor is defined as a monitor with no video being fed to it.

3. All cameras when in use should be facing on the roadway at all times.

4. LPTV and videowall "E" cameras will be controlled and selected by the floor manager. If an operator is required to use these camera inform the manager to release ownership, so it can be controlled. Once an operator is done using the camera release the ownership of control, then the manager will regain the control of camera.

5. If an alarm is assigned to an operator and camera controls are not available. Operator should inform the manager to the controls available for use.

6. When using the cameras to scan the freeways the operator should use the reset and preset[1] options, but should always keep the camera facing the roadway. If any structures prevent an operator to completely scan an area, an alternate camera should be used to insure that the roadway has been checked.

7. Before releasing a camera select the reset command of the camera to insure the camera is facing the roadway and not in some neighborhood.

8. Inform the manager of any camera malfunctions, so it can be reported to maintenance personnel.

LANE CLOSURE REQUESTS PROCEDURES

Purpose:

All lane closures occurring in Bexar County will be called or faxed into the TransGuide Operations Center. Information received will be entered into the LPTV Lane Closure System. This information will be transmitted through our LPTV station and District Network (LAN).

Lane closure requests are received from construction inspectors or maintenance sections.

Review the request for accuracy. Verify that the following information is submitted:

Highway:	highway to include the limits (Upper or Lower level)
Direction:	north, south, east, west or both
Date Start.	MM DD YYYY **Time Start:** 0000 **Time End:** 2359
Date End:	MM DD YYYY
Nature of work:	type of work being performed
Limits:	from X to X (Upper or Lower Level)
Existing lanes:	number of lanes
Lane(s) Closed:	number of lanes closed (left, right or alternating)
Ramp(s) closed:	exit or entrance, if none N/A
Contact person:	Operations Manager *
Inspectors:	List inspector (radio call sign and/or telephone number)
Detour:	Enter suggested detour route if any
Notes:	Any additional information, if Barricade Maintenance contract is required enter the Item No. 1, 2,3, etc, your initials.

* Operations Manager telephone number is hard coded.

Verify that the lane(s) to be closed are submitted as 1 left, 2 left, 1 right, 2 right or alternating and if the lane(s) to be closed are on the upper or lower level.

If any information needs to be modified on the submitted lane closure called the inspector maintenance section submitting the closure. **DO NOT CHANGE ANY INFORMATION UNTIL VERIFIED WITH THE PERSON SUBMITTING IT.**

Once information has been verified enter the data into the LPTV lane closure system.

Once the ATIS Sun workstation has been updated with the new lane closure data, print a copy of the lane closure and place it in the lane closure folder.

If the Barricade maintenance contractor is required, verify that the Item No. has been entered. Then fax a copy of the printed lane closure to Flasher. This has to be done in order for Flasher to perform the required lane closure.

For convenience Flasher's fax number has been programmed in the fax machine, so all you have to do is select the appropriate number to fax the closure. Always ask for confirmation from Flasher to inform us that they are able to do the requested closure. And file it in the Lane closure folder.

If you have any questions ask one of the four Managers.

Revised 11/6/97

REQUEST FOR APPROVAL OF LANE CLOSURE
phone 210-731-S139 fax 210-731-5307

HIGHWAY:

DIRECTION:

DATE SCHEDULED:

TIME: _________ M TO: _________
M

NATURE OF WORK:

LIMITS:

EXISTING LANES:

LANES CLOSED:

RAMPS(S) CLOSED:

INSPECTOR/SUPERVISOR:

RADIO CALL SIGN/TELEPHONE NUMBER:

DETOUR:

NOTES:

BARRICADE MAINTENANCE CONTRACT YES NO

IF YES ITEM NUMBER ____ CONTRACTOR REQUIRED TO REMAIN YES
NO

ROADWAY CHARGE #_________

EXHIBIT A

c:msoffice\winword\procedures\lnform.doc

Appendix B.6

City of Bellevue, Washington
Disclosure of Public Documents Policy

City of Bellevue,
Washington
Chapter 2.26
PUBLIC RECORDS

2.26.005
Posting of rules and procedures.

Each department of the city shall prominently display and make available for inspection and copying for guidance of the public:

A. Descriptions of its central and field organization and the established places at which, the employees from whom, and the methods whereby, the public may obtain information, make submittals or requests, or obtain copies of department decisions;

B. Statements of the general course and method by which its operations are channeled and determined, including the nature and requirements of all formal and informal procedures available;

C. Rules of procedure;

D. Substantive rules of general applicability adopted as authorized by law, and statements of general policy or interpretations of general applicability formulated and adopted by the department. (Ord. 3385 § 1, 1984.)

2.26.010
Public records and current indices maintained.

Each department shall make public records available for public inspection and copying during the customary office hours of the department. To the extent required to prevent an unreasonable invasion of personal privacy, the department shall delete identifying details when it makes available or publishes any public record; however, in each case, the justification for the deletion shall be explained fully in writing.

Each department shall maintain and make available for public inspection and copying a current index providing identifying information regarding the following public records issued, adopted or promulgated after January 1, 1973:

A. Final opinions, including concurring and dissenting opinions, as well as orders, made in the adjudication of cases;
B. Those statements of policy and interpretations of policy, statute, and the Constitution which have been adopted by the department;
C. Administrative staff manuals and instructions to staff that affect a member of the public;
D. Planning policies and goals, and interim and final planning decisions;
E. Factual staff reports and studies, factual consultant's reports and studies, scientific reports and studies, and any other factual information derived from tests, studies, reports, or surveys, whether conducted by public employees or others; and
F. Correspondence and materials referred to therein, by and with the department relating to any regulatory, supervisory, or enforcement responsibilities of the department whereby the department determines, or opines upon, or is asked to determine or opine upon, the rights of the state, the public, a subdivision of state government, or of any private party.

Ordinances, resolutions and policies adopted by the city council, minutes of the regular meetings of the city council, and amendments, revisions and repeals thereof, all public contracts, deeds and leases shall be indexed and maintained in the office of the city clerk and be available for public inspection and copying in accordance with Chapter **42.17 RCW** and this chapter.

All other such records of the city relating to the specific function or responsibility of a particular department shall be maintained in the office of the particular department and shall be available for public inspection and copying in accordance with Chapter 42.17 RCW and this chapter. (Ord. 3385 § 2, 1984; Ord. 2165 § 1, 1974; 1961 code § 2.36.010.)

2.26.020
Exempt public records.
The following shall be exempt from public inspection and copying:
A. Personnel information in any files maintained for city employees, appointed or elected officials, to the extent the disclosure would violate their right to privacy;
B. Information required of any taxpayer in connection with the assessment or collection of any tax if the disclosure of the information to other persons would be prohibited to such persons by RCW 82.32.330 or would violate the taxpayer's right to privacy and would result in unfair competitive disadvantage to such taxpayer;
C. Specific intelligence information and specific investigative files compiled by investigative law enforcement and penology agencies and state agencies vested with the responsibility to discipline members of any profession, the nondisclosure of which is essential to effective law enforcement or for the protection of any person's right to privacy;
D. Information revealing the identity of persons who are witnesses to or victims of a crime or who file complaints with investigative, law enforcement or penology agencies, if disclosure would endanger any person's life, physical safety or property; provided, that if at the time the complaint is filed, the complainant, victim or witness indicated a desire for disclosure of nondisclosure, such desire shall govern;
E. Test questions, scoring keys and other examination data used to administer a license or employment examination, including civil service examinations;
F. Except as provided by Chapter 8.26 RCW, the contents of any real estate appraisals made for and by any agency, including the city, relative to the acquisition or sale of property by the city, until the project or prospective sale is abandoned or until such time as the property has been acquired, or the property to which the sale appraisal relates is sold, but in no event shall disclosure be denied for more than three years after the date of the appraisal;
G. Valuable formulae, designs, drawings and research data obtained or produced by the city, its officers, employees and agents within five years of any request for disclosure thereof when disclosure would produce private gain and public loss;
H. Preliminary drafts, notes, recommendations and intra-agency memoranda in which opinions are expressed or policies formulated or recommended, unless such a record is publicly cited by an agency in connection with any official agency action;
I. Records which are relevant to a controversy to which the city or any of its officers, employees or agents is a party, but which records would not be available to another party under the rules of pretrial discovery for causes pending in the superior courts;
J. All applications for employment with the city, including the names of applicants, resumes and other related materials submitted with respect to an applicant;
K. The residential addresses and telephone numbers of employees or volunteers of the city which are held by the city in personnel records, employment or volunteer rosters, or mailing lists of employees or volunteers;
L. The residential addresses and telephone numbers of the customers of city utilities contained in the records of lists held by such utilities;
M. Client records maintained by the city under its domestic violence program as defined in RCW 70.123.020 or rape crisis center records as defined in BCW 70.125.030;
N. Information that identifies a person who, while a city employee:

1. Seeks advice, under an informal process established by the city, in order to ascertain his or her rights in connection with a possible unfair practice under Chapter 49.60 RCW against the person; and

2. Requests his or her identity or any identifying information not be disclosed;

O. Any record which is exempt from disclosure under state or federal law.

The exemptions of this section shall be inapplicable to the extent that information, the disclosure of which would violate a personal privacy or vital government interest, can be deleted from the specific records sought. No exemption shall be construed to permit the nondisclosure of statistical information not descriptive of any readily identifiable person or persons.

Inspection or copying of any specific records exempt under the provisions of this section may be permitted if the King County Superior Court finds, after a hearing with notice thereof to every person in interest and the city, that the exemption of such records is clearly unnecessary to protect any individual's right of privacy or any vital government function.

If the city refuses, in the whole or in part, inspection of any public record under this section it shall include a statement of the specific exemptions authorizing the withholding of the record (or part) and a brief explanation of how the exemption applies to the record withheld. (Ord. 4464 § 1, 1992; Ord. 3385 § 3, 1984; Ord. 2482 § 1, 1977; Ord. 2165 §

2.26.030

Procedure for inspection or copying.

Persons wishing to inspect or copy records should first make such request to the department of the city which maintains the records requested. If the requestor does not know in which department such records are maintained, the request shall be made to the city clerk. The city clerk shall direct the requestor to the appropriate department. All assistance necessary to help the requestor locate the particular record shall be provided-by the city clerk and the department maintaining the records; provided, that the giving of such assistance does not unreasonably disrupt the operation of the department or the other duties of the assisting employee. (Ord. 4464 § 2, 1993; Ord. 3385 § 4, 1984; Ord. 2165 § 3, 1974; 1961 code § 2.36.030.)

2.26.040

Reimbursement for copying costs.

Conformed copies of written records, copies of maps, photographs including slides, copies of audio tape recordings, and copies of video tape recordings shall be made and provided by the city upon request and payment of the actual cost of reproducing same. The city clerk is directed to prepare and have on file as a public document a schedule of such costs of reproduction. In determining the cost of reproduction, labor and mailing costs shall be includable factors.

Where the request is for a certified copy, there shall be an additional charge to cover the additional expense and time required for certification.

The cost schedule shall include, but not be limited to, the following records: street maps, zoning maps, zoning books, zoning book amendment services, sign ordinances, other ordinances, public meeting minutes, resolutions, verbatims, clerk's voter's registration records, accident reports, fingerprints for other than official use, deeds, and other records of the character contemplated in BCC **2.26.010.** (Ord. 2165 § 4, 1974; 1961 code § 2.36.040.)

2.26.050

Alteration of cost schedule.

When economic or other factors require a change in the established cost schedule, the city clerk, in consultation with appropriate department heads, may change the schedule by filing a new schedule. The report shall contain all data required to determine the actual costs of copying. (Ord. 2165 § 5, 1974; 1961 code § 2.36.050.)

2.26.060

Official city business.

A department head may provide copies of city records at no charge to individuals or government agencies doing business with the city, if the department head determines such action is in the best interest of the city. (Ord. 2165 § 6, 1974; 1961 code § 2.36.060.)

2.26.065

Copying - Costs.

No fee shall be charged for the inspection of public records. Charges shall be collected for providing copies of public records not exceeding the amount necessary to reimburse the city for actual costs incident to such copying, in accordance with fee schedules promulgated by the city. Such fees shall be paid prior to the provision of any copies by the city. (Ord. 3385 § 5, 1984.)

2.26.075

Request for public records - Departmental decision - Review of decision - Grant or denial of public records.

A. Upon receiving a request to inspect a copy of public record, the department shall grant the request unless it determines that the record requested is or may be exempt from disclosure in whole or in part or that uncertainty exists as to whether the record is exempt from disclosure in whole or in part, in which case the department shall require that a written request for public records form be completed by the requestor.

B. The completed written request for public record shall immediately, upon receipt by the department, be delivered by the department to the city clerk unless the request is to inspect or copy a record maintained by the police department, in which case the form shall be immediately delivered to the police legal advisor.

C. Upon receiving a completed written request for records form, the city clerk, or police legal advisor, in the case of a request to inspect or copy a record maintained by the police department, shall determine whether the record requested is exempt by law from inspection and copying in whole or in part. The city clerk shall consult with the city attorney in making such determination. In the case of a request to inspect or copy a record maintained by the police department, the police legal advisor shall first make a preliminary determination whether the record requested is exempt by law from inspection or copying in whole or in part. If the police legal advisor determines that the record requested is exempt from inspection or copying in whole or in part, he or she shall consult with the city attorney before a final decision is made on the record request. Within five business days of the date of receipt by the city of the written request for a record, the city clerk or police legal advisor in the case of a request to inspect a record maintained by the police department, shall:

1. Provide the record;

2. Acknowledge that the city has received the request and provide a reasonable estimate of time the city will require to respond to the request;

3. Deny the public record request.

Additional time to respond to a request under subsection (c)(2) of this section may be based upon the need to clarify the intent of the request, to locate and assemble the information requested, to notify third persons or agencies affected by the request, or to determine whether any of the information requested is exempt and a denial shall be made to all or part of the request.

In acknowledging receipt of a public records request that is unclear, the city clerk, or police legal advisor, may ask the requestor to clarify what information the requestor is seeking. If the requestor fails to clarify the request, the city need not respond to it.

D. If the city clerk, or police legal advisor in the case of a request to inspect or copy a record maintained by the police department, determines that the document is exempt in part but can be made available after deletion of exempt portions, the request shall be granted; provided that such exempt portions shall first be deleted. If the city clerk, or police legal advisor in the case of a request to inspect or copy a record maintained by the police department, determines to deny the request, in whole or in part, a written statement of the specific reasons for the denial shall be provided the requestor.

E. A decision by the city clerk or police legal advisor denying inspection shall be reviewed by the city attorney. Such review shall be deemed completed at the end of the second business day following the denial of inspection and shall constitute final city action for the purposes of judicial review. The requestor shall be notified by mail of the decision to grant or deny the request. (Ord. 4464 § 3,1993; Ord. 3385 § 7,1984.)

2.26.080

Disclosure prohibited by other statutes.

The city shall not be required by this chapter to permit public inspection and copying of any record to the extent public disclosure of the record is prohibited, restricted or limited by state or federal statute or regulation including, but not limited to:

A. Chapter **10.97 RCW,** Washington State Criminal Records Privacy Act.

B. Chapter **13.50 RCW,** Keeping the Release of Records by Juvenile Justice or Care Agencies.

C. Chapter **46.52 RCW,** Accidents - Reports -Abandoned Vehicles.

(Ord. 3385 § 8, 1984.)

2.26.085
Administrative rules.

The city manager, upon recommendation of the city clerk, may issue rules for the implementation of this chapter. (Ord. 4464 § 4, 1993; Ord. 3385 § 9, 1984.)

2.26.100
Payment of cost of transcription of verbatim written transcript.

Whenever the city is required to prepare a verbatim written transcript of any proceedings of the city in response to a writ of review or other action filed in the superior court or any other state or federal court the cost of preparing the same shall be borne by the party filing the action. Within 10 days of the service of such writ of review or other action on the city, the city clerk shall notify the party filing the action that it will be necessary for the city to prepare a verbatim written transcript of the proceedings involved. In such notice the city clerk shall state the date and subject matter of the public meeting(s) and/or hearing(s) involved and the estimated cost of the preparation of the transcript, including copying costs. Within 10 days of the receipt of such notification the party filing such action shall pay said estimated cost to the city clerk and the city clerk shall thereafter make provision for the preparation of the transcript.

Should the actual cost incurred by the city in preparation of the transcript exceed the amount deposited with the city clerk, the party making such deposit shall be required to reimburse the city for such additional amount within 10 days of notification that such amount is due. Should the actual cost incurred by the city be less than the estimated cost deposited, such credit due shall be reimbursed by the city to the party making the deposit.

If transcripts have previously been prepared by the city clerk as provided for under Resolution No. 2833 with regard to appeals to the city council, then there shall be no additional charge to the party filing the action, except for copying costs, and such previously prepared transcripts shall be filed with the court by the city at no additional expense to the party appealing, except for copying costs.

Any party filing an action may request waiver of the payment of cost of transcription in accordance with the requirements set forth in Section 4 of Resolution No. 2833. (Ord. 2769 § 1, 1979.)

Chapter 2.30
REGISTRATION PROCEDURE FOR BONDS AND OBLIGATIONS

Sections:

2.30.010 Findings.

The city council of the city finds that it is in the city's best interest to establish a system of registering the ownership of the city's bonds and obligations in the manner permitted by law. (Ord. 3324 § 2, 1983.)

2.30.020 Definitions.

The following words shall have the following meanings when used in this chapter:

A. "Bond" or "bonds" have the meaning defined in section 2 (1), chapter 167, Laws of 1983, as the same may be from time to time amended.

B. "Fiscal agencies" mean the duly appointed fiscal agencies of the state of Washington serving as such at any given time.

C. "Obligation" or "obligations" have the meaning defined in section 2 (3), chapter 167, Laws of 1983, as the same may be from time to time amended.

D. "Registrar" is the person or persons designated by the city to register ownership of bonds or obligations under this chapter. (Ord. 3324 § 1, 1983.)

Appendix B.7

Washington State Department of Transportation FLOW Operator's Handbook

TABLE OF CONTENTS

Overview of FLOW

The Washington State Department of Transportation Traffic Systems Management Center (TSMC) FLOW operation has three main components:

1. surveillance, control and driver information (SC&DI) devices;
2. personnel;
3. information obtained by other agencies and networks.

All these components are dedicated to increasing safety and minimizing delays on Seattle area freeways.

Surveillance, Control and Driver Information (SC&DI)

SC&DI equipment is made up of closed circuit television cameras (CCTVs), electronic data stations (ESs), loop detectors, highway advisory radio transmitters (HARTs), highway advisory radio signs (HARSs), and variable message signs (VMSs).

- **CCTVs:** Cameras in the field which monitor the flow of traffic and help confirm the incidents reported by other sources. They run on a fiberoptic cable system. There are approximately 180 CCTVs located along the major freeways.

- **ESs:** A metal cabinet in the field, enclosing a “170 controller” which gathers data from a set of loop detectors and controls ramp meters, where applicable, at a single highway location. The ES collects data from the loop detectors and relays it to a hub. The hub in turn gathers information from many cabinets and directs it to TSMC, where it is managed by the VAX computer. Selected information is sent to the FLOW Operator by way of the Traffic Management System software (TMS). This information is in the form of flow maps, the ramp meter window, and the ES window.

- **Loop detectors:** Wire loops embedded in the roadway which detect vehicles by inductance. When a large piece of metal, namely a vehicle, passes above the loop, the magnetic field is disturbed and the loop registers a “hit,” or gets data. This data is sent to the ES.

- **HARTs:** Transmitters that send out radio transmissions of traffic-related information at an AM frequency of either 530 kHz or 1610 kHz. Drivers can tune their radios to hear traffic or construction information. Messages are recorded on HARTs by FLOW Operators and Radio Operators.

- **HARSs:** Yellow signs with black lettering which tell drivers to tune to 530 AM or 1610 AM for traffic, construction, or highway pass information. Many HARSs have two beacons which flash when a message is being broadcast on the corresponding HART, prompting motorists to tune to the HAR message. Others are static signs which always direct motorists to tune to 530 or 1610 for traffic advisory. Presently, HARSs with beacons must be activated independently from the transmitters (HARTs). Many HARSs are located just prior to a decision point, such as a freeway interchange.. They are operated by TSMC and Radio personnel.

- **VMSs:** Highway signs that display traffic-related information. Like HARSs, VMSs are usually located just prior to a decision point, such as a freeway interchange. Messages can be created to fit each particular traffic-related circumstance. They are operated by TSMC and Radio personnel. Messages are displayed with pixels (dots or flip disks). Backlights can be used to make the sign more visible, particularly at night. Flashing beacons can be used to give the message more emphasis.

- **Ramp Meters:** Traffic signals placed on freeway on-ramps. When in operation ramp meters will alternate between the red and green lights, restricting the number of vehicles entering the freeway, thereby reducing congestion and bottlenecks on the mainline. Ramp meters are controlled by TSMC personnel.

SC&DI Equipment Inventory (As of 2/20/97)

Closed Circuit Television Cameras: 181
Electronic Stations (measure occupancies, speeds, and volumes): 210
Highway Advisory Radio Transmitters (HART): 7
Highway Advisory Radio Signs (HARS): 21
Loop Detectors: 2500
Variable Message Signs: 46
Ramp Meters: 122

Personnel

Many different people help make the FLOW system work:

- **FLOW Operators** interpret information received and produce traffic reports, regulate ramp metering, use VMSs and HARs to inform motorists about traffic conditions, inform the media about roadway incidents, and help keep the system hardware working.

Overview of FLOW
(continued)

- **Radio Operators** serve as the communications link between WSP, maintenance personnel, incident response teams, tunnel operators, and project inspectors. They manage emergency situations on a regular basis. They also use VMSs and HAR equipment during non-FLOW hours, monitor the Convention Center for fires and other potential emergencies, and update the mountain pass reports during the winter months.

- **Tunnel Operators** work to ensure the safety of motorists traveling through the Mount Baker Tunnel and Mercer Island Lid on Interstate 90. They monitor the ventilation and fire suppression systems and use SC&DI devices to monitor and manage traffic through the tunnels.

- **Incident Response Teams** provide traffic control and roadway clearing services for highway incidents; easing the burden on the WSP and helping to minimize the impact of delays.

- **Maintenance Technicians** troubleshoot and repair equipment; keeping the system at full capability.

Information Obtained by Other Agencies and Networks

In addition to the SC&DI tools available, TSMC also has access to information from several other agencies:

- A direct network link with the Washington State Patrol's (WSP) Computer-Aided Dispatch (CAD) system (most incident detection begins here).
- Direct phone line to Metro Traffic Control, accessing traffic information from: 1) their airborne units, 2) their bird’s eye view, and 3) their communications with WSP, which are more frequent than ours.

Rules to Follow in the FLOW/Control Room

Since the FLOW Control Room is the most popular place for tours in the Northwest Region Headquarters by WSDOT personnel, legislatures, and private citizens, it is important to keep in mind the following guidelines with respect to public image.

- Keep all equipment in its place. This equipment includes mouse, mouse pads, keyboards and their cords, diskettes, pens, note pads, and the various FLOW manuals. Keeping the work area clean is of utmost importance in this very public work place.

- No personal belongings (such as purses, homework, magazines, textbooks, decorations, or other non-FLOW related objects) are allowed on the control deck or anywhere visible from the outside glass window. There is a storage closet to store all personal belongings while on duty.

- No food or drinks near the control deck or anywhere visible from the outside glass windows.

- Personal phone calls at work are not recommended (except for emergency situations), as they decrease the efficiency and effectiveness of the FLOW operation, especially during peak periods.

- The FLOW Operator on duty is allowed visits from friends, but only during breaks. Visits from friends should not interfere with work responsibilities. Studying with friends is not allowed during your shift, including weekend shifts.

- Personal business (i.e. homework) should only be done when all other FLOW duties, projects, and cleaning tasks are completed during weekend shifts only. It should never interfere with FLOW responsibilities.

Responsibilities of FLOW Operators

One of our primary missions at the Traffic Systems Management Center (TSMC) is to provide the most current, accurate, and useful traffic information for the public (both directly and through the media). In doing this, a FLOW Operator must remain flexible while establishing strategies appropriate to each work situation. In devising strategies, the FLOW Operator should always consider the major responsibilities of the job.

Monitor Current Traffic Conditions

- Continuously refer to the input devices (WSP CAD, scanner, CCTVs, TMS maps, and radio transmissions), to track incidents and form a cohesive picture of traffic conditions.

Report Traffic to the General Public and Media

- First priority is always given to preserving life and administering emergency assistance when needed. We do this mainly by advising the State Patrol of the current status of incidents we can witness via CCTVs. We also use the HARs and VMSs to divert traffic away from areas of danger or delay.

- The FLOW Operator on duty is responsible for making traffic updates on
  1. WSDOT's Commuter Information Line (DOT-HIWY or 368-4499, ALSO 1-800-695-ROAD)
  2. Seattle Times' Info Line (464-2000)

  The public and media may access these two phone numbers to receive up-to-date traffic information. Traffic reports should be made at least once every 10 minutes during peak traffic, and should always be updated as conditions change.

- Deliver text messages (“incident messages”) to WSDOT's remote users (media and general public) through the Traffic Management System (TMS) software as soon as conditions change.

- Deliver construction information (“bulletins”) to WSDOT's remote users through TMS, and verify this information remains up-to-date.

- Efficiently use appropriate Driver Information devices such as Variable Message Signs (VMSs) and Highway Advisory Radio (HAR) to advise the motorists of incident-related or construction-related traffic conditions.

- Answer telephone inquiries by the media regarding specific incidents, maintaining our professional yet friendly rapport.

Responsibilities of FLOW Operators
(continued)

Control Ramp Meters to Maximize Freeway Efficiency

- Activate and deactivate ramp meters at selected freeway on-ramps, based on time of day and need. Also, adjust metering rates to minimize delay and optimize efficiency on both the ramps and freeway.

Assist in System Upkeep

- Check all SC&DI devices for proper operation (data stations and loops, ramp meters, VMSs, HARTs, HARSs, CCTVs, computers, etc.).

- Report device failures to SC&DI Engineer.

- Ensure the WSDOT's Commuter Information Line is delivering the most accurate and up-to-date information (traffic report and other construction information). Listen to every category of traffic-related information and report any stale messages to the agency who made the recording.

- Ensure WSDOT's WinFlow software server is regularly updating the traffic map and messages (both bulletins and incidents). Reset the server in the VAX room if it gets hung. Inform the FLOW or software engineer if the problems persists.

- Help maintain a clean and orderly state in the FLOW Control Room.

Getting Started

The FLOW Operator who comes in for the first shift in the morning is responsible for the following tasks:

- Check mailboxes in the Freeway Operations section and in flow room.
- Turn on PCs and PC monitors. Log into TMS. Send Addressable message to WinFLOW users that TSMC is running. Check Bulletins to ensure they are correct. Download the FLOW Map for use in giving traffic reports.
- Access the Washington State Patrol Computer Aided Dispatch (CAD) Log.
- Press the **STANDBY** button to turn on the rear-projection monitor (big screen monitor), and turn on the scanner.
- Check with Radio Operators to see if any major incidents recently occurred.
- Deactivate the Computer Generated Voice from the DOT-HIWY line and make complete traffic reports (express lanes status and general traffic report) on the DOT-HIWY line and report incidents on the Seattle Times Info lines.

For explanation of these tasks, see specific section in this handbook.

Logging on to TMS

1. On the **Principal** monitor, in the **TMS application** window, double click on **Go TMS Principal** icon.
2. At the **Operator's Log-in** window, type in your user name and your password. You will now have a blank screen with a bar of various options (Lower Status Bar) displayed at the bottom of the screen.
3. Click on **Map 1** (or **Map 2**, or **Map 3**).
4. Choose the **Map** pull down menu and highlight "**Select**" to open a map. Three map files will appear. Each shows a different area of the Seattle freeway system, and are described on page 8.
5. To close the map (Map 1, Map 2, or Map 3) on the **Principal** monitor, click on the corresponding map button on the Lower Status Bar.

Getting Started
(continued)

The following is a list of the maps available for the operators to choose from:

file	***description***
testrack.wmf	Data Stations that do not appear on maps
north.wmf	Local map of north half of the FLOW map
south.wmf	Local map of south half of the FLOW map

Note that in each of these maps, the Operator may choose to go a different map without selecting to open another map from the Status Bar at the bottom of the screen. This can be done by clicking on one of the following symbols on the maps. This will take you to the corresponding map of your choice:

System map: (**O**),
North map move-up: (⇑), or
South map move-down: (⇓)

Other tasks

The primary daily tasks of the FLOW Operation are listed on the "FLOW Operator's Checklist" in "The Checklist Collection" binder on the FLOW console. Each shift the FLOW Operators are required to check every item on the FLOW Operator's checklist. It is very important that you verify each completed item/task by initialing your name in the boxes provided. Please note that by signing your initials, you help provide an information pathway for engineers or maintenance people in documenting problems. If you did not perform part of the duties on the checklist, ask your replacement to complete it. Do not initial the task until it is performed. AM and PM checklists are required to be completed daily with no exceptions.

Besides regular FLOW duties, the FLOW Operator is also responsible for the weekend housekeeping tasks. A housekeeping tasks assignment list will be issued every Friday.

Washington State Patrol's CAD Log

Background

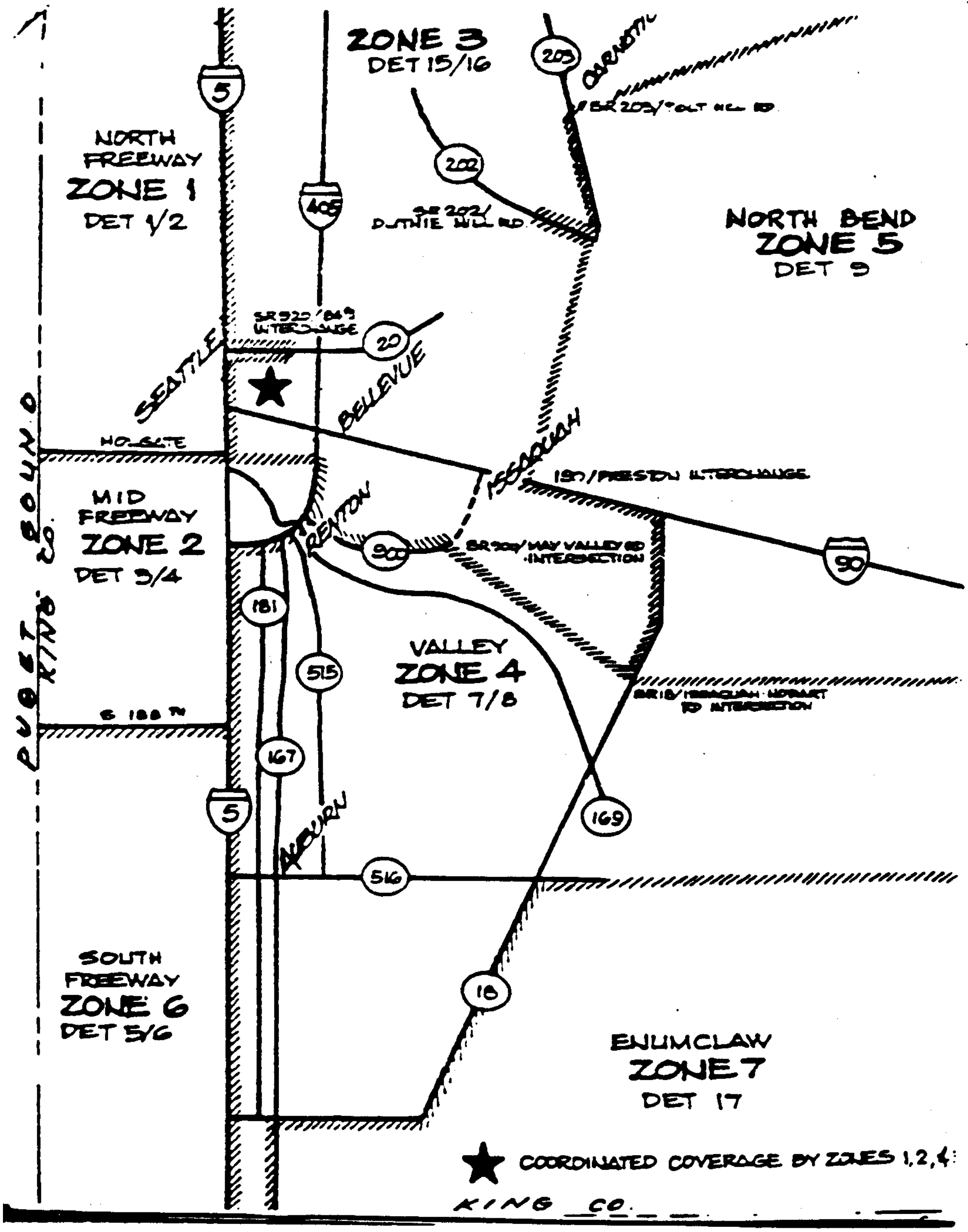
The Washington State Patrol's (WSP) Computer-Aided Dispatch (CAD) Log is one of the many sources the TSMC uses for incident detection and verification. It displays all incidents on the state highways that the WSP is aware of from traffic-related to unlawful activities on the state routes or properties. It is the FLOW Operator's responsibility to extract **only** traffic-related incidents to be included in the traffic report.

The following is a list of some abbreviations that the WSP uses.

abbreviation	*interpretation*
ABD	abandoned vehicle
ACC	accident
AIR	air patrol
BLK	blocking the roadway
CD	collector distributor
DAV	disabled vehicle (stalled vehicle)
DUP	duplicate CAD entry
F, FAT	fatalities involved (NEVER report as a fatality)
FIR	fire
HAZ	hazardous material spill
GP	gore point
HR	hit-and-run
I/C	interchange
INJ	injury
JE, JW	just east, just west
JN, JS	just north, just south
MED	medical emergency
ML	mainline
PAT	patrolling
PD	property damage involved (no injuries)
PDH	property damage hit-and-run accident (no injuries)
PED	pedestrian
PI	personal injuries involved
PIH	personal injury hit-and-run accident
PU	pick-up truck
1C, 2C, 3C,...	number of cars involved
RL, LL, CL	right lane, left lane, center lane
RS, LS	right shoulder, left shoulder
L1, L2, ...	lane number, with larger number being closer to the m
TRF	traffic hazard
UNK	unknown
>, <, or ⌉	the roadway has been cleared
*****	additional information in CAD “inquiry page”

WSP Zones

The WSP CAD current incident inquiry page lists the geographic zone the incident is in. If there is any question of an incident's location from the text description, check which zone it is in (hit F5 from the "Active CAD Log Browse" screen). The following map depicts the State Patrol's geographic zones:



<u>Log-on into WSDOT LAN NETWORK</u>

1. In DOS when prompted, enter your log-in name: TSMC
2. Enter the password: WSDOT
3. You should hear three beeps to confirm you are logged in. If not, contact the FLOW engineer.

<u>Log-on WSP's CAD through WINDOWS</u>

1. Initiate Microsoft Windows by typing "**WIN**" at the C:\ prompt.

2. Open *Applications* window and double-click on the icon labeled "**Mainframe** or **IRMAWIN**". This activates the program that connects to the mainframe computer in Olympia (it's a "terminal emulator" program).

3. The WSDOT screen will appear. At the <u>Userid</u> prompt, type either of the following user ids: "**F7S**" or "**CAL**.".

4. The cursor will automatically drop to the *Password* prompt. Type in the password and then press **ENTER**. (The password always changes on the first day of the month. It will be the word FLOW plus four digits indicating the month and year. For example, the password for February, 1997 is "*FLOW0297*".)

5. Press the **F8** key (until you see the listing for CICSCAD). CICSCAD is always the last entry.

6. Press the **down-arrow** key to move the cursor to the CICSCAD and press "**ENTER**".

7. At the <u>Userid</u> prompt, type "**HYWAY1**".

8. ***<u>TAB</u>*** to go to the *Password* prompt, type in password of the month (same as in step 4), and press **ENTER**.

9. Press the **F1** key to go to the *Active Report Log* menu.

10. Press the **F7** key to go to the *Browsing* menu.

While you are in the CAD mode, the FLOW Operator will need to look for blocking incidents in the Seattle metropolitan area. The following is a list of codes for all of the WSP dispatch areas.

01	**=**	**Tacoma / Olympia (Pierce and Thurston counties)**
02	**=**	**Bellevue / Seattle (King County)**
03	**=**	**Yakima area**
04	**=**	**Spokane area**
05	**=**	**Vancouver, WA area**
06	**=**	**Wenatchee**
07	**=**	**Everett (Snohomish, Skagit, and Whatcom counties)**
08	**=**	**Bremerton and Olympic Peninsula**

Log-off WSP's CAD through WINDOWS

1. Click the "connect or disconnect terminal session" button located on the right of the button bar. (It looks like two plugs connected to each other). The screen will blank white.

2. Click the button again, Repeat steps 3 through 5 of the log-on to WSP's CAD through Windows on page 11.

3. Place cursor on CICSCAD line by using **F8** (page down) and down arrow.

4. Press **T** (for terminate) and **ENTER** to terminate your session with CAD.

5. To disconnect from the network, push **F3**, and hit **ENTER** to confirm. At the next dialog box, do not change settings.

Logging onto CAD through microwave link

In the event that the WSDOT mainframe is inoperative, these instructions will allow you to log on to CAD through the microwave link that Seattle Radio uses. This setup will run the program slower than logging on through IRMAWIN. Please be patient.

1. Start from the DOS prompt.
2. Change to EXTRA30 directory.
3. Enter “EXTRA.”
4. Select “1” for CADD.
5. Wait for the “tree.” This may take more than 15 seconds.
6. Enter “SCADS.”

Now you will see the familiar logon window for WSP CAD. All functions are the same as running CAD through windows.

To quit, try: CTRL+ALT+Q and then type Y for yes.

For CAD-related help or information:

During office hours:	Call a FLOW Engineer (they'll call WSP)	WSP: Computer Services @ 705-7150 Lois @ 705-5155 Rick @ 705-5171 Nancy @ 705-5194
After office hours:	Call this pager:	Dial 705-7050* For network problems, press 1 For PC problems, press 2
	Or this one:	Dial 705-7680* For mainframe problems

Driver Information Package

The Driver Information Package (DIP) is prepared by the FLOW Engineer or a FLOW Operator. It describes how various SC&DI devices (such as HARTs, HARSs, and VMSs) will be used to publicize upcoming events which will affect traffic. These events include closures due to construction and maintenance work, flammable materials restrictions, rolling slowdowns, and public service messages (Oil Smart & Traffic Info Line).

The DIP will be distributed to all TSMC staff, including the FLOW Operators and Radio Operators. It should be kept on file in the "Construction Information and SC&DI Coordination" binder. It is the FLOW Operators responsibility to make sure that specific messages will be displayed on assigned VMSs or activated on assigned HARs at the specified date and time in the DIP. The FLOW Operator must check the DIP at the beginning of his or her shift, and write any deviations on it.

At the beginning of the shift, the FLOW Operator must:

1. Check that the VMSs, HARTs, and HARSs are executing their assigned messages and functions.

2. Visually confirm the VMSs and HARSs where possible, and listen to the recordings on the HARTs for clarity and grammar.

3. Check the HAR Status Excel file to ensure that appropriate HAR equipment is in use.

Note: If specified in the DIP, the beginning or ending of activities must be verified before implementing the assigned task through Radio, by phone, or through CTCO.

Highway Construction Alert (Press Release) from CTCO

The Construction Traffic Coordination Office (CTCO) plans and issues the Highway Construction Alert prior to and during construction projects or other events which will affect traffic. This information is the basis of the *Driver Information Package (DIP)* and copies of the press releases are included in the package.

It is the FLOW Operator's responsibility to keep the current Driver Information Package until an updated issue is received, or until the old package is no longer useful.

CTCO also publishes the following useful articles:

- Today's Closures & Weekend Closures - Schedules of lane and ramp closures due to occur during construction, maintenance, and other projects, organized by roadway. These reports are useful for confirming whether an observed lane closure is authorized, or for answering media inquiries.

- Construction Update Report - Detailed update on the current phase of construction and maintenance projects. This report is valuable for answering media inquiries.

These should all be stored in the "Construction Information & SC&DI Coordination" binder. They should also be put on the "bulletin" section of the TMS addressable messages if the activity occurs in the metropolitan Seattle area.

Controlling Cameras

Background
Currently, there are more than 180 Closed Circuit Televisions (CCTVs) in the Traffic Management Systems (TMS) operation at the TSMC. They are placed above major highways and are used for monitoring and verifying traffic situations. The majority of these CCTVs are solid state color cameras with 16:1 zoom lenses and have pan, tilt, zoom, and focus capabilities which can monitor traffic activities up to 2500 feet away. All of these cameras have a field of view of 20° and a horizontal pan range of 355° in one direction. (NOTE: When you can not turn the camera anymore in one direction, stop panning in that direction immediately to prevent the pan/tilt motor from burning up. You will have to turn the camera all the way around in the opposite direction to search for your target.)

Types of CCTV Communications
Currently, the video for all CCTVs is transmitted through fiber optic cables. Control is transmitted through either twisted pair coaxial cable or fiber optic cable

Joystick Priority
Overall, the TSMC and Radio operators have the priority in obtaining the control of CCTVs. Priority in obtaining control of CCTV's varies according to rank. The Priority rank is as follows:

1. Manager (MGR)
2. Supervisor (SUPV)
3. Operator (OPER)
4. Trainee (TRNE)

Anyone may gain control of the camera from another user regardless of rank of priority if the controls have been idle for more than 20 seconds. The letters in the parentheses are the shorthand that can be found on the monochrome monitor next to the TMS Principal terminal. Whenever a new user logs in to TMS, this monochrome monitor will display the user ID and the level in the rank as listed above. The media and Metro have access to the video, but do not have control privileges.

Controlling Cameras
(continued)

Accessing CCTV Control Window
CCTV cameras can be accessed by clicking on the **CAM** button at the bottom of the TMS monitor. By doing so, the *Camera/Monitor Selection* window will appear on the screen in control mode or sequence mode. This window has three basic modes of operational control of cameras--control, display, and sequence.

Control

1. To obtain control of the cameras, click on the ACCEPT button and click on the CONTROL button in the *Local Monitor Assignment* area.

2. Select a monitor in the *Local Monitor Assignment* area. If the monitor was previously displaying a sequence, the TMS will prompt you to confirm whether you want to halt the sequencing operation. Click on OK.

3. Double-click on the desired camera from the *Camera List*.

4. Use the joystick to search for your target.

Regaining Control of CCTV's when Control is Re-assigned to Another Operator
Again, anyone may gain control of the camera from another user regardless of rank of priority if the controls have been idle for more than 20 seconds. When control is taken away, a message is sent to the previous user indicating that camera control has been reassigned to another user. You lose all control of CCTV's until you take the following steps:

1. Select a camera to Display (see section below on how to display).

2. Select a camera to control (see section on how to control).

Display
Displaying a CCTV image on a monitor will not allow the operator to control this CCTV. To display a CCTV camera image on a specific monitor,

1. In the *Camera/Monitor Selection* window, click on the **ACCEPT** button.

2. Click on the **DISPLAY** button in the *Local Monitor Assignment* area.

3. Click on a monitor in the *Local Monitor Assignment* area to display. If the selected monitor was previously displaying a sequence, the TMS will prompt you to confirm whether you want to halt the sequencing

4. Double-click on the desired camera from the *Camera List*.

0

Sequence

The sequence function enables the user to select a group of cameras to be viewed in a desired order and duration time (or dwell time) on a particular monitor. The sequenced cameras currently assigned to the selected sequence monitor are indicated by index numbers following each camera name. The order of a sequence is shown by these numbers. Any number of up to 255 cameras may be selected in a sequence.

Creating a Sequence

When you want to display a (new) sequence on a monitor, follow the procedures described below to create a sequence.

1. In the *Camera/Monitor Selection* window, click on the **ACCEPT** button and then the **SEQUENCE** button in the *Local Monitor Assignment* area.

2. Select a monitor in the *Local Monitor Assignment* area to display the sequence.
   a. If the monitor was previously in Control or Display mode, go to Step 3.
   b. If the monitor was previously displaying a sequence, the TMS will prompt you to confirm whether you want to halt the Sequencing operation on this monitor. Select **OK**.

3. Double click on each of the cameras from the camera selection list desired in the sequence. Each time a camera is selected, verify that the dwell time (seconds the camera is displayed during the sequence) is adequate and adjust it if necessary. (The cameras can be put in any order desired.) Note that each selected camera will have a number in parentheses to the right of the camera name indicating the order of the camera stands in the sequence. You can delete a camera from the sequence you are building by highlighting that camera and pressing the DEL button.

4. Once all the desired cameras are selected, click on **ACCEPT** to activate the sequence.

5. To delete specific cameras from a sequence:
   a. Click **ACCEPT, SEQUENCE,** and select the monitor displaying the desired sequence.
   b. Click on the camera to be deleted in the camera list so that it is highlighted.
   c. Click the **DEL** button in the camera sequence box.
   d. Follow steps b. & c. again and delete an additional camera (the last camera in the sequence works best). Then reassign this camera to the sequence by double clicking it on the list.
   e. Click **ACCEPT** and the newly altered sequence will commence.

Controlling Cameras
(continued)

The purpose of having the CCTV cameras is to aid the FLOW Operators in monitoring traffic flow on the freeway at the existing camera locations. As a TSMC general rule, all cameras should always be zoomed out to provide the operator with the broadest view range possible of the freeway section. NOTE: Avoid aiming the camera at direct sunlight or a bright light source because the light sensor will be weakened. This will eventually degrade the image quality.

Panning/Tilting the Camera

The camera has the capability to pan right and left, tilt up and down. To pan and tilt the camera, tilt the joystick to the desired direction.

In order to properly pan/tilt the cameras, position the base of the joystick control so that the black cord is away *from you.*

Camera Movement	Direction of Joystick Handle
UP	AWAY FROM YOU
DOWN	TOWARDS YOU
LEFT	TO YOUR LEFT
RIGHT	TO YOUR RIGHT

Zooming the Camera

Zooming in:	Press down the black button on the top of the joystick while simultaneously pushing the joystick away from you.
Zooming out:	Pull the joystick toward you while the button is depressed.

Focusing the Camera Picture

Press the black button down while moving the joystick *left* or *right* to adjust the focus.

Restriction on Controlling Cameras

CCTVs are used solely for the purposes of observing traffic flow, identifying problem areas in the freeway system, and verifying traffic-related incidents/accidents with the Washington State Patrol. Keep in mind that KING, KIRO, and KOMO Television Stations have viewing access to our CCTVs, thus close shots of an incident/accident ***must*** not be shown to the public. **NEVER** use the camera to zoom in to see the conditions of the vehicles, motorists, or other non-traffic-related targets. Make sure to zoom out of the incident/accident soon after confirming the incident report with WSP's CAD log.

Monitoring the Convention Center for Fire Control

WSDOT Seattle Radio must monitor the Washington State Convention/Trade Center 24 hours a day, 7 days a week. At the end of the FLOW hours, the FLOW Operator should point the CCTVs under the Convention Center toward the walls, so that the numbered stations are within view.

When there is an incident with flame or smoke, or which sets off the heat detection system at the Dayton office, do the following:

1. Inform the Radio Operator on duty in the Radio Control Room immediately. He or she will call the Fire Department (386-1498), WSP (455-7700), Convention Center Security (447-5127), and Stan Nove (799-7002 cellular, 488-9577 home) or Bret Tredway (235-4620), as needed.

2. Notify the FLOW Engineer-on-Duty at his or her desk.

3. Notify Mahrokh Arefi at 440-4462 (office) and Barbara Briggs at 440-4463 (office). If you cannot reach either, page the Duty Engineer (680-3421).

Making/Updating Traffic Report

Because our traffic reports are one of the most direct contacts we have with the public, our reporting quality and style shape the public's image of the WSDOT. The FLOW Operator must show the highest degree of professionalism from a public agency's standpoint when making the traffic report. There should be no inappropriate behaviors or sounds (such as sighing, laughing, swearing, or joking) in the traffic report.

It is important to understand that one of the primary functions of the TSMC is to provide motorists the most up-to-date traffic information. This allows drivers to avoid congested areas.

- During peak traffic hours (6:00 to 9:00 a.m. and 2:30 to 7:00 p.m.), the FLOW Operator must make traffic reports at least once every 10 minutes, and definitely each time conditions change significantly.

- During off-peak traffic hours, traffic updates should be made as needed. (If there is no heavy traffic to report, it's okay to say, "*There are no heavy traffic conditions or blocking problems to report at this time*" or something similar, without stating the time.

The FLOW Operator is responsible for making traffic reports on the DOT-HIWY line (368-4499) and updating incidents on the Seattle Times Info Line (464-2000 ext. CARS) during FLOW hours (6 a.m. to 7 p.m. weekdays and 9:00 to 6:00 p.m. weekends). At night , traffic congestion reports are recorded automatically by the Computer Generated Voice software on both traffic lines.

The information given out to the public must be **traffic-related only**. For instance, if there is an injury accident at a certain location, the most we are allowed to inform the public is:

- Whether this specific accident is blocking the roadway,
- If the roadway is blocked, how many lanes are blocked and which ones?
- How many vehicles are involved?
- How long is the blockage expected to last? or How far is the backup?
- If motorists should be advised to use alternate routes. (Due to liability issues, DO NOT mention any specific route!!).

Never report fatalities or the status of injured individuals in the traffic report or to the public. It is critical that we not violate anyone's privacy in doing our job.

Making/Updating Traffic Report
(continued)

<u>The WSDOT Commuter Information Line (DOT-HIWY or 368-4499)</u>
The DOT-HIWY line is a public service phone line that provides the public with traffic-related information. The public may dial this number and select from one of the following categories to receive detailed information. The list of categories includes:

- Current Seattle Area Traffic Report (includes express lane status report)
- Current Tacoma Area Incident Report
- Mountain Pass Conditions
- Construction/Road Conditions of state highways, county roads, and city streets
- Washington State Ferries schedule changes
- Transit & Carpool information
- TSMC's free traffic map offer to businesses

Note that the FLOW Operator is responsible for updating the current traffic report and the express lane status report; as well as checking that the other reports are up-to-date. The Tacoma Area Incident Report and Olympic Region Construction Report are updated by Tacoma Radio. The Mountain Pass Report is recorded by Seattle Radio. The Construction Traffic Coordination Office (CTCO) is responsible for recording construction/road conditions for major state highways; the Seattle Engineering Department, the Bellevue Engineering Department, and the King County Engineering Department are responsible for corresponding road information; and the Washington State Ferries is responsible for recording the ferries information. Metro Transit is responsible for recording transit information.

<u>The WSDOT Wireless Commuter Information Line (#800-HIWY or #800-4499)</u>
The #800-HIWY line is a free service to wireless phone users where the same information available on the land-based DOT-HIWY line may be accessed.

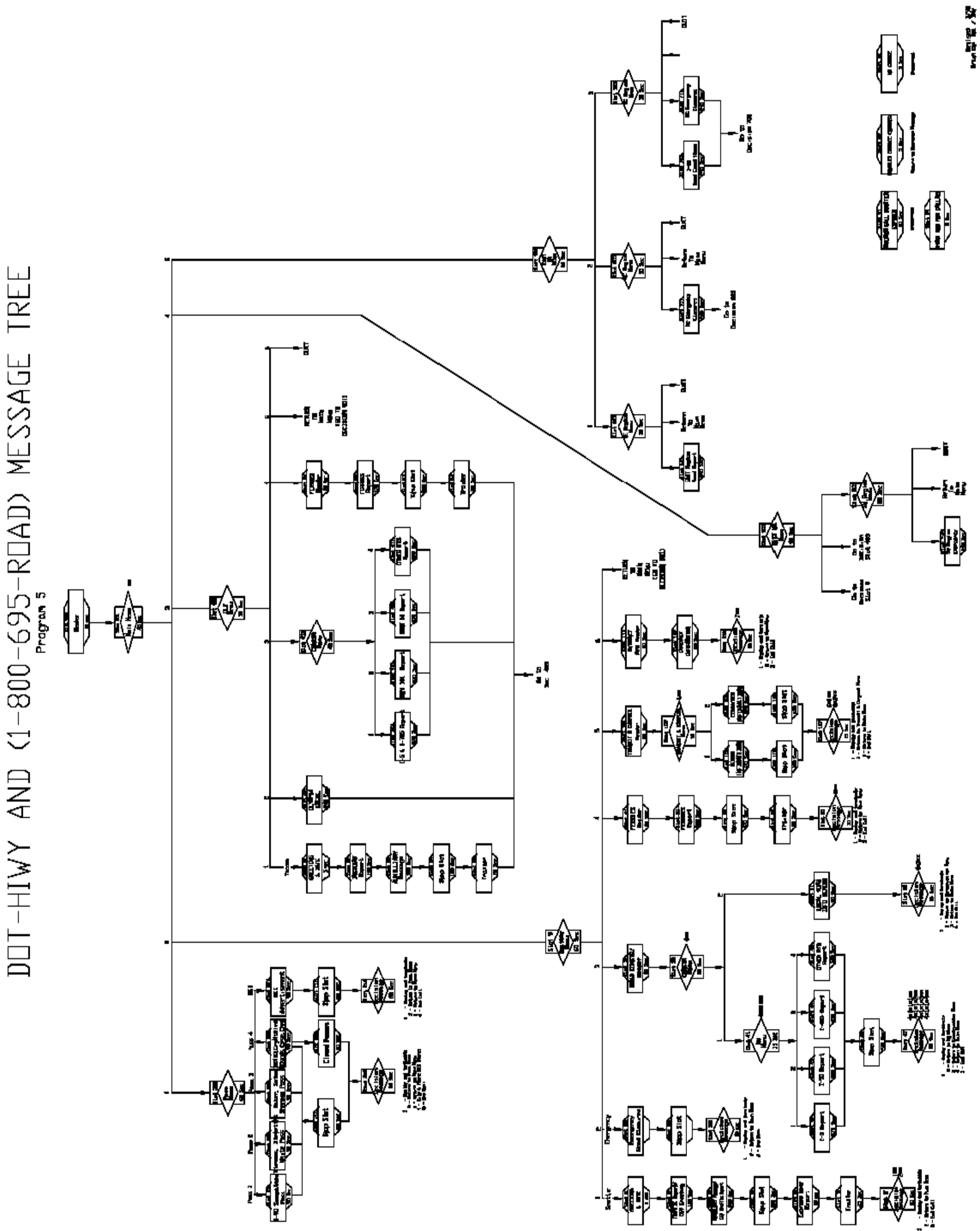
<u>The WSDOT Mountain Pass Report Line (1-800-695-7623)</u>
The Mountain Pass Report Line is a statewide toll-free number to access weather and road condition reports on Washington State’s 11 high-mountain-pass highways. This information is updated by Seattle Radio Operators between October 15 and April 15.

<u>Background of the DOT-HIWY Recording Software</u>
The Echodyne 240 Menu Program Configurator (MPC) is the software program that sets up the voice recording program used to record all of the traffic-related information for the DOT-HIWY line. This program is set up so that there will be menu messages to give callers various options to choose and receive specific traffic-related information.

The layout of the current program is listed on the following page. It is a flow chart of messages that will be heard by pressing various buttons (choosing different options) on the callers' <u>touch-tone phones</u>. The list of messages, message slot numbers, and the corresponding time limits can be found starting on page 32.

Making/Updating Traffic Report
(continued)

<u>Flow diagram of the current Echodyne program "DOT_HIWY"</u>



Making/Updating Traffic Report

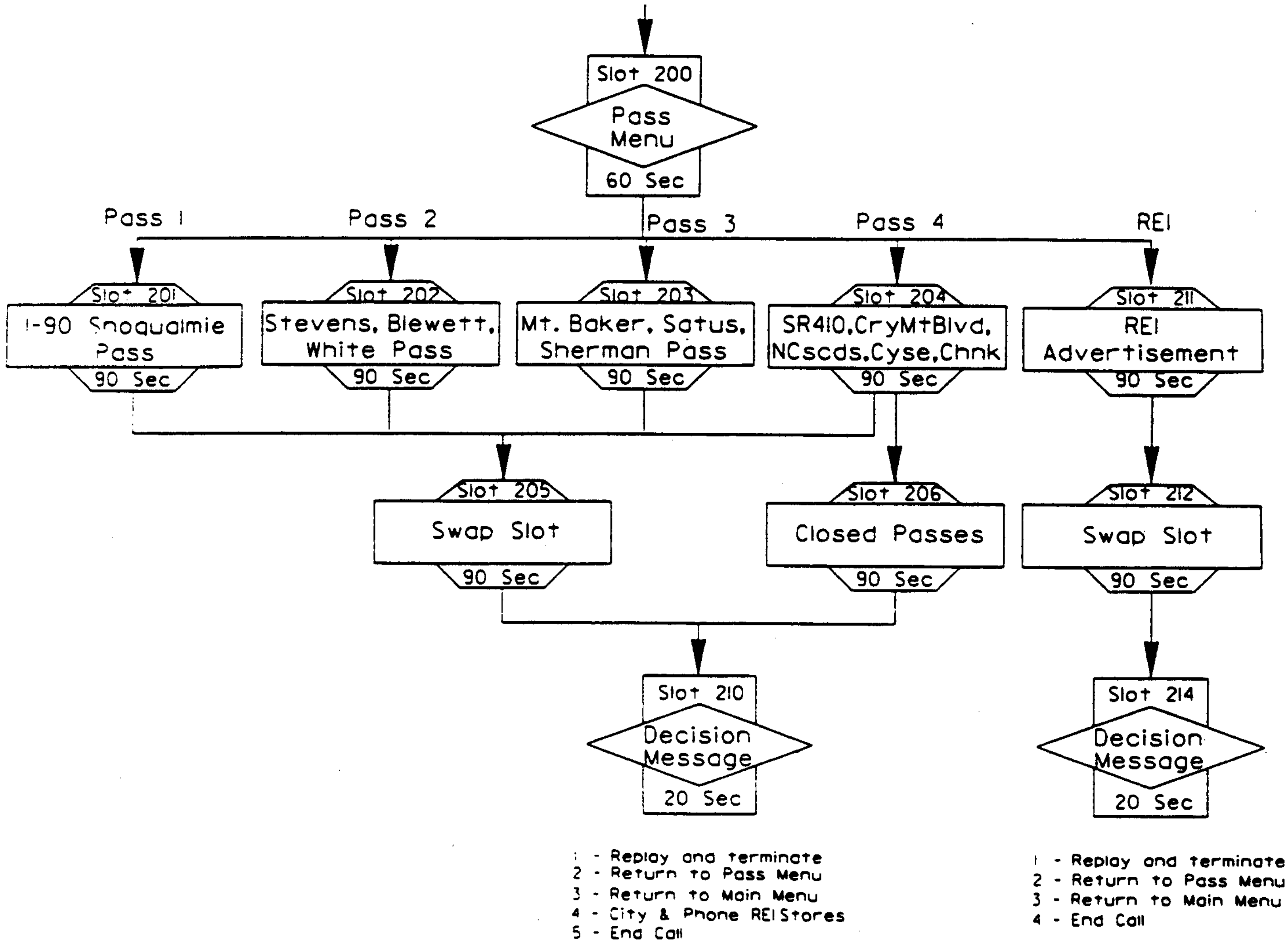
(continued)

Flow diagram of the current Echodyne program "#800HIWY"

(Graphic Unavailable)

Making/Updating Traffic Report
(continued)

Flow diagram of the current Echodyne program "MTNPASS"



Making/Updating Traffic Report

(continued)

Standard Format of Traffic Report for DOT-HIWY

As mentioned above, the FLOW Operator is responsible for updating the traffic report. The traffic report consists of four parts:

1. Greeting (good morning, afternoon, or evening, and date)
2. Current Traffic Update
3. Auxiliary Traffic Conditions - For incidents or closures that will last a substantial period of time (This slot is usually left blank).
4. Express Lane Status Report

Greeting

The greeting should be in the following format:

"Good morning(afternoon/evening). It's Wednesday, September 15."

Current Traffic Updates

As a standard TSMC guideline, traffic updates should be reported in the following format:

1. Time
2. Accidents, blocking problems, emergency roadway/lane closures.
3. NB I-5
4. SB I-5
5. I-5 Express Lanes
6. EB SR-520
7. WB SR-520
8. EB I-90
9. WB I-90
10. I-90 Express Lanes
11. NB I-405
12. SB I-405

NOTES:

1. This is only a guideline, and can be deviated from; for example, if there is little traffic congestion, only the involved areas need be reported then the following format is acceptable:

   I-5 Northbound has **[**traffic condition and location**]**,
   I-5 southbound has **[**traffic condition and location**]**.
   I-405 southbound has **[**traffic condition and location**]**,
   and there are no other heavy traffic conditions or blocking problems to report at this time."

2. Remember to mention the blocking incident/accident again when reporting the traffic condition on the pertinent roadway.
3. Make an update if an incident is cleared or as soon as conditions change.
4. When using information from the CAD, confirm it by using CCTVs, IRT, or something else (possibly by calling Metro Traffic Control), if at all possible. If you cannot confirm an incident and are not confident that it exists, you may choose to report it, stating something like, *"...and there is a reported accident on I-405 northbound at the S-curves."*

Express Lanes Status Report
At the beginning of the day or whenever the status of the express lanes changes, a status report is needed.

The express lane status report should be in one of the following formats:

i) When express lanes are **open** during the morning commute:
"Currently, the I-5 Express Lanes are open in the southbound direction, and the I-90 Express Lanes are open in the westbound direction."

ii) When the express lanes are **closed** after morning commute:
"Currently, the I-5 Express Lanes are closed, and the I-90 Express Lanes are also closed."

iii) When the express lanes are **open** during the afternoon commute:
"Currently, the I-5 Express Lanes are open in the northbound direction and the I-90 Express Lanes are open in the eastbound direction."

Making/Updating Traffic Report
(continued)

Standard Procedure for Accessing DOT-HIWY Recorder
Here are the touch-tone commands for recording and reviewing your traffic reports on the DOT-HIWY line:

Command	Function
1 + [slot A]+ ∗	**Play** message in slot A
3 + [slot A] + ∗	**Record** in message slot A
4 + [slot A] + ∗ + [slot B] + ∗	**Swap** the content of message slot A with the content of message slot B
∗	To begin or to terminate a command. (Silence will follow immediately after a command is initiated. A tone will follow immediately after a command is terminated.)

Updating the Express Lane Status Report and Greeting

1. Dial and wait for a tone (a speed dial is programmed as "[personal list] + 1"; it automatically enters the passcode in step 2).
2. Dial ∗ (or ∗) and wait for a tone. (skip this step when speed dialing)
3. Press **315∗** and start recording the express lane status as soon as the ∗ key is released. When finished (or messed up), press ∗ to terminate the recording process.
4. To listen to what you just recorded, dial **115∗**.
5. If the message just recorded sounds satisfactory, hang up. Otherwise, repeat steps 3 to 5.

The same procedure would be used for recording/changing the greeting in slot 11. Follow the same instructions above replacing 15 with 11

NOTE!!! Remember that message slots 11 and 15 will play the message **as-is** (because it does not have a swap/practice slot) once you finish the recording. This means that if you made a mistake in the recording, you will need to re-record the message <u>immediately</u>.

Making/Updating Traffic Report
(continued)

Updating Traffic Report

The official general traffic update is recorded in message slot #12. Message slot #14 is the swap (practice) slot for message slots #12 and #13 (auxiliary message slot). Message slots #12, #13, and #14 have a recording length of 180 seconds. Swapping messages allows you to re-record a message before you put it into service. If the report in message slot #14 sounded satisfactory, then swap the content of message slot #14 with message slot #12. (The recordings in message slots #12 and #13 are what is heard by our callers.) The swapping function should only be performed when two message slots have the same amount of time length. This means only slot #12 and #13 should be swapped with the practice slot #14. You **must** record directly into slots #11 and #15. Do not attempt to swap these two slots with the practice slot #14!

Procedures to recording a traffic report:

1. Dial and wait for a tone. (a speed dial is programmed as "[personal list] + 1"; it automatically enters the passcode in step 2).
2. Dial (or) and wait for a tone. (skip this step when speed dialing)
3. Dial **314∗** to start recording the new message (traffic report _or_ auxiliary message) in slot #14. Start recording as soon as the "∗" key is released. When finished recording, press ∗.
4. To review the message just recorded in slot #14, dial **114∗**.
5. If the message just recorded sounds satisfactory, swap this new message to an appropriate slot by pressing **412∗14∗** for traffic reports. If not, repeat steps 3 to 5 and record it over.

Making/Updating Traffic Report
(continued)

Computer Generated Voice (CGV)
The CGV is a computer program that uses the ES data gathered by the VAX to make traffic reports on the Seattle Times Info line and DOT-HIWY line. The DOT-HIWY line only uses CGV during non-FLOW operating hours. The FLOW operator always makes traffic reports during normal FLOW operating hours.

Deactivating CGV from the DOT-HIWY Line at Beginning of AM Shift
At the beginning of every morning the AM flow operator should remove the DOT-HIWY recorder from the active recorder list.

- First, go back to the PC that operates CGV in the computer room.
- Press the '**ESC'** key on the keyboard to interrupt data collection and bring up the main menu. Note that nothing will happen if you press '**ESC**' while the CGV is making a traffic report. Just wait until it is collecting data and press '**ESC**'.
- Select 'Display Data' by pressing the '**D**' key (see the Display menu). Select 'Active Recorders' by pressing the '**A**' key (see the Active Recorders List).
- Select 'Delete a recorder' by pressing the '**D**' key.
- Press '**0**' to remove the DOT-HIWY recorder from the active recorder list. The new list of active recorders will be displayed (without DOT-HIWY)
- Return to the main menu by pressing a key.
- Select 'Run Report' by pressing '**R**'. The CGV will then resume calling the active recorders and collecting data.
- Blank all traffic report slots on the Echodyne (slots 11,12,13,14, & 15) and begin recording the traffic report with your voice.

Making/Updating Traffic Report
(continued)

Activating CGV on the DOT-HIWY Line at End of PM Shift

At the end of the shift the PM flow operator should activate the DOT-HIWY recorder.

- First, blank all traffic report slots on the Echodyne (slots 11,12,13,14, & 15).
- Go back to the PC that operates CGV in the computer room.
- Press the '**ESC'** key on the keyboard to interrupt data collection and bring up the main menu. Note that nothing will happen if you press '**ESC**' while the CGV is making a traffic report. Just wait until it is collecting data and press '**ESC**'.
- Select 'Display Data' by pressing the '**D**' key (see the Display menu).
- Select 'Active Recorders' by pressing the '**A**' key (see the Active Recorders List).
- Press '**A**' to add a recorder to the list.
- At the recorder menu press **'0'** to add the DOT-HIWY recorder from the active recorder list. The new list of active recorders will be displayed (with DOT-HIWY present on the list)
- Return to the main menu by pressing a key.
- Select 'Run Report' by pressing '**R**'. The CGV will then resume calling the active recorders, record a traffic report for each one, and collect data.
- Verify that the greeting and first traffic report are correct.

Making/Updating Traffic Report
(continued)

The following is a list of available message slots and their corresponding messages for the DOT-HIWY voice recording program. Notice that the time constraint for a specific message is also listed next to the message slot number.

SLOT 5 MESSAGE	20 SECONDS
Thank you for calling the Washington State Department of Transportation's Commuter Information Line. This is a #800 call completely free from your cellular phone. For a complete directory of #800 numbers call #800-INFO that's #800-4636, free from any cellular phone.	

SLOT 6	20 SECONDS
SWAP Message slot for slot 5.	

SLOT 9 MESSAGE	60 SECONDS
You may make your selection at anytime during this menu, For a current Seattle area traffic report, press 1, For Emergency Road Closure Information for King, Snohomish, Skagit, Island, and Whatcom Counties, press 2, for freeway and local road construction and information, press 3, for the update to normal ferry schedules, press 4, for transit and carpool information, press 5, for information regarding our Internet web site, press 6, and to return to the main menu, press 7.	

SLOT 11	5 SECONDS
Greeting message recorded by the TSMC.	

SLOT 12	180 SECONDS
Traffic Report recorded by the TSMC.	

SLOT 13	180 SECONDS
Emergency road conditions or repeat messages recorded by the TSMC.	

SLOT 14	180 SECONDS
SWAP message slot for slots 12 and 13.	

SLOT 15	10 SECONDS
Express Lane status report recorded by TSMC.	

SLOT 16 MESSAGE	25 SECONDS
The Seattle area traffic report covers accidents and traffic congestion on major Seattle freeways between Lynnwood and Tukwila. Freeway congestion, express lane status, and other traffic impacts are reported 6 a.m. to 7 p.m. weekdays, and from 9 a.m. until 6 p.m. on weekends. The report is updated as conditions change.	

Making/Updating Traffic Report
(continued)

SLOT 17 MESSAGE	10 SECONDS
To replay this message and terminate your call Press 1, to return to the main menu press 2, to end this call, press 3.	

SLOT 21	5 SECONDS
Greeting message for Tacoma recorded by Olympic Radio.	

SLOT 22	180 SECONDS
Tacoma area incident report recorded by Olympic Radio.	

SLOT 23	180 SECONDS
Tacoma area emergency or repeat message recorded by Olympic Radio.	

SLOT 24	180 SECONDS
SWAP message slot for slots 22 and 23.	

SLOT 25 MESSAGE	25 SECONDS
The Tacoma area incident report, reports accidents and other traffic impacts for Tacoma and surrounding areas 24 hours a day and is updated as conditions change.	

SLOT 31 MESSAGE	10 SECONDS
You have selected the freeway and local road construction report.	

SLOT 32 MESSAGE	10 SECONDS
For information regarding state highways, press 1, for local roadway information, press 2.	

SLOT 41 MESSAGE	15 SECONDS
For construction information on Interstate 5, press 1, for Interstate 90, press 2, for Interstate 405, press 3, and for other state routes, press 4.	

SLOT 42	270 SECONDS
Interstate 5 construction report recorded by CTCO.	

SLOT 43	270 SECONDS
Interstate 90 construction report recorded by CTCO.	

SLOT 44	270 SECONDS
Interstate 405 construction report recorded by CTCO.	

SLOT 45	270 SECONDS
Other state routes construction report recorded by CTCO.	

Making/Updating Traffic Report

(continued)

SLOT 46	270 SECONDS
Swap slot for slots 42, 43, 44, 45.	

SLOT 47	25 SECONDS
To replay this message and terminate your call Press 1, to return to the state highway construction menu for King, Snohomish, Skagit, and Whatcom counties press 2, to return to the general road construction and information menu press 3, to return to the main menu press 4, and to end this call, press 5.	

SLOT 61 MESSAGE	30 SECONDS
For information on county roads in King County please call 205-9150, for information on city streets in the City of Seattle call 684-ROAD, and for information on city streets in the City of Bellevue call 637-7933.	

SLOT 62 MESSAGE	15 SECONDS
To replay this message and terminate your call press 1, to return to the general road construction and information menu press 2, to return to the main menu press 3, to end this call press 4.	

SLOT 81 MESSAGE	10 SECONDS
You have selected the Washington State Ferries information report.	

SLOT 82	120 SECONDS
Washington State Ferries report recorded by WSDOT Ferries.	

SLOT 83	120 SECONDS
Swap slot for slot 83.	

SLOT 84 MESSAGE	20 SECONDS
The current update to normal ferry schedules reports changes and disruptions to the daily ferry runs and is updated as conditions change. For further information please call the 24-hour hotline at 464-6400.	

SLOT 85 MESSAGE	10 SECONDS
To replay this message and terminate your call press 1, to return to the main menu press 2, to end this call press 3.	

SLOT 91 MESSAGE	10 SECONDS
Maximum call duration has expired and your call is being terminated. Please call again.	

SLOT 92 MESSAGE	5 SECONDS
Your choice is invalid for this menu. Please try again.	

Making/Updating Traffic Report
(continued)

SLOT 93 MESSAGE	5 SECONDS
No choice has been made. Thank you for calling.	

SLOT 94 MESSAGE	5 SECONDS
Good-bye, and thank you for calling.	

SLOT 95 MESSAGE	5 SECONDS
Begin recording after the tone. To end your recording press the pound key.	

SLOT 96 MESSAGE	5 SECONDS
Your recording has been accepted. Returning to main recording options.	

SLOT 97 MESSAGE	5 SECONDS
To listen to your recording press 1, to accept your recording press 2, to re-record press 3.	

SLOT 101 MESSAGE	10 SECONDS
You have selected the transit and carpool information report.	

SLOT 102 MESSAGE	10 SECONDS
For Metro information, press 1, and for commuter information, press 2.	

SLOT 103	120 SECONDS
Metro transit report recorded by Metro	

SLOT 104	120 SECONDS
Swap slot for slot 103.	

SLOT 105 MESSAGE	120 SECONDS
Be Oil Smart! Share the ride. For Metro carpool and vanpool services hotline call 625-4500. For Metro rider information and trip planning call 553-3000.. During severe weather conditions, please listen to the radio for updated information as this line does become very busy. For Metro schedule information please call 287-8463. You will need to call from a touchtone phone, know the bus route number, and the bus stop location.	

SLOT 106	120 SECONDS
Swap slot for slot 105.	

SLOT 107 MESSAGE	15 SECONDS
To replay this message and terminate your call, press 1, to return to the transit and carpool menu, press 2, to return to the main menu, press 3, and to end this call, press 4.	

Making/Updating Traffic Report
(continued)

SLOT 111 MESSAGE	10 SECONDS
You have selected information regarding the Washington State Department of Transportation's Internet web site.	

SLOT 112 MESSAGE	60 SECONDS
A congestion map and pictures of freeway conditions are available to individual computer users on the Internet. Links to this information can be found on the Department of Transportation's homepage located at www.wsdot.wa.gov.	

SLOT 113 MESSAGE	10 SECONDS
To replay this message and terminate your call, press 1, to return to the main menu, press 2, and to end this call, press 3.	

SLOT 200 MESSAGE	60 SECONDS
This is the Washington State Department of Transportation Mountain Pass Road report, brought to you by REI your headquarters for snow-sports gear and clothing in Seattle, Bellevue, Lynnwood, Federal Way, and Spokane. You may enter your selection at any time. For I-90 Snoqualmie Pass Press 1, for US 2 Steven's Pass, US 97 Blewitt Pass, or US 12 White Pass Press 2; for State Route 542 Mount Baker Highway, US 97 Satus Pass, or State Route 20 Sherman Pass Press 3; for State Route 410, Crystal Mount Blvd., State Route 20 North Cascades Highway, State Route 123 Cayuse Pass, or State Route 410 Chinook Pass Press 4; or for the city and phone number of REI stores in Washington State press 5.	

SLOT 201	90 SECONDS
Snoqualmie Pass Report recorded by Seattle Radio.	

SLOT 202	90 SECONDS
Stevens, Blewitt, and White Pass Reports recorded by Seattle Radio.	

SLOT 203	90 SECONDS
Mt. Baker, Satus, and Sherman Pass Reports recorded by Seattle Radio.	

SLOT 204	90 SECONDS
SR410, Crystal Mtn Blvd, N. Cascades Hiwy., Cayuse, and Chinook Pass Reports recorded by Seattle Radio.	

SLOT 205	90 SECONDS
SWAP slot for slots 201, 202, 203, and 204.	

SLOT 206	90 SECONDS
Closed Passes recorded by Seattle Radio.	

SLOT 209 MESSAGE	15 SECONDS
To replay this message and terminate your call Press 1, to return to the mountain pass menu press 2, for the city and phone number of REI stores in Washington State press 3, or to end this call press 4.	

SLOT 210 MESSAGE	20 SECONDS
To replay this message and terminate your call press 1, to return to the mountain pass menu press 2, to return to the main menu press 3, for the city and phone number of REI stores in Washington State press 4, or to end this call press 5.	

SLOT 211 MESSAGE	90 SECONDS
At REI you'll find the gear and clothing for skiing and snowboarding plus climbing, hiking, cycling and paddling. Call to check the merchandise assortment at the store you're interested in. REI has 6 stores in Washington to serve you. Seattle: (206)223-1944 Bellevue: (425)643-3700, Federal Way (253) 941-4994, Lynnwood: (425) 774-1300, Spokane: (509) 328-9900. Our Approach store at Bellevue Square also offers a wide selection of clothing plus Internet access to our complete selection of REI gear and clothing. Reach approach at (425) 462-9798. You can also shop REI on the Internet at www.rei.com; or through our Mail Order catalog. Call 1-800-426-4840 to receive your free REI catalog. Thank you for your interest in REI.	

SLOT 212	90 SECONDS
SWAP Slot for slot 211.	

SLOT 213 MESSAGE	15 SECONDS
To replay this message and terminate your call press 1, to return to the mountain pass menu press 2, or to end this call press 3.	

SLOT 214 MESSAGE	10 SECONDS
To replay this message and terminate your call press 1, to return to the mountain pass menu press 2, to return to the main menu press 3, or to end this call press 4.	

SLOT 301	30 SECONDS
Emergency Road Closure Report recorded by Seattle Radio.	

SLOT 302	60 SECONDS
Swap slot for 301	

SLOT 303 MESSAGE	10 SECONDS
To replay this message and terminate your call, press 1, to return to the main menu, press 2, or to end this call, press 3.	

Making/Updating Traffic Report
(continued)

SLOT 400	15 SECONDS
To record emergency road closures press 1, to record construction reports press 2 or press 3 to hang-up.	

SLOT 403	30 SECONDS
Press 1 for Tacoma area traffic reports, press 2 for emergency road closures, press 3 for construction reports, press 4 for updates to normal ferry schedules, press 5 to return to the main menu or to end this call press 6.	

SLOT 411	240 SECONDS
****Olympic region emergency road closure report. RECORDED BY OLY RADIO.**	

SLOT 412	240 SECONDS
To record construction reports for I-5 and I-705 press 1, for Highway 101 press 2, for Highway 16 press, 3 for other routes press 4, to return to the previous menu press 5 or to end this call press 6.	

SLOT 413	40 SECONDS
For construction and road closure information on Interstate 5 and 705, press 1, for US Highway 101, press 2, for state highway 16, press 3, for other state routes press 4, to return to the Olympic Region menu press 5, to return to the main menu press 6 or to end this call press 7.	

SLOT 414	240 SECONDS
****I-5 and I-705 construction report. RECORDED BY OLYMPIC RADIO.**	

SLOT 415	240 SECONDS
****Highway 101construction report. RECORDED BY OLYMPIC RADIO.**	

SLOT 416	240 SECONDS
****Highway 16 construction report. RECORDED BY OLYMPIC RADIO.**	

SLOT 417	240 SECONDS
****Other highways construction report. RECORDED BY OLYMPIC RADIO.**	

SLOT 422	10 SECONDS
To listen to your recording press 1, to accept your recording press 2, to re-record press 3, to return to the previous menu press 4 or press 5 to hang-up.	

SLOT 500	15 SECONDS
To record emergency closures press 1 or to end this call press 2.	

Making/Updating Traffic Report
(continued)

SLOT 503	30 SECONDS
Press 1 for emergency highway closures, press 2 to return to the main menu or press 3 to hang-up.	

SLOT 511	240 SECONDS
****SW Region emergency road reports. RECORDED BY SW REGION.**	

SLOT 520	25 SECONDS
Not Used at this time.	

SLOT 600	15 SECONDS
Press 1 to record highway conditions report or to end this call press 2.	

SLOT 603	30 SECONDS
For emergency highway closures and road conditions on major Interstates and U.S routes press 1, to return to the main menu press 2 or to end this call press 3.	

SLOT 611	240 SECONDS
**** Eastern Region road report. RECORDED BY EASTER REGION.**	

SLOT 620	25 SECONDS
Not Used at this time.	

SLOT 700	15 SECONDS
To record emergency closures press 1 or to end this call press 2.	

SLOT 703	30 SECONDS
Press 1 for emergency highway closures, press 2 to return to the main menu or to end this call press 3.	

SLOT 711	240 SECONDS
**** SC Region emergency construction report. RECORDED BY SC REGION.**	

SLOT 720	30 SECONDS
Not used at this time.	

SLOT 800	15 SECONDS
To record emergency closures press 1 or to end this call press 2.	

SLOT 803	30 SECONDS
Press 1 for emergency highway closures, press 2 to return to the main menu or to end this call press 3.	

SLOT 811	**240 SECONDS**
**** NC Region emergency construction report. RECORDED BY NC REGION.**	

SLOT 820	**30 SECONDS**
Not used at this time.	

SLOT 900	**10 SECONDS**
Thank you for calling the Washington State Department of Transportation's Highway Information Line. If you know the extension you wish to hear, please enter it now.	

SLOT 901	**40 SECONDS**
[PAUSE 2 SECONDS] *For mountain pass reports press 1, for information regarding the Seattle area press 2, for information regarding the Tacoma area reports press 3, for the rest of Western Washington press 4 and for Eastern Washington press 5.*	

SLOT 905	**40 SECONDS**
Press 1 for highway information in Northwest Washington which includes King, Snohomish, Island, Skagit, Whatcom and San Juan counties. Press 2 for the Olympic region which includes Pierce, Thurston, Mason, Kitsap, Grays Harbor, Jefferson and Clallam counties. Press 3 for Southwest Washington which includes Clark, Lewis, Skamania, Cowlitz, Klickitat, Wahkiakum and Pacific counties.	

SLOT 906	**30 SECONDS**
Press 1 for highway information in Northeast Washington, which includes Spokane, Adams, Lincoln, Stevens, Pend Oreille, Ferry and Whitman counties. Press 2 for North Central Washington which includes Okanogan, Chelan, Douglas and Grant counties. Press 3 for South Central Washington which includes Yakima, Kittitas, Benton, Franklin, Walla Walla, Columbia, Garfield and Asotin counties.	

SLOT 912	**20 SECONDS**
For the Olympic Region Press 1, for the SW Region press 2, for the Eastern Region press 3, for the South Central Region press 4, for the North Central Region press 5 or to quit press 6.	

Making/Updating Traffic Report
(continued)

Ensuring that the DOT-HIWY and Seattle Times Info Line are Updated and Appropriate

Once during the a.m. shift, the. FLOW Operator is responsible for listening to the traffic report on the Seattle Times line and the DOT-HIWY line traffic report, King County, City of Seattle, City of Bellevue, WSDOT Ferries, Metro information, carpool information, and the freeway congestion map offer.

Once during the p.m. shift, the FLOW Operator is responsible for listening to the Seattle Times and the DOT-HIWY line state highway reports.

Checking the DOT-HIWY line:

1) Dial 368-4499 (DOT-HIWY)
2) Listen to the commands and check all required slots. Use the DOT-HIWY Message Tree or the list of available message slots and their corresponding messages illustrated in the pages above. When all slots are checked, hang up.
3) Notify the appropriate person when a slot needs to be updated or re-recorded.

Checking the Seattle Times Info line:

1) Dial 382-7660 (first choice) or 464-2000 (second choice)
2) Press 2277 (CARS)
3) Listen to the commands and choose one.
4) After the message is over, follow steps two through four again. When all slots are checked, hang up.
5) Notify the appropriate person when a slot needs to be updated or re-recorded.

When You Find Outdated Information

If you find a slot on the DOT-HIWY line that does not have current information, then look in front of the phone directory for the contact person representing the specified agency.

Making/Updating Traffic Report
(continued)

The Seattle Times Info Line (464-2000 or 382-7660)
The public can dial 464-2000 and enter category number of CARS(2277) to listen to the WSDOT's incident report recorded by the FLOW Operator(s) and the traffic congestion report recorded by the Computer Generated Voice (CGV). However, to record an incident update for this information line, the FLOW Operator has to enter the password in order to access the voice recorder. By calling the same numbers with extension 2277, the FLOW Operator may review the quality of the complete traffic update previously recorded.

Standard Procedure to update the Seattle Times Info Line
To access the voice recording program,

1. Dial **9-382-7660** (or 464-2000 or speed dial by pressing "[personal list] + 2")
2. Enter ∗**9436**∗ when you hear a greeting of a male voice
3. Enter **12271#** as a category number to access the voice recording program
4. You will be asked to enter a message index number:
    - Press **1#** for the **current incidents (blocking accidents and disabled vehicles) and special traffic conditions**.
    - Press **2#** for the **Computer Generated Voice traffic congestion update.**
    - Press **3#** for the **Computer Generated Voice express lane conditions**.

To record messages:

Command	*Function*
D (3)	Delete previous message and record new message
K (5)	Keep the new recording (automatic swapping function)
Q (7)	Quit or terminate the recording process (used when finished recording or when a mistake is made in the recording)

Controlling Ramp Meters

Ramp Metering

Ramp metering controls the flow of vehicles entering the freeway by allowing them to merge into mainline traffic one at a time, rather than as a platoon of cars, at a rate that can be accommodated by the mainline facility. This is accomplished through the use of vehicle detection devices, field controllers, ramp meters, a central computer system (VAX), and FLOW Operators.

- Currently, induction loop detectors are the only vehicle detection devices in use; they detect volumes (numbers) of vehicles and also occupancies (percentage of time the detector is activated) in each lane on the mainline and ramps.
- Field controllers collect traffic data from the loops and send this information to the central computer at the TSMC. The central computer analyzes the data and displays it on a computer terminal.
- The ramp meters utilize both the volume and occupancy data from detector loops.
- The central computer (VAX) is capable of adjusting upstream metering rates based on downstream conditions. For example, a metering rate at an upstream location will be decreased if a bottleneck develops downstream. Adjustments are also made when the on-ramp queues are too long. The length of an on-ramp queue is also taken into account when determining metering rates.
- FLOW Operators activate the meters when the occupancy reaches metering levels. They are pivotal in monitoring the performance of the detectors, meters, and central computer. When malfunctions occur, Operators disable detectors, adjust or turn off meters, or troubleshoot computer problems.

Control Criteria

The criteria for ramp metering is based on downstream conditions and on-ramp queue conditions. There are two ways a metering rate is determined: *remote metering* and *standby metering*.

Remote Metering

This is the normal mode of operation for the Seattle system. In this mode, metering rates for all ramp meter locations are determined by the field controllers. The central computer is capable of adjusting upstream metering rates based on downstream conditions. A metering rate at an upstream location will be decreased if a bottleneck develops downstream. The condition of each on-ramp queue is also taken into account. The start and end times of metering can be adjusted from the TSMC using the TMS software. Typically FLOW Operators will activate the meters when the occupancy on the mainline exceeds 15% and a peak commuting period is approaching.

Standby Metering

This is used when communications to the central computer are interrupted or when the central computer is "down". In these cases, each ramp meter will determine a metering rate for its on-ramp according to local traffic conditions or by a time of day table, taking into account the on-ramp queue conditions in standby metering. The ramp meter operates independently, without coordinating with other ramp meter controllers, so adjustments for bottlenecks are not made. Also, the FLOW Operator cannot change metering parameters (such as minimum metering rate) when the communications are failed.

Metering Algorithms & Adjustments

The field controller determines the metering rates for each meter by selecting the more restrictive metering rate as determined by three separate algorithms:

- Local Metering Algorithm
- Time of Day Metering Algorithm (During communications failures)
- Predictive Control Metering Algorithm -- **(In development phase)**

Each algorithm computes the number of vehicles allowed to enter the mainline traffic flow. This metering rate is then further adjusted by

- Bottleneck Adjustment
- Queue Adjustment
- Advance Queue Adjustment
- Red Violations
- HOV Bypasses.

In the event that communications are lost between the central computer at TSMC and a field controller, the field controller will continue to operate. It will control the ramp and select a metering rate according to the Local Metering Algorithm or a preset Time of Day Metering Algorithm. *The more restrictive of the two is selected as the current metering rate* (DMR). The figure on page 45 shows how the metering rate is calculated.

Local Metering Algorithm

The Local Metering Algorithm considers the occupancy of the adjacent mainline, it does not consider the characteristics of traffic flows downstream or upstream of the ramp in question. The resulting metering rate is referred to as the local metering rate (LMR) and the units are vehicles per minute(vpm). This algorithm is run by the field controller which allows it to function independently of the central computer if communications are lost.

Controlling Ramp Meters
(continued)

Time of Day Algorithm

The Time of Day Algorithm is run by field controllers, and is only used when there is a communication breakdown between the central computer and a field controller. This algorithm consists of preset metering rates, on/off times, and days of operation. The algorithm checks the current day and time against the preset values to determine if it should be metering or not and if so at what rate. For example, the controller may have a preset turn on time of 6:30 a.m. with an associated metering rate of 18 vpm and another time and rate of 6:55 a.m. and 12 vpm, respectively. The controller would then start metering at 6:30 a.m. and allow 18 vehicles to enter the freeway each minute until 6:55 a.m. when it would decrease the rate to 12 vehicles per minute.

Predictive Control Algorithm

The Predictive Control Algorithm attempts to predict when a point on the freeway is about to become congested. When the algorithm recognizes the characteristics that occur just prior to congestion (e.g., time, occupancies at various key locations, rate of change of occupancy, etc.), ramp metering rates upstream of this point are reduced to try to avoid, or at least delay, the onset of congestion.

Bottleneck Adjustment

A bottleneck exists when more vehicles are entering a particular freeway segment than are exiting. The Bottleneck Metering Algorithm determines whether a bottleneck condition exists on the mainline. If so, this algorithm will assign a metering rate adjustment to all upstream ramps that have an impact on the bottleneck area. The result is referred to as the bottleneck metering rate (BMR) and the units are vehicles per minute. (It uses the PMV-previous minute ramp volume--HOV and Meter)

This algorithm checks all data stations to see if the mainline occupancy is greater than the bottleneck occupancy threshold. If so, it determines the number of vehicles being stored between the data station in bottleneck and the next upstream station. This is done by first retrieving the mainline volume at the first data station upstream from the bottleneck station. Then, to this volume, the volume of all entrance ramps between the two stations is added.

The philosophy of the BMR is to ease the bottleneck congestion by reducing the incoming volumes until they equal the outgoing volumes. This algorithm reduces the metering rates of all upstream ramps that have a significant impact on the bottleneck area. The total amount of reduction equals the number of vehicles being stored. The BMR of the ramp equals the number of vehicles entering the mainline from the ramp minus the volume reduction of the ramp.

Controlling Ramp Meters
(continued)

Queue Adjustment

The queue adjustment algorithm determines if the designated metering rate of a particular ramp should be increased due to backups on the ramp. There are two ways that ramp queue occupancy can become excessive:

1. A very large volume of vehicles using the ramp.
2. High occupancies on the mainline cause restrictive metering rates.

HOV Adjustment

At many ramps, there is a non-metered HOV bypass lane, allowing HOV traffic to bypass the metered queue. The purpose of the HOV Adjustment Algorithm is to compensate for HOVs bypassing the ramp meter by reducing the metering rate accordingly.

This algorithm keeps a record of all HOVs that used the bypass for the past minute. This volume is subtracted from the current metering rate (DMR). The new meter rate is calculated as:

Metering Rate = DMR - # of HOVs

In this manner, ramp volumes are kept under control and merging capacities of the mainline remain at optimal levels.

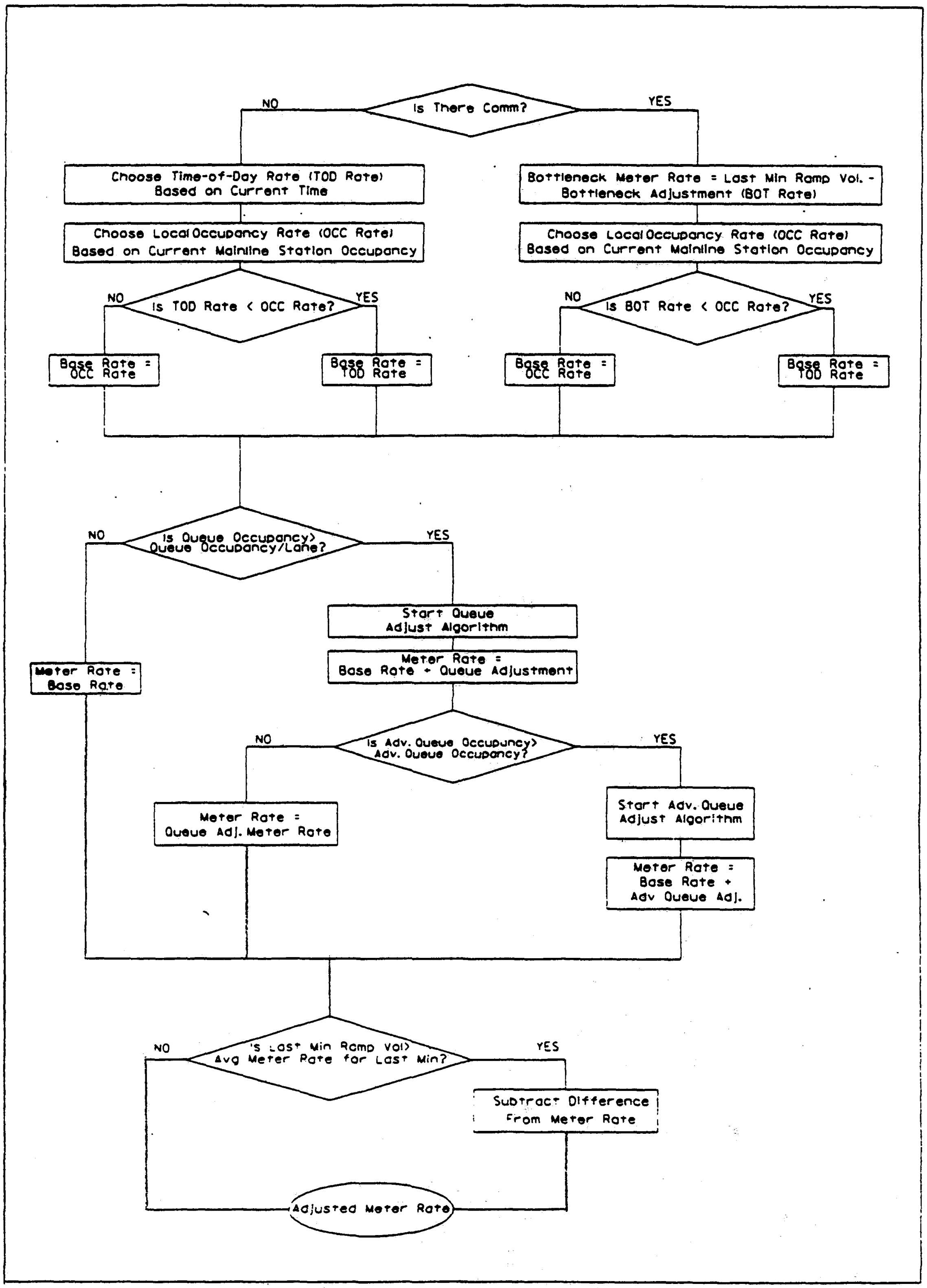
Advance Queue Override

The Advance Queue Override Algorithm is intended to prevent the meter queue from interfering with the adjacent arterial(s). The Advance Queue Override metering rate will adjust the DMR with a value intended to immediately shorten the queue.

To find out which algorithm is currently governing a ramp meter's metering rate, simply look at the status (**S**) in the **GROUP METER STATUS** window. Abbreviations are used to designate the governing algorithm and are summarized as follows:

ABBREVIATION	ALGORITHM
L	Local
B	Bottleneck
LQA	Local Queue Adjusted
BQA	Bottleneck Queue Adjusted
BAO	Bottleneck Advance Override
LAO	Local Advance Override

Ramp Meter Algorithm selection



Controlling Ramp Meters
(continued)

Ramp Metering Schedule

The ramp metering system was implemented in September, 1981. Currently, the system controls 21 southbound I-5 ramps, 6 northbound I-5 ramps, 14 westbound I-90 ramps, 13 southbound I-405 ramps, and 4 northbound I-405 ramps during the a.m. peak period. During the p.m. peak period, it controls 20 northbound I-5 on-ramps, 10 southbound I-5 ramps, 2 eastbound SR-520 ramps, 4 eastbound I-90 ramps, 4 southbound I-405 ramps, and 12 northbound I-405 ramps. On-Ramps from NE 145th Street and Lake City Way to southbound I-5 are not metered because an additional lane is added to the freeway at each of these two locations.

Ramp meters are activated by the FLOW Operator during peak hour traffic. The metering time windows are broken up into three categories. These categories are generally:

AM peak

I-5	Southbound:	6:00 a.m. to 9:30 a.m.
	Downtown Seattle:	6:00 a.m. to 10:00 a.m.
	Columbian Way to Northbound:	6:00 a.m. to 10:30 a.m.
I-90	Westbound:	6:30 a.m. to 9:00 a.m.
	Front Street:	7:20 a.m. to 7:40 a.m.
I-405	Northbound and Southbound:	6:00 a.m. to 9:30 a.m.

PM peak

I-5	Southbound:	9:30 a.m. to 7:00 p.m.
	Northbound:	2:30 p.m. to 7:00 p.m.
	Downtown Seattle:	2:00 p.m. to 7:00 p.m.
	Olive Way:	2:00 p.m. to 4:00 p.m.
I-90	Eastbound:	3:30 p.m. to 7:00 p.m.
I-405	Northbound and Southbound:	3:00 p.m. to 7:00 p.m.
SR520	Eastbound:	2:30 p.m. to 7:00 p.m.

Weekend peak:

I-5	Southbound:	9:00 a.m. to 6:00 p.m.

The FLOW Operator manually activates and deactivates each ramp meter during the above time windows. Keep in mind that ramp meters should not be activated outside of these time windows without permission from a FLOW engineer. Good judgment is essential in deciding if metering is justified, and if so, for what duration. A balance must be sought between the goals of limiting the ramp backups and limiting the freeway slowdowns caused by adding traffic (both at the merge and downstream).

Controlling Ramp Meters
(continued)

When meters are activated, it is the Operator's responsibilty to verify the correct functioning of each one as they are monitored. Though some locations require more attention than others, all meters should be inspected with the cameras, if possible, at least once during the time in which they are on.

AM Peak

Both directions of I-5, both directions of I-405, and westbound I-90 traffic must be closely monitored during a.m. peak. Traffic will start to become heavy at the Snohomish/King County Line, Eastgate, and around the SR 520 interchange. After 6:00 a.m., when the mainline occupancy starts to climb higher than about 12%, it is time to consider metering. Keep in mind the following important reminders:

- I-90 at **Front Street** must be deactivated by **7:40 a.m.**
- All **I-90** ramp meters must be deactivated by **9:00 a.m.**
- **I-5** ramp meters (North of 130th) must be deactivated by **9:30 a.m.**
- All **I-405** ramp meters must be deactivated by **9:30 a.m.**
- **I-5** ramp meters in downtown Seattle must be deactivated by **10:00 a.m.**
- Columbian Way to NB I-5 may remain operational until 10:30 a.m. if conditions warrant.
- I-5 SB meters between NE 130th and the Ship Canal Bridge may remain operational if conditions warrant

PM Peak

During the p.m. peak, both directions of I-5, both directions of I-405, eastbound SR-520, and eastbound I-90 traffic must be closely monitored. The Operator must weigh local mainline occupancy as well as downstream conditions in deciding if, when and where to meter.

- **All p.m. ramp meters** must be deactivated by **7:00 p.m.**

Weekend Peak

Currently, the TSMC is metering 7 ramps on southbound I-5 during weekend hours. The FLOW Operator must monitor traffic on **Southbound I-5** to effectively control the traffic flow using selected ramp meters. The only meters used for weekend metering are:

- NE 130th St.
- NE 110th St.
- NE 107th St.
- NE 85th St.
- Ravenna Blvd.
- NE 50th Street
- NE 45th Street

Gauging local mainline occupancy and downstream effects, the Operator must use engineering judgment to determine when to activate and deactivate these ramp meters.

Controlling Ramp Meters
(continued)

Existing Ramp Meters

(The diamond sign (◊) in front of the ramp meter locations indicates that a particular ramp meter has an HOV bypass--HOVs are not metered.)

AM Peak Ramp Meters in Operation :

Interstate 5

◊ 164th St. SW - SB
Swamp Cr (NB I-405) - SB
◊ Swamp Cr (SB SR-525) - SB
◊ NB 44th Ave W - SB
SB 44th Ave W - SB
◊ 220th St. SW - SB
◊ 236th St. SW - SB
◊ 244th St. SW - SB
◊ EB NE 205th St. - SB (2 meters)
◊ NE 175th St. - SB
◊ Metro Base - SB (◊ only)
◊ NE 130th St. - SB
NE 110th St. - SB
◊ NE 107th St. - SB
◊ NE 85th St. - SB
NE Ravenna Blvd. - SB (◊ exp)
NE 50th St. - SB
◊ NE 45th St. - SB
Boylston Ave. - SB
4th Ave. - SB
◊ Michigan St. - NB (2 meters)
◊ Columbian Way - NB
4th Ave. - NB
Dearborn St. - NB
University St. - NB (2 meters)
◊ Olive Way - NB (Not Active)

Interstate 90

◊ Front St - WB (2 meters)
◊ NB SR 900 - WB
◊ SB SR 900 - WB
◊ W. Lk Sammamish Pkwy - WB
◊ Eastgate - WB (2 meters)
◊ Richards Rd - WB (2 meters)
◊ Bellevue Way - WB
◊ E Mercer Way - WB
Island Crest Way - WB
76th Ave SE - WB
◊ W Mercer Way - WB

Interstate 405

◊ NE 160th St. - SB
◊ EB NE 124th St. - SB (2 meters)
WB NE 124th St. - SB
◊ NE 116th St. - SB (2 meters)
◊ EB NE 85th St. - SB
WB NE 85th St. - SB
◊ NE 72nd St. - SB
NE 8th St. - SB (2 meters)
◊ NE 4th St. - SB
◊ SE 8th St. - SB
◊ SE 8th St. - NB
◊ NE 4th St. - NB
◊ EB NE 8th St. - NB
◊ WB NE 8th St. - NB

Controlling Ramp Meters
(continued)

PM Peak Ramp Meters in operation:

Interstate 5:

◊ Michigan St. - NB (2 meters)
◊ Columbian Way - NB
4th Ave. - NB
Dearborn St. - NB
Universtiy St. - NB (2 meters)
◊ Olive Way - NB
◊ Pike - NB (◊ only)
◊ Bus Tunnel - NB (◊ only)
◊ NE 45th St. - NB
◊ NE 50th St. - NB
NE 70th St. - NB
◊ NE 80th St. - NB
◊ Northgate - NB (2 meters)
◊ NE 145th St. - NB
◊ NE 175th St - NB
◊ SR 104 - NB
◊ 220th St. SW - NB (2 meters)
◊ NE 130th St. - SB
NE 110th St. - SB
◊ NE 107th St. - SB
◊ NE 85th St. - SB
Ravenna Blvd. - SB
NE 50th St. - SB
◊ NE 45th St. - SB
Boylston Ave. - SB
4th Ave. - SB
Columbian Way - SB

Interstate 90:

◊ NB Rainier Ave S - EB
◊ SB Rainier Ave S - EB
Island Crest Way - EB
◊ E. Mercer Way - EB

State Route 520:

◊ Montlake Blvd. - EB
Lake Washington Blvd. - EB

Interstate 405

NE 8th St. - SB (2 meters)
◊ NE 4th St. - SB
◊ SE 8th St. - SB
◊ SE 8th St. - NB
◊ NE 4th St. - NB
◊ EB NE 8th St. - NB
◊ WB NE 8th St. - NB
◊ NE 72nd St. - NB (2 meters)
EB NE 85th St. - NB
◊ WB NE 85th St. - NB
Totem Lake - NB
Totem Lake (EB NE 124th)-NB
Totem Lake (WB NE 124th)-NB
◊ NE 160th St. - NB

Weekend Ramp Meters in Operation:

Interstate 5

◊ NE 130th St. - SB
NE 110th St. - SB
◊ NE 107th St. - SB
◊ NE 85th St. - SB
Ravenna Blvd. - SB
NE 50th St. - SB
◊ NE 45th St. - SB

Controlling Ramp Meters
(continued)

Obtaining Control of Ramp Meters
The Lower Status Bar contains the **RMP** button and the **LUP** button. Left-clicking on these buttons opens the *Group Meter Status Window* and the *Cabinet Selection Window*, respectively. Right-clicking on the **RMP** button opens the *Meter Tuning Window*.

Checking Ramp Meter Status and Activating/Deactivating Meters

1. Click on the **RMP** button in the lower status bar at the bottom of the screen. The *Group Meter Status* window will appear on the screen. The FLOW Operator may then control and check the status of the meters.

2. Activating/Deactivating Meters:
    a. Under the **IDENTIFICATION** column, highlight the desired meters.

    b. To activate meters, click on the box next to *Activate Sel. Meters*. Within 20 seconds, the **STAT** column should indicate an "**L**" for local metering and a metering rate should be indicated under the **RATE** column.

    c. To deactivate meters, click on the box next to *Deactivate Sel. Meters*. Within 20 seconds, the **STAT** column should indicate "**OFF**" for ramp meter status. If meters are not deactivating as commanded, it may be necessary to implement the police switch to immediately turn them off. See the **Police Switch Guidelines** section below for instructions.

3. The button next to *Deselect All* will indicate how many meters have been selected. (NOTE: Check that the number of meters selected is correct before you activate or deactivate.)

Controlling Ramp Meters
(continued)

Police Switch Guidelines

When an operator has selected to deactivate a certain meter, the following process takes place. First, the metering rate is increased to its **RMAX** value in an attempt to alleviate any queue. The meter will not begin the shut down process until its rate is not governed by the Queue Adjust or Queue Advance algorithms. Once this requirement is met, the meter waits for a 10 second gap on the demand loop, in which it receives no hits. After six seconds, if the 10 second gap has not been sensed, the required gap is reduced by 0.1 second. So for the next six seconds, the meter will wait for a gap of 9.9 seconds before it will shut off. This iterative process will continue automatically until an adequate gap is sensed and the meter can shut off. When the meter finally shuts off, it will remain green for one minute, and then turn completely off.

If an adequate gap is never attained to allow the meter to shut off, it may be necessary to manually shut it off. This need would arise when the mainline is flowing smoothly or the time of day does not permit it to be on. Before the police switch is implemented, the operator must first select to deactivate the meter. Then, the meter's **SINGLE STAT** window must be then be accessed by clicking the **EDIT** button. In the **PARAMETERS** window, near the bottom of the list, each metering location has a **POLICE SWITCH** parameter. Highlight it, enable it using the **METER TUNING** button and select **SAVE SETTINGS**. Immediately, the meter(s) at the corresponding location should go green and remain green. At this point, the **GROUP STAT** window will show the meter's status to be **OFF**. It is imperative that the operator **DISABLE** the police switch immediately. The meter will remain green until the police switch is disabled. At this point, the meter will remain off because it has already received the off command. It is highly advisable to keep track of meters with enabled police switches, and to verify all transactions with the cameras.

Manual Adjustments of Metering Rates
There will be times when the computer algorithm is inadequate to make proper adjustments for a given traffic condition due to construction of the ramp or malfunction of loops. It is therefore necessary to make manual adjustments to the parameters of the metering rate.

To adjust the metering rate parameters,

1. Click on the **RMP** button to access the *Group Meter Status* window.

2. Click on a specific ramp meter that needs to be adjusted.

3. Click on the **EDIT** button to access the *Meter Tuning* window.

4. On the right side of the *Meter Tuning* window is the *Ramp Meter ID* column and the parameters with their corresponding values.

5. Highlight the parameter to be adjusted and use the new value box to select a new value for that parameter. Once the new value is selected, click on the parameter again to set the new value into place. FLOW operators may adjust MAX and MIN parameters only. If a need arises to adjust additional parameters, consult with a FLOW engineer.

There is a Ramp Meter Checklist designed to assist the operator to keep track of the meter status and parameter adjustments. This checklist may be found in the checklist collection.

Remember to always restore the parameters to the original values after peak congestion is over. Ramp meters should be restored to the following values after the peak hour:

TYPE OF RAMP	MIN	MAX
Single Lane meters	7	18
Dual Lane sharing the same meter head [1]	5	16
Two single lane meters at the same location [2]	7	18
Three lane meters	5	16
Front Street and Island Crest Way on I-90	5	13

[1] An example of this situation is the meter at NE 116th St to SB I-405
[2] An example of this is the situation at 4th Ave/ S Dearborn St to SB I-5

Sending Messages through VAX

Sending Messages to the Media and Other TMS Users

The FLOW Operator is responsible for sending messages to our media WinFLOW software users (i.e. traffic reporters at radio or TV stations) and the internet. These messages should contain information of traffic-related incidents gathered from different sources available to us, i.e. the incident may have been observed from CCTV, reported by the Radio Operators, or from the WSP's CAD Log.

Anytime you can visually verify an incident which has a noticeable and enduring traffic impact you should send a text message describing the incident. Also send a message when the incident status changes, for example, a blocking accident becomes a non-blocking incident that is cleared off to the shoulder.

IMPORTANT: Here are a few guidelines to always keep in mind:

- Keep in mind that the TSMC personnel are restricted from sending any non-traffic-related details of an incident(s).
- Never include fatalities or the medical status of injured individuals in the messages.
- Do not report any non-traffic related incidents such as TSP (traffic stop) or ROB (robbery) in the messages.
- In most cases, hit-and-run accidents are "standing by" somewhere, and are not affecting traffic whatsoever, and should not be reported. If there's any doubt, check the inquiry page (move cursor to the incident line and press **F5**).
- We are not responsible for reporting incidents off the state highways and interstate freeways. These are listed on CAD as "NA" in the "HIWAY" column. BUT, every now and then an incident occurs on a busy city street, and it's good to report it, so keep your eyes open.

Sending Messages through VAX
(continued)

Accessing the TMS Addressable Message Window
There are two ways to access the Addressable Message Window:

1. Right-click on the **OPL** button at the Lower Status Bar. This button will directly open the *TMS Addressable Message* window.

2. Left-click on the **OPL** button at the Lower Status Bar. This button will open the *TMS Log/Report Selection* window. Then, click on the **MESSAGE** button to open the *TMS Addressable Message* window.

Preparing a Message
Note: The FLOW Operator may report more than one incident in a message.

1. Select which type of message you are sending out by clicking on the corresponding button. The types of messages are bulletin, incident, or addressable message.

2. The message to be sent *must* be typed in the **MESSAGE** box and must be short, precise, and clear. Use ALL CAPS. (See the "Standard Message Format:" on p. 56) Verify the **SAVE TO DISC** box at the bottom of the screen is selected.

3. After the text message is reviewed for its clarity and preciseness with appropriate information details, send it by clicking the **ACCEPT** button. NOTE: At the beginning of your shift and at other times (but not every time), you should route your first message. Be sure to review "Routing the Message" on p. 55, to see if you need to route it before sending it.

Sending Messages through VAX
(continued)

Routing the Message
There are times when the TSMC will want to send specific messages to a selected group of our VAX on-line or remote users.

With normal operations, the routing list does not need to be checked, unless some change has occurred, such as:

- This is the first message of the shift.
- The TMS has been restarted.
- The VAX has been restarted.
- The TMS on the PC has been halted and/or the PC has been rebooted.
- You want to add or delete someone from the address list.

The following procedure explains how the Operator can route a message to the media:

1. When you have created an acceptable message, click on the **ROUTE** button in the *TMS Addressable Message* window. A list of users who are logged-on to the VAX will come up in the *Online Users* box.

2. Select the following users, if they're listed:
   - SERVER2
   - OTHER USERS CLASSIFIED AS MEDIA

   You may select an entire group by double clicking on any of the users within the desired group. All users in the same group will highlight.

3. Make sure that the **Addressable Message** button is selected.

4. Click on the **ACCEPT** button.

NOTE: It is advisable to frequently check your routing list to ensure the appropriate users are still selected.

Sending Messages through VAX

(continued)

The standard format for creating a message reporting an accident or incident is discussed below. Messages sent from the TSMC to remote map users need to be consistent in format and content. Since it is crucial that the media is provided with accurate, unambiguous, and timely information, the following format has been adopted and effective for use in all text messages. Consistency is a **MUST**.

Standard Message Format

1. General Guidelines

- Arrange messages in the order that they have been received.
- Do not send a message until the incident has been confirmed by CCTV (unless there are four or more incidents to check all at once).
- Mark new incidents and updates with an asterisk.
- When incidents have been cleared, leave them up for at least two minutes.
- Use proper abbreviations.
- Send messages about incidents which are reported on CAD but cannot be located with CCTV (to inform the media).

2. Initial Report

Arrange the initial messages in the following order:

- Roadway (I-5, SR520)
- Direction (SB, WB)
- Location (NE 130TH, JS BREWERY)
- Description of incident (ROLLOVER, 2C, SEMI, INJ)
- Type of incident (DAV, ACC)
- Lanes involved (PART BLKG HOV, BLKG L1/2, RS)
- Source of information (CAD, CCTV, RADIO, WSP)
- Time (0628, 1450)

For instance: * I-405 NB JN NE 85TH 2C/TK INJ ACC BLKG HOV/L2 CCTV 1645

Sending Messages through VAX
(continued)

3. Making Updates

Make all updates at the beginning of the message and cite the source and time. It is necessary to make an update when any of the following occur:

- *Location is updated:*
  SR169 JN AQUABARN 3C INJ ACC BLKG RL CAD 1039
  becomes:
  * UPDATE CAD 1043: SR169 1/S AQUABARN 3C INJ ACC BLKG RL CAD 1039

- *WSP, aid, or DOT arrives on scene:*
  * WSP ONSCENE CAD 1544: I-5 SB INTERURBAN DAV BLKG L3 CAD 1533

- *Aid is enroute:*
  * AID ENROUTE CAD 1313: SR520 WB JE TOLL PLAZA INJ ACC 4C BLKG L1/2 CCTV 1306

- *Lanes are cleared, or additional lanes are blocked (remove old lane references):*
  I-90 WB JW SR900 INJ ACC BLKG L1 CCTV 0715
  becomes:
  * AID ONSCENE, L1/2 BLKD CCTV 0755: I-90 WB JW SR900 INJ ACC BLKG CCTV 0715

- *When an incident reported by CAD is confirmed with CCTV:*
  * CCTV 1235: SR520 EB @ I-405 DAV BLKG L1 CAD 1229

- *When an incident cannot be located:*
  * UNABLE TO LOCATE W/ CCTV: I-5 NB NGATE DAV BLKG HOV CAD 0803

- *When the incident is cleared:*
  * CLEARED CAD 1450: SR18 EB PEASLEY CANYON ACC BLKG L1 CAD 1347

(see the following page for appropriate abbreviations used by WSP)

Abbreviations Used in the Messages

You may choose to spell words out entirely in the text message, but if you do decide to abbreviate, please use the following list. (The media was informed of and understands the following abbreviations and their meanings. Please do not make up your own!)

Abbreviation	Meaning
ACC	accident
BLKG/BLK	blocking the roadway
BOE FLD	Boeing Field
CAD	computer aided dispatch
CBD	Central Business District
CCTV	CCTV cameras
CD	collector-distributor
CL	County Line or Center Lane
CLEARED	Incident is cleared. Do not abbreviate this term!!!
CONV CTR	Washington State Convention & Trade Center
DAV	disabled vehicle
DEB	debris
DET	Details
ECB	East Channel Bridge (I-90)
EHR	East Highrise on the bridges
EXP/EXP LNS	express lanes
GP	Gore Point
HOV	High-occupancy Vehicle Lane or Carpool Lane
INJ ACC	accident involving personal injuries
IRT	WSDOT's Incident Response Team
LL	left lane
MBT	Mount Baker Tunnel
MC	Motorcycle
MH	Motorhome
MIL	Mercer Island Lid
ML	Mainline
MTLK	Montlake Blvd
NGATE	Northgate
PART	Partially (as in partially blocking)
PC	Passenger Car
PD	Property Damage Only (No injuries)
PED	pedestrian
PI	Injury Accident
PU	Pickup

Sending Messages through VAX
(continued)

RADIO	DOT Radio Operators
RDWY	roadway
RL	left side/shoulder
RS	right side/shoulder
SCB	Ship Canal Bridge
SCTR	Southcenter Mall
SCURVES	The Renton S-Curves on I-405
SR	State Route (State Highway)
TK	Truck
TSMC	Traffic Systems Management Center
UNK	Unknown or injuries unknown
WHR	West Highrise on the bridges
WSP	Washington State Patrol
L1-L4	lanes 1 through 4 (the largest number being the inside lane closest to the median)
1C, 2C, 3C, ...	number of cars involved
NB, SB, EB, WB	northbound, southbound, eastbound, westbound
JN, JS, JE, JW	just north, just south, just east, just west

Guidelines for Variable Message Sign Use

Introduction
The Variable Message Sign (VMS) system is part of WSDOT's Traffic Management System and is operated by staff at the TSMC. The primary function of the VMS system is to provide drivers with information on unusual traffic conditions. However, the system may also be used for other traffic-related items on a limited basis.

Responsibility for Operation of VMS System
WSDOT's Traffic Systems Management Center is responsible for creating, scheduling, coordinating, and displaying messages through the VMS system. TSMC individuals and groups that may be individually or jointly responsible for these items include Flow Operators, Flow Engineers, Seattle Radio, and Tunnel Operators. The Freeway Operations Engineer oversees all VMS operations and should be contacted at 440-4463 with questions regarding sign operations.

Traffic Conditions for VMS Usage
The manner in which the VMS system is used will vary depending on the nature of the associated traffic condition. Various categories of traffic conditions are described below, along with specific information on the appropriate use of the VMS system.

Traffic Restrictions
In this context, traffic restrictions refer to the prohibition of vehicles from using a roadway. These restrictions may be planned or unplanned, short or long duration, and specific or general. Requests for traffic restriction messages generally come from WSDOT or local agency maintenance offices.

Bridge Drawspan Openings
- Usually SR 520 Evergreen Pt. or SR 104 Hood Canal openings for boat traffic or weather conditions

Flammable Restrictions
- Enacted when SR 5 Convention Center, SR 90 Mt. Baker Tunnel, or SR 90 Mercer Island Lid fire control systems are inoperative

Weight, Height, Width Restrictions
- Restriction would be initiated by a maintenance office
- VMS use only appropriate in emergency situations (e.g. earthquake damaged bridge), not long term use (e.g. construction-related height restriction)

Incidents
The use of the VMS system for incident information requires close monitoring by TSMC personnel. The use of the system for incident information has the greatest potential for increasing or decreasing WSDOT's VMS credibility. If we are accurate and timely with our VMS usage, we increase our credibility, and vice versa.

Disabled Vehicles and Accidents
- VMS used only when incident is visually confirmed or when requested by IRT or WSP
- Communication with IRT or WSP should be through Seattle Radio
- Messages are to be removed once the incident is no longer blocking
- Messages describe the general nature of the situation (e.g. Accident At Mercer) and traffic impacts (e.g. Congestion from Northgate to Ship Canal Bridge)

Guidelines for Variable Message Sign Use
(continued)

- Specific alternate routes included only if alternate is another State Route or with approval from route operator (e.g. City of Seattle)
- Messages describing severe incident-related traffic conditions may be continued at the discretion of the operator (e.g. Congestion from Northgate to Ship Canal Bridge Due to Earlier Accident), however, VMS should not be used to describe recurrent congestion (i.e. normal day to day backups)

Unusual Road and Driving Conditions

- VMS should not be used to display weather conditions nor expected driving conditions (e.g. icy roadway under near-freezing temperatures)

Special Events

- VMS may be used to manage traffic destined for high impact special events (e.g. Seahawks game at Husky stadium)
- Special event related VMS should be coordinated prior to event
- Message information limited to description of event-related traffic impacts and their duration

Construction and Maintenance Information

The VMS system can be an effective *supplement* to construction traffic control. The system should not be used to make up for a lack of traffic control planning. Rather, the system should be used when construction activities require drivers to perform complex maneuvers, for major impacts, or in cases where traditional signing methods are impractical.

WSDOT

- VMS system may be used to display information on lane, ramp, or road closures; detours; and advanced notice for high impact closures
- Construction-related VMS use should be coordinated with Construction Traffic Coordination Office (CTCO)
- Message information limited to the nature of the construction impact and the effect on drivers
  Impacts include: Left Lane Closed; Exit 167 Closed
  Driver effects include: Use Caution; Use Alternate Route; Follow Detour (only if signed detour provided); Expect Delays (no specific durations)

Non-WSDOT

- VMS use should be coordinated with CTCO
- Establish a method of maintaining communication with outside agency
- Messages follow same guidelines as above

Public Service Announcements

The VMS system *should not* be used for Public Service Announcements. Having said that, the system may be used for PSAs with hesitation. The PSA should contain traffic-related information of sufficient importance and benefit to warrant the related time and money expenditures.

Commuter Info Line

- VMS may be used to display phone number for WSDOT Commuter Info Line
- Benefits drivers by informing them of a resource for commuting information
- Message displayed on a rotating schedule, no beacons

Guidelines for Variable Message Sign Use
(continued)

Oil Smart Wednesdays
- Messages displayed on consecutive Wednesdays in March
- Intended to benefit transportation system by encouraging drivers to use alternate modes of transportation
- Messages displayed on selected signs, no beacons

VMS System Priorities
- WSDOT's first priority is safety. Related to the VMS system, this priority means that any messages that are directly related to safety are given first priority for display. Two notable examples of this type of message are an emergency tunnel closure and a flammable restriction.
- The second VMS system priority is the display of road or ramp closures, regardless of the reason for the closures (accident, construction, etc.). This information has second highest priority because closures directly impact the route a driver would take.
- The third priority is information on minor traffic impacts. Minor traffic impacts include construction lane closures, blocking incidents, and delay information.
- The last priority for the VMS system is PSAs. These messages do not immediately affect drivers, and therefore are not critical to the efficient operation of the transportation system.

Procedure for Changing these Guidelines
These guidelines have been, and will continue to be, developed over time. Factors such as changing areas of responsibility, new VMS technologies, and changing personnel and philosophies will necessitate the revision of these guidelines. Any revisions should be well thought out and discussed prior to implementation. Upon implementation, all parties involved with operation of the VMS system should be notified of the revision.
As a minimum, these guidelines should be reviewed annually to identify any weaknesses or ambiguities.

Controlling Variable Message Signs (VMS)

Overview
See the "VMS Location Map" at the end of this chapter (also inside the front cover).

VMS Policy
The VMSs associated with the express lanes and tunnels give priority to their respective missions. When one of these VMSs is needed, the following steps must be taken:

For express lanes - contact FLOW engineer.
For tunnels - inform respective tunnel operator (MBT 587-5071 / MIL 587-5087).

Make sure to let the replacement FLOW Operator or radio operator know of any signs on for incidents or special events.

VMS Configurations
Not all VMSs are the same size. There are 7 sizes of VMSs that are used for freeway applications:

1 line × 18 letters
2 lines × 15 letters
2 lines × 17 letters
2 lines × 18 letters
2 lines × 21 letters
2 lines × 22 letters
3 lines × 8 letters

In general, VMS letters are typically formed by pixels (dots or flip disks). The letters are arranged in a 5-pixels-wide by 7-pixels-tall module and are typically 18 inches tall for mainline freeway application, which will give a minimum readability distance of 800 feet.

Controlling Variable Message Signs (VMS)
(continued)

Some of the VMSs are *continuous* dot matrix and some are *fixed* font. ***Continuous*** dot matrix VMSs does not have a fixed letter width. The width of a character is actually the proportional font of the characters. Therefore this type of VMS may give us less or more letter capacity on each line than normal. The FLOW Operator must use caution when creating a message on these signs to avoid letters being cut off, especially with 3 x 8 signs, which may only display 7 characters per line.

A ***fixed*** font VMS simply means that each letter is made up of a 5×7 pixel module with a divider between each module. Each letter displayed on this sign will appear in uniform width constraint and each line will have a known letter capacity (8, 15, 21, or 22 letters).

The VMSs will display one-, two- or three-phased messages. Multiple phases are used because the VMS is not large enough to display an entire message in one phase or to draw attention to the sign. The multi-phase option of the VMSs allows a complete message to be delivered to motorists by splitting the message into two or three parts. One message phase typically lasts between 2 and 3 seconds. A car traveling 60 mph has about 9 seconds to read the message on the VMS (if the motorist starts reading at 800 feet from the VMS), which gives the motorist time to read a two- or three-phased message under ideal conditions.

"Canned" messages have been created to minimize the length of the VMS message lists and to expedite the process of displaying messages that inform motorists of blocking incidents. These messages are shown in the VMS message list box and are designated with an asterisk (*). The FLOW operator should use these messages if possible, altering the message to address the specific incident most appropriately. However, the contents of a "canned" message should always maintain agreement with the message title. For instance, a message entitled, "***STALL 520**" should always describe a stalled vehicle (not an accident) on SR520 (not I-5, I-405, etc.). Within the restraints of the title, the FLOW operator is encouraged to provide additional details that would assist the public. "Canned" messages are for the benefit of all operators, so they should never be deleted.

VMS Problems Sheet

Occasionally, a VMS will malfunction or require maintenance work. Until the problems are fixed, FLOW operators must strive to create messages that work around these problems. A visual **VMS PROBLEMS SHEET** is maintained and provided to FLOW operators to inform them of existing problems. This sheet should always be referenced before a message is displayed, especially during hours of darkness when VMS backlights are critical.

Controlling Variable Message Signs (VMS)

(continued)

VMS ID #	Location	Milepost	Letter Capacity	Control (TSMC or Manual)	Continuous or Fixed
VMS-008	I-5 NB @ SR-161	141.37	3 × 8	TSMC	continuous
VMS-021	I-5 SB @ S 304th St.	144.90	3 × 8	TSMC	continuous
VMS-055	I-5 NB @ S 184th St.	152.70	3 × 8	TSMC	fixed
VMS-071	I-5 SB @ S 142nd St.	155.55	3 × 8	TSMC	fixed
VMS-097	I-5 NB @ S. Holgate St.	163.90	2 × 22	TSMC	fixed
VMS-106	I-5 NB/REV @ Cherry St	165.40	2 × 18	Manual	continuous
VMS-107	I-5 NB/REV @ Columbia St.	165.45	2 × 18	Manual	continuous
VMS-115	I-5 NB/REV @ 9th Ave.	165.90	2 × 18	Manual	continuous
VMS-116	I-5 NB/REV @ Pike St.	165.90	2 × 18	Manual	continuous
VMS-118	I-5 SB @ Denny Way	166.35	2 × 22	TSMC	fixed
VMS-121	I-5 NB/REV @ Mercer St.	166.75	2 x 18	Manual	continuous
VMS-124	I-5 NB @ Lakeview Blvd.	167.57	2 × 22	TSMC	fixed
VMS-130	I-5 SB @ Ship Canal Bridge	168.74	2 × 21	TSMC	fixed
VMS-141	I-5 SB/REV @ Ravenna	170.02	2 × 17	TSMC	continuous
VMS-154	I-5 SB/REV @ NE 103rd St.	172.40	2 × 17	TSMC, Manual	continuous
VMS-155	I-5 SB/REV @ 1st Ave. NE	172.41	2 × 17	TSMC, Manual	continuous
VMS-156	I-5 SB/REV @ NE 107th St	172.66	2 × 15	TSMC, Manual	fixed
VMS-158	I-5 SB/REV @ NE 112th St.	172.85	2 × 15	TSMC, Manual	fixed
VMS-161	I-5 SB/REV @ NE 120th St.	173.33	2 × 15	TSMC, Manual	fixed
VMS-164	I-5 SB/REV @ NE 130th St.	173.85	2 × 15	TSMC, Manual	fixed
VMS-206	I-5 SB @ 170th St. SW	183.70	2 x 22	TSMC	fixed
VMS-229	I-5 NB @ 42nd St. SE	192.40	3 x 8	TSMC	fixed
VMS-247	I-5 SB @ 66th St. NE	199.68	3 x 8	TSMC	fixed
VMS-507	SR-520 WB @ Lake Wash. Blvd.	1.60	2 x 18	TSMC	fixed
VMS-596	SR-518 EB @ 37th Pl. S	2.85	3 × 8	TSMC	fixed
VMS-335	SR-167 NB @ SW 39th St.	24.82	3 × 8	TSMC	fixed
VMS-532	SR-520 WB @ 124th Ave. NE	7.30	2 x 22	TSMC	fixed
VMS-658	I-405 NB @ SE 57th St.	8.53	2 × 22	TSMC	fixed
VMS-678	I-405 SB @ SE 20th St.	11.96	2 × 22	TSMC	fixed
VMS-694	I-405 NB @ NE 10th St.	14.00	2 × 21	TSMC	fixed
VMS-708	I-405 SB @ NE 53rd St.	16.50	2 × 21	TSMC	fixed
VMS-803	I-90 EB @ Airport Way S.	(-0.13)	2 × 17	TSMC, Manual	continuous
VMS-821	I-90 EB/REV @ 19th Ave.	0.66	2 × 22	TSMC	fixed
VMS-823	I-90 EB @ Rainier Ave S	0.72	2 × 22	TSMC, Manual-tunnel	fixed
VMS-852	I-90 WB @ W. Hirise	1.74	1 × 22	TSMC, Manual-tunnel	fixed
VMS-854	I-90 WB/REV @ W. Hirise	1.86	1 × 22	TSMC	fixed
VMS-863	I-90 EB/REV @ 60th Ave SE	3.39	2 × 22	TSMC, Manual-tunnel	fixed
VMS-864	I-90 EB @ 61st Ave. SE	3.39	2 × 22	TSMC	fixed
VMS-876	I-90 WB/REV @ 76th Ave SE	4.19	2 × 22	TSMC, Manual-tunnel	fixed
VMS-877	I-90 WB @ 76th Ave SE	4.19	2 × 22	TSMC, Manual-tunnel	fixed
VMS-881	I-90 WB/REV @ Is. Cr. Wy.	4.61	2 × 17	TSMC, Manual	continuous
VMS-893	I-90 WB/REV @ Bellevue Way	6.58	2 × 17	TSMC, Manual	continuous
VMS-905	I-90 WB @ 142nd Ave SE	11.03	2 × 22	TSMC	fixed
VMS-990	I-90 WB @ SR-18	26.30	3 × 8	TSMC	continuous

Controllable by VAX (TSMC)
Controlled in the field by the express lane/center roadway operators.

Controlling Variable Message Signs (VMS)

(continued)

Accessing the VMS Status and VMS Control/Edit Windows

The *VMS Status* window can be accessed by left-clicking the **VMS** button in the Lower Status Bar at the bottom of the TMS monitor. The *VMS Control/Edit* window can be accessed by right-clicking the **VMS** button.

Creating a New Message (NOTE: Many symbols display differently on the VMS than on the screen when they are entered into a message. If you are using symbols in a message, make sure to *check the guide* in the front flap of this binder!)

1. Click on the **VMS** button in the Lower Status Bar. The *VMS STATUS* window will come up on the monitor screen.**

2. Click on the **CONTROL** button to get into the *VMS CONTROL/EDIT* window.**

3. Select a VMS by highlighting it from the *Item List* box and clicking the **CURRENT** button.

4. Click on the **MESSAGE** button to get into the *VMS MESSAGE/EDIT* window.

5. Click on the **NEW** button in the VMS window and enter the message title in the **CURRENT MESSAGE** box.

6. Tab or click into the **TEXT** boxes. Enter the text message in the TEXT boxes, then click **AUTO-CENTER** while the cursor is on each line. Compare the message with the **VMS PROBLEMS** sheet and ensure that your message accommodates the designated problems.

7. Enter phase time for each phase. To the left of each message box, there is a small box for the phase time entry in tenths of a second (i.e. 020 = 2.0 seconds, 025 = 2.5 seconds, etc.). (**Note:** The computer system will not accept a single-phase message with a phase time, since there is no need; nor will it accept a multi-phase message with any phase time missing.) Assign phase times that are multiples of 0.5 seconds only. The entire message should take a total of 4 seconds or less to completely display.

8. Click on **BACKLIGHT** for internal illumination and **BEACONS** for flashing beacons, as required by the message.

9. To test the message's effectiveness, select the **ANIMATE MSG** box in the upper right corner. The message will display in the top text box.

10. Click the **ACCEPT** button to **save this message before displaying it.**

3**Steps 1 and 2 can both be accomplished by clicking the right mouse button on the VMS button on the Lower Status Bar.

Controlling Variable Message Signs (VMS)
(continued)

Displaying an Existing Message

1. Access the *VMS STATUS* window by clicking on the VMS button located in the Lower Status Bar.**

2. Click on the **CONTROL** button to get into the *VMS CONTROL/EDIT* window.**

3. Select a VMS by highlighting it from the *Item List* box and clicking the **CURRENT** button.

4. Click on the **MESSAGE** button located in the *Other Windows* box. The *VMS MESSAGE EDIT* window will appear.

5. Scroll through the *Message List*. Highlight the desired message to put on the selected VMS. Always verify the contents of the message accommodate the problems shown on the **VMS PROBLEMS** sheet. If there are discrepancies, make appropriate changes, accept it and re-check it before displaying. Click **OK** on the warning message if it appears.

6. Click on the **DISPLAY** button to display the message on the selected VMS.

7. Click on the **CONTROL** button located in the *Other Windows* box to return to the *VMS CONTROL/EDIT* window.

8. In the *VMS CONTROL/EDIT* window, click on the **STATUS** button to get into the *VMS STATUS* window. Check the message being displayed on the VMS. (**Note:** Click on the **ANIMATE MESSAGE** box for multi-phase messages.)

Steps 1 and 2 can both be accomplished by clicking the right mouse button on the **VMS button on the Lower Status Bar.

Blanking a Single VMS Display

1. Follow steps 1 - 3 above.

2. Click on the **BLANK** button located in the *Sign Control* box.

3. To check on the status of a VMS click on the **STATUS** button. This will take you back to the *VMS STATUS* window.

NOTE: It is often appropriate to display a "generic" message (such as an advertisement for the DOT-HIWY line) immediately following a message that had previously described a blocking incident. The purpose of this is to avoid alarming motorists who may be reading a message when it is suddenly blanked.

Controlling Variable Message Signs (VMS)
(continued)

Cluster Messages
A cluster is defined as a group of VMSs and their corresponding messages in a list. The cluster function will activate pre-determined messages on the pre-assigned VMSs.

Creating a New Cluster
(NOTE: In order to create a cluster, you must first be sure that the desired message to be displayed by each VMS is already created and stored in the memory of the appropriate VMS--see "Creating a New Message"). If the messages are already created and stored with the appropriate VMSs, then do the following to create a cluster:

1. Access the *VMS STATUS* window by clicking on the VMS button located in the Lower Status Bar.
2. Click on the **CONTROL** button to get into the *VMS CONTROL/EDIT* window.
3. Select a VMS by highlighting it from the *Item List* box and clicking the **CURRENT** button.
4. Click on the **CLUSTER** button.
5. Click on the **NEW** to create a new cluster.
6. Enter the name of the cluster in the *Current Item* box.
7. Select a VMS from the *Item List box* and Click on the **ADD** button.
8. Select the corresponding message for this VMS and click on the **ADD** button.
9. Repeat Steps 7 and 8 until all the signs and their corresponding messages in the cluster have been added.
10. Click on the **ACCEPT** button to store the new cluster.

Deleting a VMS from a Cluster
1. After step #4 from above, select the cluster to delete from and click on the **CURRENT** button.
2. Select the VMS in the cluster to be deleted, then click on the **DELETE** button.

Adding a VMS to a Cluster
1. Select the desired cluster from the list and hit the **CURRENT** button.
2. Click the on the **SIGN** button and select the VMS.
3. Click **ADD** after selecting the desired sign.
4. Select desired message and then hit **ACCEPT.**

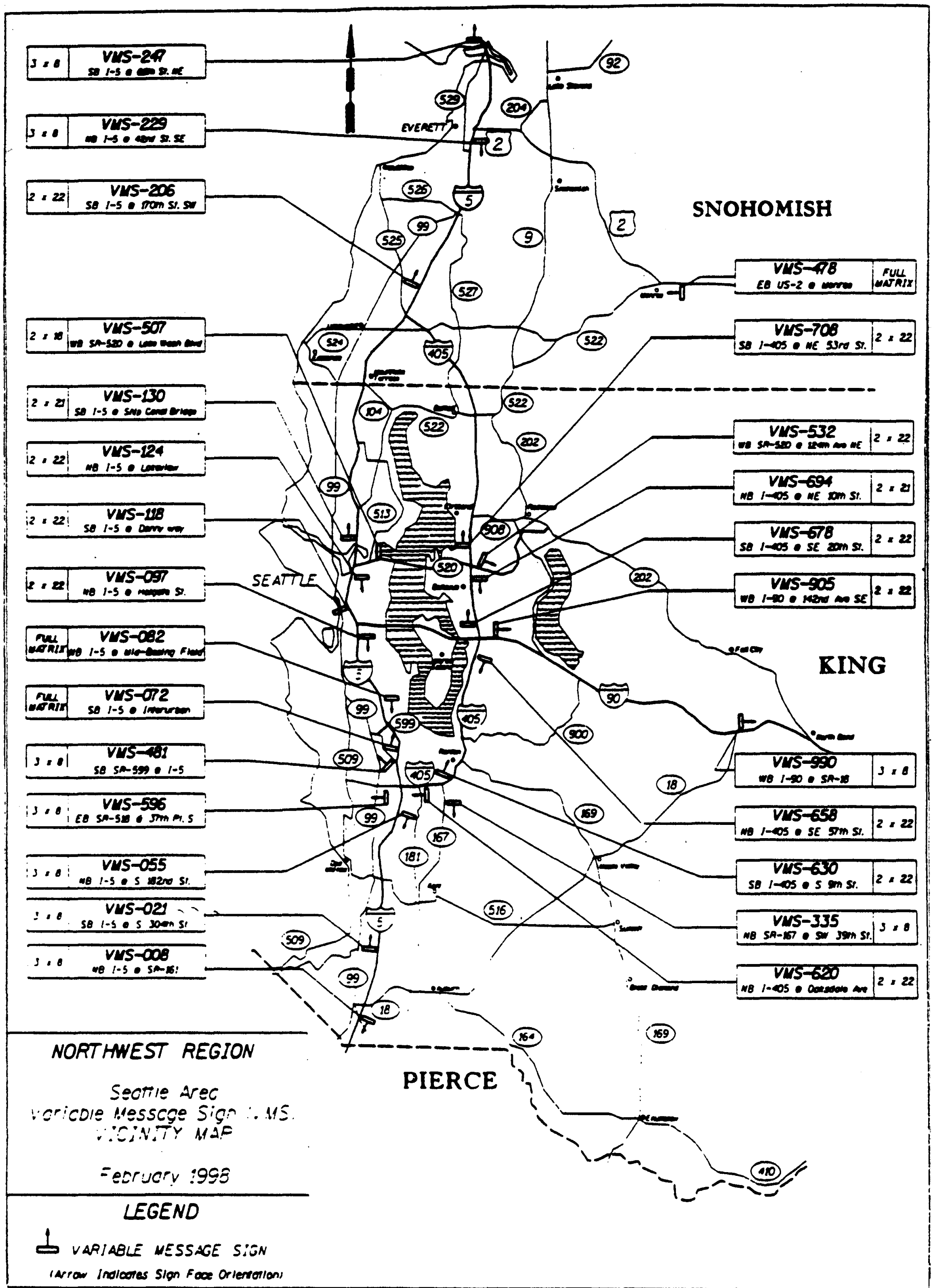
Controlling Variable Message Signs (VMS)
(continued)

Executing a Cluster

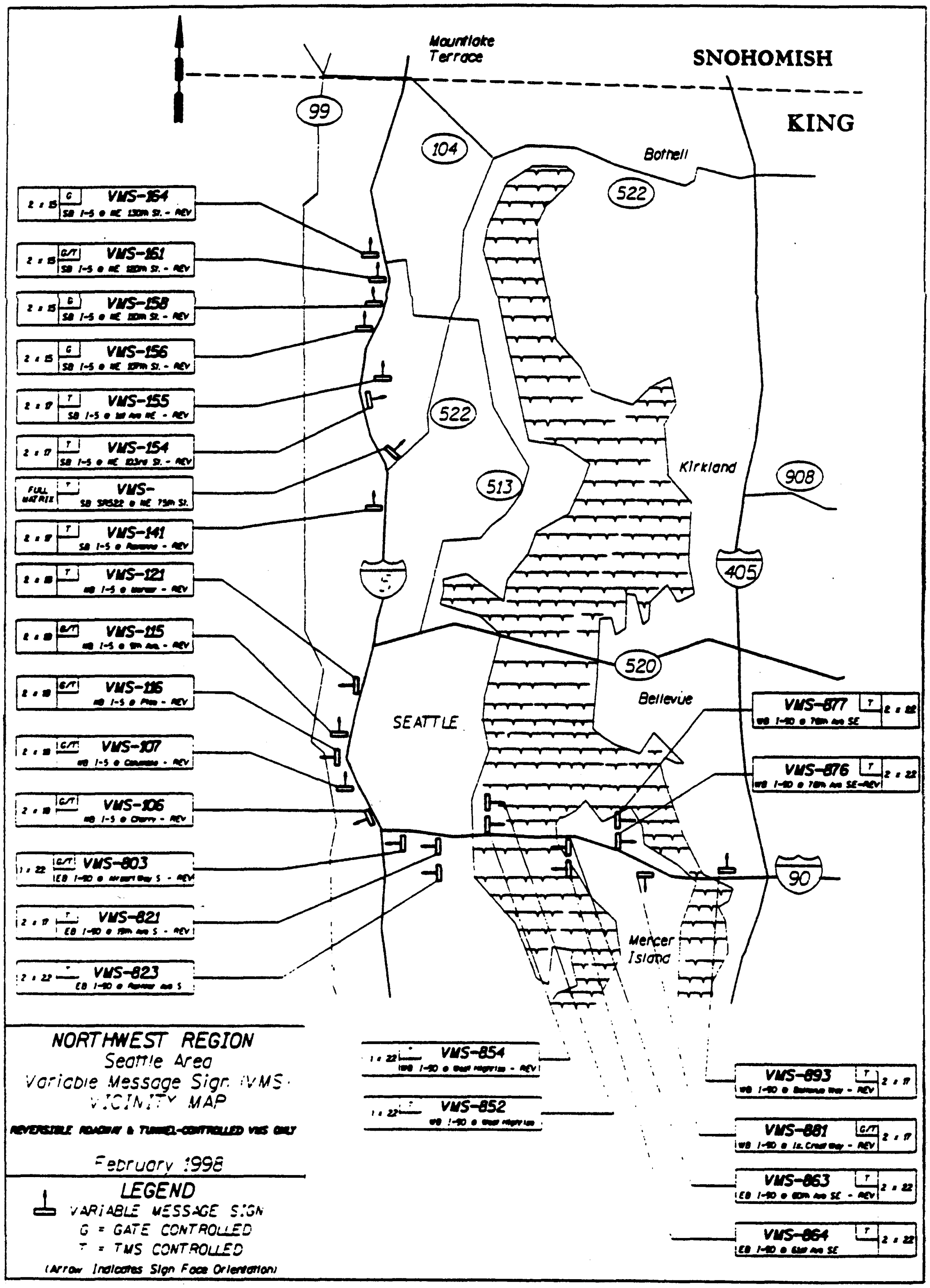
1. After choosing **CLUSTER** from the *VMS CONTROL/EDIT* window select the desired cluster from the list and hit the **CURRENT** button.
2. Click on the **EXECUTE** button.
3. Return to the *VMS STATUS* window by clicking on the **STATUS** button and check that the cluster has been successfully executed.

Controlling Variable Message Signs (VMS)
(continued)

Location Map for Common VMSs



Location Map for Tunnels and Express Lanes VMSs



Highway Advisory Radio (HAR)

Background
The Highway Advisory Radio is used to inform motorists of special events or conditions which may affect traffic in the Seattle area. Northwest Region (formerly District 1) of WSDOT currently has 7 HARs in the metropolitan Seattle area. Each HAR has a transmitter station and corresponding signs with beacons (flashing lights) -- see the "HAR Location Map" at the end of this chapter. An example of the HAR sign (HARS) is shown below.

HIGHWAY TRAFFIC ADVISORY

TUNE 530 AM

WHEN FLASHING

Information on maintenance and construction advisories are usually planned in advance and this information is channeled through the Northwest Region's Construction Traffic Coordination Office (CTCO). In addition, messages pertaining to special traffic incidents or conditions that will seriously affect traffic for an extended duration of time should be recorded on the HAR. For roadway/construction information received from CTCO, a FLOW Engineer or the full-time FLOW operator will decide the relative impact of these events or incidents and create the Driver Information Package for the FLOW Operators, Radio Dispatchers, and all TSMC staff. The FLOW Operator (or the Radio Operator during non-FLOW hours) will then record the message for a specific traffic-related event on the HAR transmitter's voice recorder. At scheduled time, the FLOW Operator or Radio Operator enables these messages and activates the transmitters and HAR signs.

The FLOW Operator has the access via phone lines to turn on the beacons at the various HAR signs (except HARS-053, 079, 208, 536, and 662, the FLOW Operator must inform the Radio Operators which HARSs are needed to have flashing beacons turned on).

The FLOW Operator must also verify proper operations of all HARTs and HARSs and report to the FLOW Engineers through the use of the SC&DI Trouble Report forms, as this is one of the daily tasks of the FLOW Operators.

Highway Advisory Radio (HAR)

(continued)

How Do HARTs and HARSs Work?

Each message slot is set at 30 seconds long. The various HAR transmitters/voice recorders have from 2 to 4 slots depending on the transmitter. The range of the HAR transmitter is approximately 1 mile radius from the physical location of the transmitter. This means that if there is an activated transmitter and only one message is enabled to be broadcast, then a driver traveling at 55 MPH will tune to 530 AM or 1610 AM (depending on the transmitter) after seeing a HAR sign with flashing beacons, and will receive the repeating message 3 to 4 times.

The Multiple Message Announcement Repeater allows the voice recorder to selectively play back or replace any of the messages in the 2 to 4 message slots. After one or more messages have been recorded in the voice recorder, one or more of the messages may be selected to be continuously repeated. The voice recorder will continue to repeat the enabled message(s), even while the phone line is inactive. There are currently 12 HARs accessible by telephone line (see list on next page).

Notice: Due to various technical reasons, the operator must increase their voice volume when recording HAR messages in order to make an audible message!! Review the procedures to access and operate HAR. The summary of the HAR commands are listed on page 78.

Highway Advisory Radio (HAR)

(continued)

A HAR transmitter (HART) can be used to broadcast messages when a particular HAR sign (HARS) in the vicinity is to be used--see HAR Location Map. The following table illustrates existing HARTs and corresponding HARSs.

HAR Transmitter	Location	Telephone No.	Associated HAR Signs
HART-064 (530 AM)	Tukwila (Sea-Tac)		HARS-053 (Radio) (I-5 NB @ S 188th) HARS-079 (Radio) (I-5 SB @ Norfolk St) HARS-594* (242-7401) (SR-518 @ 32nd Ave S)
HART-093 (530 AM)	Spokane St.	(direct)	HARS-088* (5387) (I-5 NB @ Michigan St.) HARS-098* (5328) (I-5 SB @ Holgate St.)
HART-135 (530 AM)	NE 45th St.	(direct)	HARS-142* (5381) (I-5 SB @ NE 58th St.) HARS-127 (Out of Service) (I-5 NB Ship Canal)
HART-203 (530 AM)	Swamp Creek	O/S	HARS-208 (Radio) (SR 525 SB @ 164th SW) HARS-770* (919-0907) (I-5 SB @ 164th SW) HARS-196 (Static) (NB I-5 @ 40th Ave W) HARS-759 (Static) (NB I-405 J/S Damson Rd)
HART-475 (1610 AM)	Monroe / Stevens Pass	(long distance)	HARS-293* (920-6388) (SR-522 EB) HARS-472* (818-2365) (US-2 EB)
HART-698 (530 AM)	Northup	(direct)	HARS-536 (Radio) (SR-520 WB @ NE 24th) HARS-520* (5380) (SR-520 EB @ 94th Ave NE) HARS-694* (5382)(I-405 NB @ NE 10th) HARS-708 (Out of Service) (I-405 SB @ NE 53rd)
HART-908 (530 AM)	Eastgate $^{\Phi}$	(direct)	HARS-662 (Radio) (I-405 NB @ SE 52nd) HARS-680* (5329) (I-405 SB @ SE 13th St.) HARS-904* (5385) (I-90 EB @ 136th) HARS-912* (5386) (I-90 WB @ 164th Ave)

* The beacons on this HAR sign can be activated via direct telephone controls. The step-by-step procedures to activate these HARS are shown on page 68.

Φ If the pass report recorded in slot 1 of this HART is stale or incorrect, or if the message is not enabled or the transmitter not on, call Radio at 440-4491.

Highway Advisory Radio (HAR)
(continued)

Activating the HAR System

I. Gain Control

1. Dial the phone number of the desired HART.

2. As soon as you hear a low-pitch chirp or a voice message, press firmly. You should hear a beep. If you still hear the low-pitch chirp or a voice, press again until you hear a beep.

II. Record and Enable Message

3. Press firmly to access the recorder. You should then hear a short chirp and then silence. This chirp tells you that you are now in the voice recorder program.

   a) If you heard a low-pitch chirp in Step 1, that means this HART does not have any message recorded. Go to Step 4

   b) If you heard a voice message, check to see which message slot number this message is recorded in. To do so, press 51 (to listen to message slot number 1), 52 (message slot number 2), ... etc. (NOTE: You don't have to listen to an entire message; you can interrupt by pressing "#".)

4. To start recording press **4 + message slot number**. Start recording after the beep. When finished recording, press "#" to terminate.

5. To review the message just recorded, press **5 + message slot number**. After the message is played, you should hear a chirp.

6. If the message recorded sounded satisfactory, press **6 + message slot number** to enable the message to be broadcast. If not, record over by pressing **4+ message slot number**.

III. Activate Transmitter

7. Check the transmitter status by pressing **03**. If you hear a steady tone, the transmitter is ON already. If you hear a chirp, the transmitter is OFF. (If there are no messages activated on a HART, then it should be turned OFF.)

8. Press **01** to turn the transmitter ON. Press **03** to check the transmitter status to make sure that the transmitter is ON. (Press **02** to turn the transmitter OFF.)

9. Press **99** to exit. You should hear a low-pitch chirp. Hang up.

IV. Activate Appropriate HARSs

10. Turn on the HARs (HAR signs) by phone, except ones to be activated by radio.

11. Make the necessary changes in the Excel spreadsheet on the center console to make note of the HARTs and HARSs in use and the corresponding event(s). To do this, go to the right center console. Select the MSOFFICE button, located in the top right corner of the screen, that is labeled “HAR”. This will open the EXCEL spreadsheet used to keep track of HART and HARS status. The status of the transmitter and sign should match the status shown in this file. Make the appropriate changes whenever you use a HART or HARS. Be sure to click on **UPDATE** when completed.

Deactivating the HAR System

1. Turn off HARS before you turn off the corresponding HART (HARSs are turned off by phone or by radio depending on the HARS).

2. Access the HAR voice recorder (see steps 1 through 4 of "Activating the HAR System") and disable the message in the desired slot(s) by pressing **7+ message slot number**. Wait for a chirp. (If you won't be using the same recording again soon, record a blank in the slot by pressing **4 + message slot number**, then immediately, **#**. Check that the slot is blank by pressing **5 + message slot number**.)

3. If *all* slots are disabled, turn the transmitter OFF by pressing **02**. Check the transmitter status by pressing **03** to make sure it is off--you should hear a stuttering chirp.

4. Press **99** to exit the program. You should hear a low-pitch chirp. Hang up.

Activating/Deactivating Flashing Beacons by phone for HARS-088, 098, 127, 142, 293, 472, 520, 680, 694, 770, 904, and 912.

1. Dial the telephone number. You will hear a loud tone.

Sign	Location	Phone #
HARS-088	I-5 NB @ Michigan St.	(direct)
HARS-098	I-5 SB @ Holgate St.	(direct)
HARS-127	I-5 NB @ Roanoke	(Not hooked up)
HARS-142	I-5 SB @ NE 58th St.	(direct)
HARS-293	SR 522 EB	
HARS-472	US 2 EB	
HARS-520	SR-520 EB @ 94th Ave NE	(direct)
HARS-594	SR-518 EB @ 32nd Ave S	
HARS-680	I-405 SB @ SE 13th St	(Not hooked up)
HARS-694	I-405 NB @ NE 10th St.	(direct)
HARS-770	I-5 SB @ 164th SW	
HARS-904	I-90 EB @ 136th Ave SE	(direct)
HARS-912	I-90 WB @ 164th Ave SE	(direct)

2. Enter the security code: **11**. You will hear three beeps, which means your access is granted.

   For HARS 088, 098, 127, 142, 293, 472, 520, 680, 694, 770, 904, and 912:
   a. To **activate** flashing beacons of this sign, press **.**
   b. To **deactivate** the beacons, press **.**

3. Hang up by pressing #.

Highway Advisory Radio (HAR)

(continued)

HAR Recording Process Summary

command	function
	To **enter** the voice recorder system. (It can also be used to terminate a process.)
	Access code
4 + message slot number	**Record** in desired message slot
5 + message slot number	**Play** content in desired message slot
6 + message slot number	**Enable** the desired message to be broadcast
7 + message slot number	**Disable** the broadcast of the desired message slot
01	Turn transmitter **ON**
02	Turn transmitter **OFF**
03	Check transmitter **status** (**Chirp = OFF, Tone = ON**)
99	**Exit** from the voice recorder program

HAR Message Format

The standard format of a HAR message should be as follows. Once again, due to liability concerns, DO NOT recommend any specific alternate route in the message.

1. *"This is the Washington State Department of Transportation Highway Advisory Radio.*
2. [Incident report],
3. *Motorists are advised to* [use alternate routes, expect delays/congestion, use caution, and/or move to the left/right when approaching the area].
4. *KNEZ 390**, [location of the HART]."

* OR *KNCL 518* for HART 064

Highway Advisory Radio (HAR)

(continued)

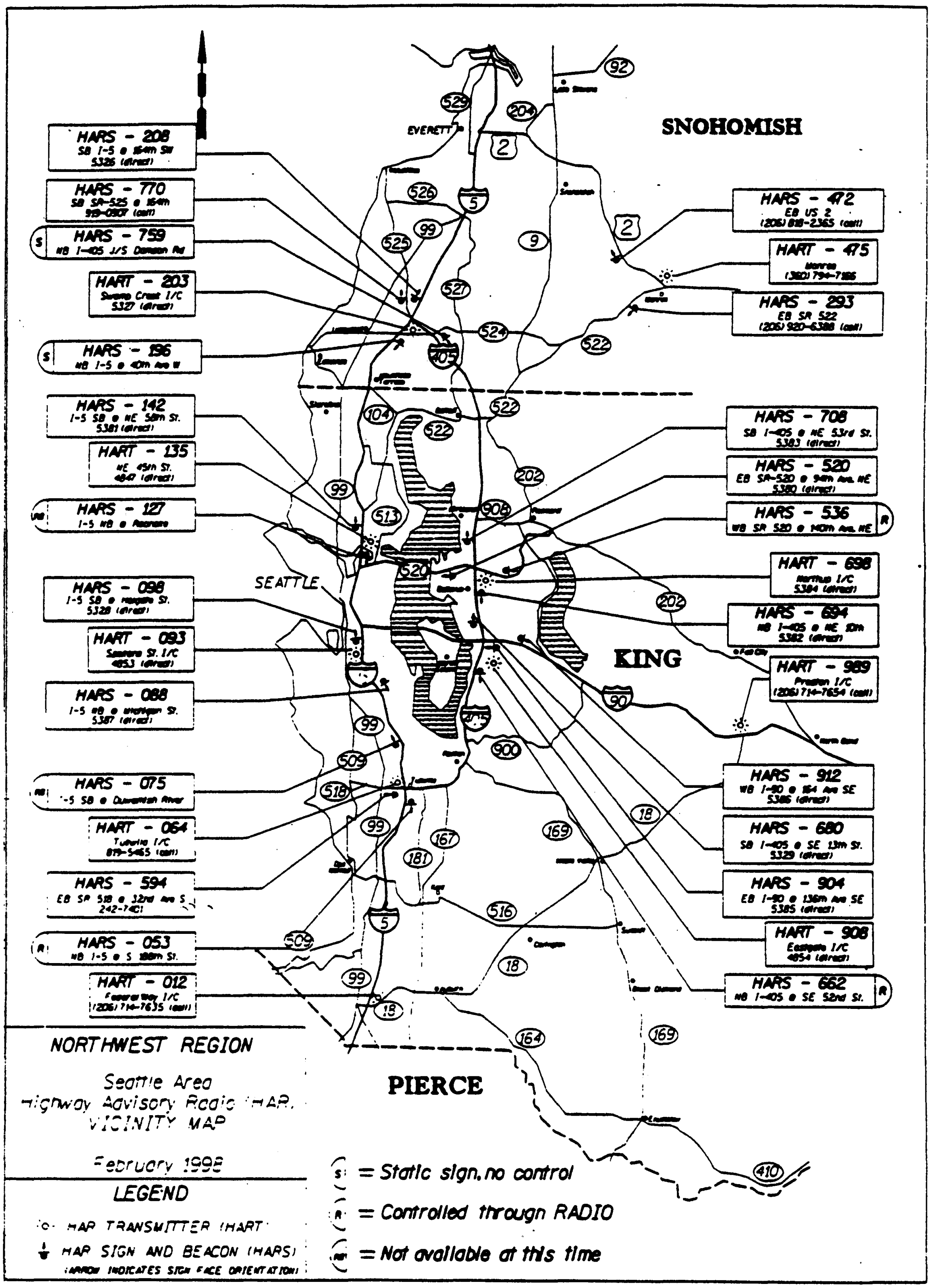
HAR Commands

The following commands are supported by the Dial Access Controller and Multiple Message Announcement Repeater:

Command No.	Function
01	Turn Transmitter On (primary user only)
02	Turn Transmitter Off (primary user only)
03	Check Transmitter Status
04	Change primary access code (primary user only)
05	Change secondary access code (primary user only)
06	Set number of plays to phone line (primary user only)
07	Set delay before answer (primary user only)
41	Record message #1 (primary user only)
42	Record message #2 (may not be accessible to secondary user)
43	Record message #3 (may not be accessible to secondary user)
44	Record message #4 (may not be accessible to secondary user)
45	Record message #5
46	Record message #6
47	Record message #7
48	Record message #8
50	Play all enabled messages
51	Play message #1
52	Play message #2
53	Play message #3
54	Play message #4
55	Play message #5
56	Play message #6
57	Play message #7
58	Play message #8
60	Enable all messages
61	Enable message #1
62	Enable message #2
63	Enable message #3
64	Enable message #4
65	Enable message #5
66	Enable message #6
67	Enable message #7
68	Enable message #8
70	Disable all messages
71	Disable message #1
72	Disable message #2
73	Disable message #3
74	Disable message #4
75	Disable message #5
76	Disable message #6
77	Disable message #7
78	Disable message #8
99	Exit from programming mode

Highway Advisory Radio (HAR)
(continued)

HAR Location Map



Handling Major Accidents

According to the Major Accident Investigation Team (MAIT), a minor accident is one which involves only property damage which does not exceed $500 (estimated). A major accident is anything else. (For example: accidents involving severe personal injuries, fatalities, MAIT, property damages beyond $500, or any state vehicle.)

The following guidelines represent an effective strategy to handle such a situation. The more severe an accident, the more important it is to follow each step.

1. If the source of this information comes from WSP's CAD log, Radio Dispatchers, or a phone call from the public, confirm the incident using CCTVs, when applicable.

2. Inform the Radio Dispatchers of the incident and any additional information (which lanes are blocked, how many cars are involved, etc.).

3. Once confirmed with CCTVs, inform the FLOW Engineer. Then he/she will inform the Operations Engineers.

4. Effectively and efficiently use VMSs and HARs at appropriate locations--use your engineering judgment and common sense. Confirm your strategy with the FLOW Engineer.

5. Send an addressable message to the media informing them of the incident.

6. Update the traffic reports, advising the motorists to expect delays, or if possible, use alternate routes (but do not recommend any specific alternate routes, due to concerns of liability). DO NOT report any fatalities or status of injured individuals.

7. Consider other options such as:
   Activating Ramp Meters
      When a major accident causes severe backups and congestion, it may be wise to activate ramp meters upstream from the accident location. If time-of-day tables allow it, appropriately meter affected locations. If time-of-day tables do not permit metering at the time, consult with the FLOW engineer on duty. He or she has the authority to override the existing time-of-day tables for ramp meters and turn them on at any time.

   Express Lanes Direction
      If a severe accident occurs on I-5 or I-90, the direction of the freeway's Express Lanes could have a dramatic affect on traffic flow through the area. If an accident occurs just prior to a change in the Express Lanes' status, consult with the FLOW engineer on duty and consider postponing the change, or beginning it earlier, depending on the effects of the accident. The FLOW engineer has the final call on this matter.

Detecting and Handling Loop Failures

Background

A loop is a 6' by 6' wire induction loop that, when powered, produces an electromagnetic field which detects the presence of metal objects. Mainline freeway loops are placed in the center of lanes to detect moving vehicles. As loops detect vehicles passing, the data is transmitted to the roadside cabinets. This data is then translated into values of volume (total number of vehicles), lane occupancy (percentage of time a loop is occupied), and speed (not available at all locations). Occupancy values are averaged over the lanes at cabinet locations and transmitted to the VAX (TSMC's central computer) via fiberoptic cables or leased phone lines. This average value is used to "paint" the FLOW map with colors that correspond to specific occupancy values, providing a quick, accurate summary of traffic congestion status at specific locations.

Detecting Hung Loops

Occasionally, loops will malfunction as a result of broken induction wires, wiring connection problems, power supply problems, communication problems with the VAX, or a loop amplifier malfunction. Loops in such conditions are termed, 'hung' and will report occupancies of 100% (or slightly less) and volumes of 0. It is important to prevent hung loops from affecting the TSMC operations. Hung loops will provide false information to users of the FLOW map and could unnecessarily affect ramp metering rates, if meters are on. Every loop is individually checked each weekend to verify that it is reporting reasonable data. Throughout the week, FLOW operators are to inspect suspicious loops. Hung loops will cause their corresponding cabinets to report abnormally high average occupancies, which in turn will often cause the FLOW map to display colors incorrectly indicating heavy or stop-and-go traffic conditions. FLOW operators should question the legitimacy of the reported data when the FLOW map shows a single segment of red or black, surrounded by areas of green. To inspect the loops at the ES under question, simply use the mouse to click on the segment. Inspect the contents of the right box called, **LOOP DATA**. Loops displaying bad data must be disabled.

Detecting and Handling Loop Failures
(continued)

Re-setting/Disabling a Hung Loop

All malfunctioning loops must first be handled by re-setting the loop amplifier before disabling. If after a few minutes the loop is still "hung", disable the loop (by following the procedures below) and report to FLOW Engineers using the SC&DI Trouble Report forms.

1. While running the TMS software, select a local map that includes the hung loop station(s).

2. Select the data station by clicking on the red, flashing red, or the white roadway segment of interest. (If you know the loop number, the cabinet name and/or loop name, you may click on the **LUP** button in the Lower Status Bar without using a local map. Highlight that specific data station.) The *Cabinet Selection* window will appear on the screen.

3. If you selected the ES station of interest from the map, the *Loop Data Display* window will appear on the screen.

4. In this window, check each loop name in this data station and its corresponding volume and occupancy. Pay attention to those loops that give volume of about zero and an occupancy of about 100%. This is the indicator of a hung or bad loop.

5. Hit **RESET** a few times and wait up to 60 seconds to see if the data becomes legitimate. If the data remains indicative of a hung loop, disable the loop amplifier. Highlight the hung loop and click on the **DISABLE** button.

Detecting and Handling Loop Failures
(continued)

6. Recheck the status of the disabled loop within a few minutes.

   a) If the hung loop seems to be working (giving valid data) after the loop amplifier has been reset, this hung loop is fixed. Follow the instructions for "Enabling a (Previously Hung) Loop."
   b) If the hung loop is still giving volume of zero and 100 percent occupancy, leave it disabled. Do not fill out a SC&DI trouble report. Reporting hung loops is performed during the weekend shifts (see page 85).

Note: In the *Loop Data Display* window, the status column will display and indicate the status of the loop and also gives a description of bad or suspicious data. A single character is used (under the S column) to indicate bad loops and why they are bad. The following is a list of the keys to these single characters.

Character	Condition
(blank)	Good Data
S	Short Pulse
C	Chattering Amplifier
E	Envelope, outside of vol-occ
4	Reserved*****
5	Reserved*****
L	Disabled by VAX
D	Disabled by operator
B	Bad loop - unspecified cause

∗ **=** If you see this character displayed, please note important details on the SC&DI Trouble Report form(s) and report to the Software Engineer immediately.

Detecting and Handling Loop Failures
(continued)

Reporting Hung Loops

This routine is conducted on the weekends only.

1. Pick a roadway and open to it's section in the SC&DI log. Check the status of every loop for each cabinet on the assigned roadway. Try **RESET**ing the hung or bad loops a few times first. Keep track of the loops that remain hung after being reset.

2. Take the list you have made of hung loops and compare it to the list made the previous week. Any loop that appears on both lists should be reported on a trouble report.

3. On your current list write REPORTED next to the loops that you filled out a trouble report for and throw away the previous week's list.

4. Place the new hung loop list in the front of the SC&DI log and put the date on it.

Detecting and Handling Loop Failures
(continued)

Enabling a (Previously Hung) Loop

The operators will need to enable a loop(s) when the SC&DI Trouble Report returns from the Maintenance Section reporting a hung loop of a specific ES station has been fixed in the field or the loop appears to be working correctly again. The operator must enable this previously hung loop by following the procedures listed below:

1) Access the *Loop Data Display* window by:
   a) While running the TMS software, select a local map that includes the hung loop station(s), then click on the affected station; or
   b) Double-click on the desired cabinet in the **CABINET SELECTION** window. The **LOOP DATA DISPLAY** window will come up.

3) Highlight the desired loop from the **LOOP DATA** box to enable, and click on the **ENABLE** button. Wait 20 seconds and verify that the status no longer reads **L** or **D**.

Obtaining Call Counts

To keep track of the number of DOT-HIWY information line users and which recordings are used most, there is a software program written specifically for this purpose. Use the right center principal FLOW terminal to obtain call counts. As a general rule, call counts are obtained at the end of the day. Follow the instructions below to record daily call counts.

1. If the computer is running the TMS software, you must first exit the TMS. If you're in DOS, access Windows by typing "**WIN**" at the C:\> prompt.

2. Once in Windows, open the **Accessories** window. Double-click on the **CALL COUNTS** icon to enter the program.

3. Select the "**CALL ECHODYNE**" button. The modem will now call the Echodyne recorder. If the line is busy, try again in a few minutes.

4. When the modem connects and the Echodyne responds with "PASSWORD" prompt on the screen, select the "**PASSWORD**" button. The operating password should automatically appear at the prompt.

5. Now select the "**DOT-HIWY COUNTS**" and record the total number of calls.

6. Click “**CELL USERS COUNTS**” and record the total number of calls.

7. Continue clicking through each button, recording the total number of calls for each path. Select “**PRINTER ECHO**” prior to clicking the “**PASS COUNTS**” button and deselect “**PRINTER ECHO**” after “**PASS COUNTS**” have run.

8. **EXIT** the program.

Traffic Volume Data Retrieval

TSMC often receives traffic volume data requests from other public agencies and private sectors. Currently, there are four ways of retrieving traffic data (volume and occupancy) that each apply to different time periods. Use each for the following applications:

RETRIEVAL METHOD	TIME PERIOD
VAX Data Retrieval (VDR)	Within the past 6 months
CD ROM Data Retrieval (CDR)	Between 1993 and 6 months ago
Dated Diskettes	February 1, 1991 to May 21, 1993
Perkin-Elmer Tapes	1978 to 1992

<u>Procedures to Run VAX Data Retrieval</u>

1. Get into Windows. Make sure to exit all active programs (this will help avoid a system crash).

2. At the TMS window in the Program Manager window, double-click on the **NEW VDR!** icon. The *VDR Logon* window will appear.

3. Log on by entering your user ID and password (same as in TMS). The *VDR 2.3 BETA* window will appear.

4. Under **RETRIEVAL SETUP**, enter the start date and end date of the desired data report (End date is not necessary if you just need one day). Use the **TAB** key or the mouse to move the cursor around.

5. Under **REPORT SETUP**, enter the file name of the data report to be saved. For example, you can save it on your diskette--a:\filename.rpt or b:\filename.rpt. Otherwise this data report will be saved as the default file name, **VAX_DATA.RPT**.

6. Under **REPORT SETUP**, you will need to select the type of data report for VAX retrieval. Your options are:
   - 5 minute
   - 15 minute
   - hourly summary
   - excel format.

7. Under **REPORT SETUP**, select the data type: volume data only or a combination of volume with occupancy and length. Click on the appropriate box of data desired.

8. Under **SELECT SOURCE**, the options of File and Cabinet List are available.

Traffic Volume Data Retrieval
(continued)

a) If you previously made a file of desired stations/loops, click on the ***File*** box. A window will appear to prompt you for the file name in C:\VDR directory. The default file is **DEFAULT.VDR**.

b) If you would like to select a group of loops and/or stations from the cabinet list (or the ES database), click on the ***Cabinet List*** box.
   i. A list of ESs will appear, double-clicked on the desired ESs and click **OK** after all ESs have been chosen.
   ii. A list of all loops in the selected ESs will appear. Double-click on the desired loops and click OK when all have been selected. To save these loops/stations in a source file, click on **FILE, SAVE AS**. In the **SAVE AS** window, enter the file name. (No extension is required.) Your file will be saved as **c:\vdr\vdrb**\filename.**vdr**

9. Finally, click on the **PROCEED** button at the bottom of the screen to start the retrieval process.

10. You will be able to look at the data that you just requested under **FILE VIEWER** while you are still in this program. Remember, the report file is saved as what you entered in Step 5.

11. Click on **FILE, EXIT** to end the VDR program.

12. Enter **Word** and open the **.RPT** file. When you are in Word, you will be prompted to select the file type to convert from. Select the **TEXT ONLY** conversion.

13. Change the entire data report to **Line Printer** font, size=**8**. Under **FILE**, **PAGE SETUP**, click on **Paper Size** and select **Landscape**. Under **FILE**, **PRINT PREVIEW**, adjust the margins in order to fit the maximum number of stations/loops possible on each page. To adjust the margins, use the rulers located on the top and left side of the **PRINT PREVIEW** window. To get the rulers to appear, click once on the page.

NOTE: If you are going to be retrieving other data and would like to attach the new data report to an existing **.RPT** file, click on the box in front of "***Append to existing Report***" after Step 5.

<u>Restoring (Uploading) Archived Traffic Data Files to the VAX Environment</u>
NOTE: This procedure should only be followed when the CD ROM Data Retrieval method is unavailable.

This set of instructions describes the steps involved in restoring TMS data files to the VAX so that VDR can access the data. To restore a tape, use the following procedures:

1. Get the tape with the month you need and put it on the drive. Use the guide on the door for help on loading the tape. When the tape has been loaded, close the door and then push the **<LOAD>** and then **<ON-LINE>** buttons.

2. Log on to a VAX terminal. Ask the flow engineer for help with this.

3. At the '$' prompt enter the following commands:

   $ **set def dua1:[000000.fmdb_daily_primary]**
   $ **sh dev d**

   These commands allow you to see how much room is available to load on the VAX. Look at how may blocks are available on the line labeled '<u>Dua1:</u> .' It takes about 7000 blocks for each day. So for a month, about 210,000 blocks are needed. If there is not enough room to load data, delete the oldest month of data from the VAX with the following command:

   $ **del** {enter the last two numbers of the year and then the month} ***.*;***

   For example to delete the month of December, 1995 you would entering the following command.

   $ **del 9512*.*;***

4. Once you have enough space enter the following commands to load the data you want onto the VAX:

   $ **allocate mua0:**
   $ **mount/foreign mua0:**
   $ **backup/noassist/log**
   _From: **mua0:/rewind**
   _To: **dua1:[fmdb_dialy_primary]**

   It will take about 20 minutes for the tape to completely load on to the system.

5. A '$' prompt will appear when it is completed. Dismount the tape with the following command:

   $ **dismount mua0:**

6. Now you can use VDR to retrieve the desired data. After you have completed your retrieval be sure to delete the month you uploaded from the tape with the following commands:

   $ **set def dua1:[000000.fmdb_daily_primary]**
   $ **del** {enter the last two numbers of the year and then the month} ***.*;***

<u>Procedures to Run CD ROM Data Retrieval</u>

1. Access an NT Terminal and locate the appropriate Compact Disk (found in the top drawer of the file cabinet in the Development Room) for the time period needed.

2. Click on the **SHORTCUT to CDR_lo** icon. The *CDR 2.3* window will appear.

3. Place the CD in the case and insert the case, metal side first, into the CD drive.

4. Under the **OPTIONS** menu and **FILE LOCATIONS** select CD-ROM Drive Letter **F** for data files. Also select the desired location for output files (a:, b:, or c:).

5. There are three types of retrievals possible to obtain. Raw data provides simply the Click **ON** the type of data desired (i.e. Raw Data, Single Day Summaries or Multiple Day Summaries) and name your output file. Raw Data reports simply provide the desired data, without any summaries or manipulations of the data. Single Day Summaries provide the requested data for each day selected along with information on each day's peak hours. Multiple Day Summaries provide summaries of peak hours as well as average volumes and occupancies for the group of days selected.

6. Select text or spreadsheet output. Text output provides a file that easily translates to a Word file. It is useful when the tabular results of the data retrieval are all that is needed. The text output format provides a more aesthetically pleasing report than the spreadsheet output format. Spreadsheet output converts nicely to an Excel file so that results may be manipulated further as needed.

7. Select **CHANGE** under *Dates* and enter the desired dates. Similarly, select **CHANGE** under *Elements* and select the desired stations and/or loops. Click **VIEW** under *Dates* and *Elements* to verify the items selected.

Traffic Volume Data Retrieval
(continued)

8. Select any other miscellaneous options desired. (i.e. 15 min summary, Monthly Day-of-Week)

9. Click the **GO** button to run the report. The **-Status Messages-** window at the bottom of the screen will show the status of your report. In a few seconds it should read:

   Reading data in fmdb files...
   Writing ___ output file...

   At this point you may inspect the contents of your report under the file menu.

10. You may wish to convert your report to a Word or Excel document to facilitate manipulation and analysis of the data.

11. Always properly replace CD's in their cases and return them to the file cabinet.

Traffic Volume Data Retrieval
(continued)

Procedures for Retrieving Data from Dated Diskettes

The following procedures for retrieving the traffic volume data are good for data collected between February 1, 1991, and May 21, 1993. These data are saved on floppy diskettes (stored in the rightmost cabinet in the FLOW Room). The following procedures are used to retrieve data from floppy diskettes:

1. Find diskettes with desired date of data in the cabinet.

2. Use the center or the left FLOW console to perform data retrieval.

3. At C:\> prompt, type "**CD DAILYVOL**" to change directory to dailyvol (which stands for daily volume).

4. The dated diskette contains *.zip files. The ".zip" files are actually 2 files (.VOL and .OCC)condensed into one. To "unzip" or re-create the original files, type "**PKUNZIP A:**\filename**.ZIP**" or "**PKUNZIP B:**\filename**.ZIP**", depending on the disk drive used.

5. After "pkunzipping" the files, check the directory by typing "***DIR***" at the c:\dailyvol\> prompt. The directory should show 3 files with the same date, one with a ***.ZIP*** extension, a second with an ***.OCC*** extension, and a third with a ***.VOL*** extension. You are now ready to request a data report.

6. There are two types of volume data:
   S (= STATION): average data of a group of loop detectors
   D (= LOOP DETECTOR): data from an individual loop detector

   You may also choose to receive the data in varies forms:
   5 = 5-minute volume & occupancy data
   15 = 15-minute volume & occupancy data
   24 = hourly volume data with AM and PM peaks identified
   d = 15-minute volume report for one day
   w = 1-hour volume report for one week

Traffic Volume Data Retrieval
(continued)

7. To get a report, at c:\dailyvol\> prompt, type:
   volrpt
   filename (without extension)
   report type (S or L)
   Station number or loop detector number (use old numbering scheme, see "Data Station Reference Guide")
   data type (5, 15, 24, d, or w)
   disk drive and filename to write to (e.g. a:\042193.dat)

EXAMPLE:
To get a 15-minute volume and occupancy data for station 209 for October 25, 1992 (from 5 1/4" diskette), and write it to b:\ drive as DATA209.dat, you would do the following:

```
c:\ cd dailyvol
c:\dailyvol\> pkunzip a:\102592.zip
c:\dailyvol\> volrpt 102592 s 209 15 b:\data209.dat
```

Traffic Volume Data Retrieval
(continued)

Retrieving Data from TSMC's Volume Tape Archive (Perkin-Elmer Tapes)

Data may now be retrieved from the old CTCM Perkin-Elmer tapes. These tapes hold traffic data for District 1 (now Northwest Region) from about 1978 to 1992. The tapes contain five-minute data from traffic induction loops and each tape holds about one month. The procedure for retrieving the data is outlined below:

1. Mount the tape containing the dates you want on the tape drive.

2. Turn on the PC and type **CD TDX** and press ENTER.

3. Type **VTUP** and press ENTER. This will start a tape utility program that has a variety of functions. Use the 'FILE FOR' to forward the tape to the dates you want. It will ask you how many files to forward. Each date is one file on the tape. Enter the appropriate number so that the tape will stop a day or two ahead of the dates you want. The tape may take a few minutes to forward depending on how far you need to go.

4. After the tape has finished forwarding exit the VTUP utility by pressing ESC.

5. Now type **FCOPY MTA *FILENAME*** and press ENTER. ***FILENAME*** is the name of the file you want to put the data in. The program will extract one day of data from the tape and place it in the file you designated.

6. To retrieve additional days type **FCOPY MTA *FILENAME* /A**. If you use the same filename as before this will append the next day of data to the original file. Repeat as many times as necessary to retrieve all the days you need. At the end of each copy the "Bytes Transferred" should equal 635,800 for dates after 09/01/1985 or 491,300 for older dates. If there is a tape error select "Ignore" or "Retry". Tape errors will cause data loss of five minutes each.

Traffic Volume Data Retrieval
(continued)

5. Use the **VOLTAPE.EXE** program to process the tape data into printed reports. This can be done in two different ways. The first way is by running a single loop or station from the command line. The following line will run a 24-hour report for each day in the file named ***FILENAME*** for station 324 and write the output to a file called *report.txt*:

VOLTAPE *FILENAME* s 324 24 report.txt

6. The second way is by running a command file and is recommended if data from a number of different stations and loops is desired. The **VOLTAPE.EXE** program can run up to 100 loops and stations as defined by a command file. The following listing is the KAB.INI file and is on the hard drive under the TEST directory. Edit this file's loop and station numbers as needed and save the file under a different name. Note also that [FILENAME] must be changed to the name of the file you created using FCOPY. Change [OUTPUT] to the filename you want the final formatted data to have.

Traffic Volume Data Retrieval
(continued)

```
;This file contains the data and control strings for VOLTAPE.
;The last update was done by MLF on 04/04/94.
;Notes: ';' lines are comments.
;
{VOLTAPE}
;
;            Maybe FILE or TAPE (INPUT)
[DataDevice] = FILE
;            Date for Tape Input if "TAPE" - FUTURE N.A.
[TapeStartDate] =
[TapeEndDate] =
;
;            File name for Input or Temp Storage if TAPE.
[FileName] = 102290.DAT
;
;            Device name for Output, PRN, LPT1, REPORT.DAT etc.
[Output] = 102290.txt
;
;            Maybe 5, 15, 24, or D
[ReportType] = 5
;
;            Enter the Station Numbers you want upto 50.
[Station] = 60
[Station] = 61
;
;            Enter the Loop Numbers you want up to 50.
[Loop] = 207
[Loop] = 208
[Loop] = 209
[Loop] = 210
[Loop] = 211
[Loop] = 212
[Loop] = 213
[Loop] = 214
;
;
;End of File
```

The following line will run a command file called *test.ini*:

VOLTAPE test.ini

Program Operation and Error Checking

The copy from tape to disk can result in errors in the data. These errors usually result in missing 5-minute records. The program verifies that the first line in the disk file is a valid data date. If the date is before 09/01/85 the program will read 1700 bytes otherwise it will read 2200 bytes. The program tests the first 8 bytes of each read for a valid date. If a date is found in the data portion of a file, the rest of that day will be made zero. If a disk read is less than 1700 or 2200 bytes, that 5 minute record will be made zero. A short file will result in zero data for the missing records.

There are no record marks in the copied tape files. If a tape copy results in a day data that is missing a partial record, the copied file may be useless. The program will not find the date stamp on an even boundary and will continually be zero days until it finds a valid date or the end of file. You can copy the tape files one at a time to differentiate filenames and if each copy is the right size, then concentrate them. This might help if the tape has many parity errors.

Future Upgrades

There are plans to make voltape.exe read the tape drive directly. This mode of operation would be selected by the command file. this programming is not complete and thus voltape.exe will not read the MTA device directly.

Loop Naming Scheme

Loop Naming Scheme
The following section is taken out from the SC&DI Design Guide (pages 50-54).

A loop name contains exactly seven characters. The underscores are considered characters and are therefore necessary. A loop name is found by selecting one item from each column in table # 1 (Roadway, Direction, Lane Type, and Lane Number). These items are then combined into a loop name. The correct item is found by following the conventions in the list of rules below. Special loops that need to be identified to the 170 controller at each ES station/cabinet are shown in table #2.

Speed loops must also be identified to the 170 controller . These loops are identified by XXXXXSX. To find the corresponding loop for the trap, match each X in XXXXXSX to each X in XXXXXTX.

***Table 1*. (Loop Naming Scheme)**

Roadway *	Direction	Lane Type	Lane Number
_M - Mainline	S - Southbound (SB)	_X - Exit Ramp	_1
_C - Collector/Distributor	N - NB	_O - On-Ramp	_2
_R - Reversible	E - EB	RA - Right Advance Queue	_3
AM - Auxiliary Mainline	W - WB	LA - Left Advanced Queue	_4
AC - Auxiliary C/D		_Q - Queue Loop	_5
AR - Auxiliary Reversible		_I - Intermediate Queue Loop	_6
MM - Metering Mainline		_D - Demand Loop	_7
MC - Metering C/D		_P - Passage Loop	_8
MR - Metering Reversible		HX - HOV Exit Ramp	_9
		HO - HOV On-Ramp	S1 - Speed Loop L-1
		HD - HOV Demand Loop	S2 - Speed Loop L-2
		HP - HOV Passage Loop	S3 - Speed Loop L-3
		H_ - HOV Mainline	S4 - Speed Loop L-4
		__ - Mainline	S5 - Speed Loop L-5
			S6 - Speed Loop L-6
			S7 - Speed Loop L-7
			S8 - Speed Loop L-8
			S9 - Speed Loop L-9

*"A" is used for multiple roadways for one cabinet (i.e. SR-167 and I-405).
"M" is used when the loop is used in figuring meter rates. Otherwise an underscore is used.

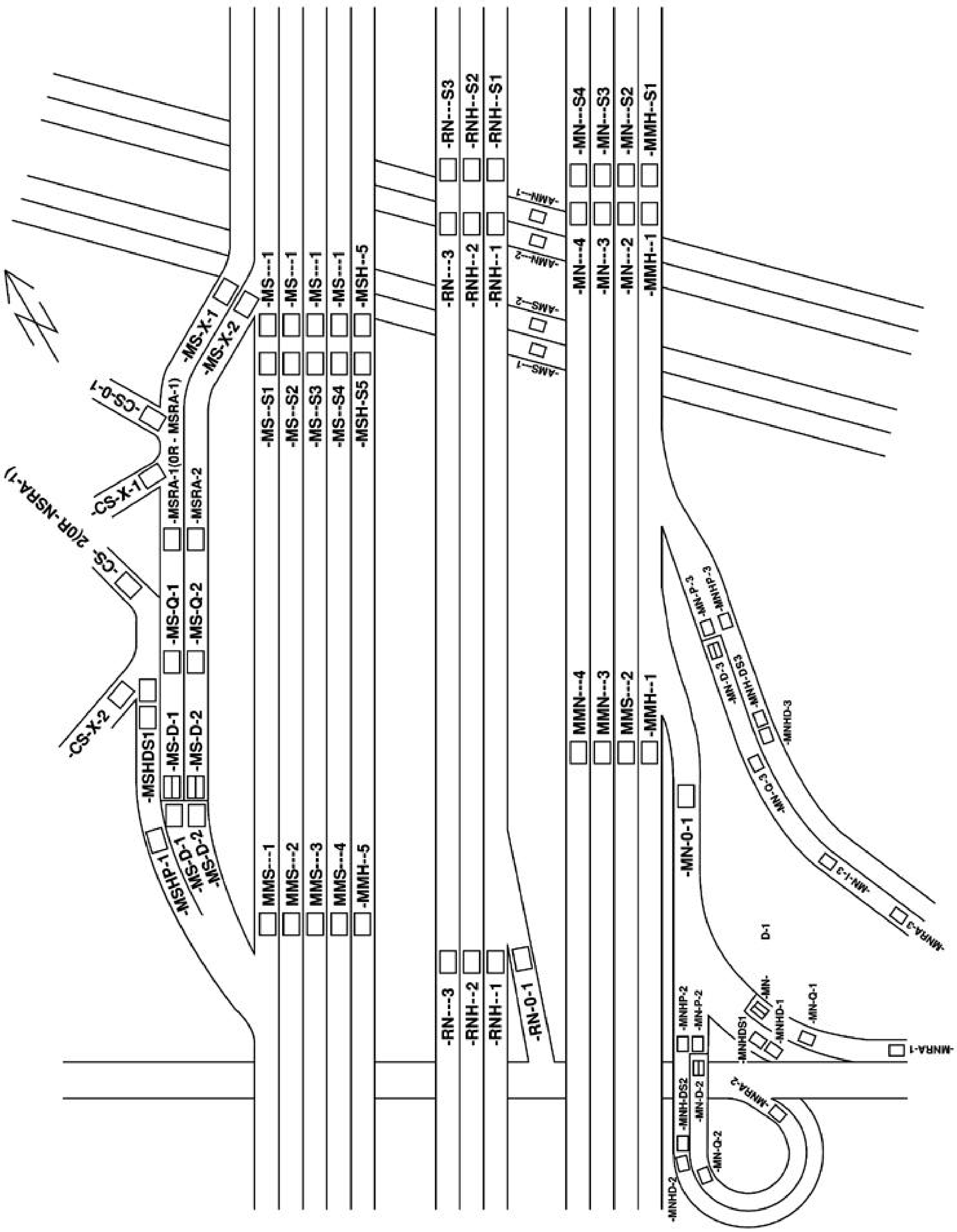
Loop Naming Scheme
(continued)

***Table 2*. (Special Loop Names)**

Function Name	**Lane 1**	**Lane 2**	**Lane 3**
Passage	XXX_P_1	XXX_P_2	XXX_P_3
Demand	XXX_D_1	XXX_D_2	XXX_D_3
Intermediate Queue	XXX_I_1	XXX_I_2	XXX_I_3
Queue	XXX_Q_1	XXX_Q_3	XXX_Q_3
Adv. Queue Right	XXXRA_1	XXXRA_2	XXXRA_3
Adv. Queue Left	XXXLA_1	XXXLA_2	XXXLA_3
Station Loops	MXXXXXX	MXXXXXX	MXXXXXX
HOV Demand	XXXHD_1	XXXHD_2	XXXHD_3

Loop Naming Scheme
(continued)

Sample Loop Naming Scheme Diagram



Displaying the TMS Map/Window on Big Screen

The following steps are used to display a TMS map or any other TMS window on the "Big Screen" (the rear-projection monitor) in the FLOW Room. You may be asked to do this for demonstration purposes during tours.

1. Use the <u>center</u> FLOW/TMS ***Principal*** Console.

2. Log into TMS and bring up the desired window or map to be displayed on the Big Screen.

3. Use the remote control for the Big Screen, press the yellow button labeled "SOURCE" and promptly press "**0 1**". The text on the monitor will be SLOT = 0, and INPUT = 1

4. Wait for a few seconds and the TMS window or map that appears on the center console's principal monitor will be displayed on the Big Screen.

5. To return to displaying a camera picture on the Big Screen, use the remote control for the Big Screen, press the yellow button labeled "SOURCE" and promptly press "**1 2**". This then will change the text on the monitor to SLOT = 1 and INPUT = 2.

Using the VCR for Videotaping

Occasionally, the TSMC receives a request to videotape a traffic incident or construction event in progress. Other times, traffic studies are made of certain stretches of highway within the view of a camera. Sometimes taping will be planned; other times it will be impromptu.

Impromptu Videotaping:

1. Obtain a (blank) video tape from the closet/cabinet to the right of the right FLOW/TMS Console.

2. Use the principal monitor of the ***Center*** FLOW/TMS Console for manipulating the videotaping process.

3. Log into the TMS and bring up the *Camera Selection/Control Window*.

4. Click on **ACCEPT**, **DISPLAY**, monitor #**5** (for VCR). From the CCTV list, double click on a desired camera. This assigns the VCR to the selected camera for recording. You can then select monitor #4 to control the camera and position it to record what you want.

5. To display the CCTV camera image being recorded, click on **ACCEPT**, **DISPLAY,** and a monitor **other than** monitor #5 and select **CCTVVCR 0 TMS CONSOLE VCR** from the camera list (this should be at the top of the list). This monitor should be kept on during the duration of the programming process. Notice that the right upper corner of the picture shows the date and time. Also, "013 hold" will be displayed at the top center of the monitor.

6. Insert the videotape into the VCR. Use the black remote control for the VCR to control the VCR (It should be located on top of the VCR). The power turns on automatically when the tape is inserted.

7. Reset the tape counter by pressing the **RESET** button on the VCR's remote control.

8. Press **RECORD**. Taping begins immediately.

9. When the recording period is over, press **STOP**. Rewind the tape and press the **EJECT** button to retrieve the videotape. Turn the VCR OFF.

10. Clearly label the tape using the tape label sticker. Make sure to write down the:
    - name & location of incident,
    - date,
    - beginning and ending counter reading of this taping, and
    - name of the person who requested the tape (if the tape is to be sent out).

Using the VCR for Videotaping
(continued)

Planned Videotaping:

Follow the above steps, with the following substitutions:

6. Insert the videotape into the VCR (the power turns on automatically when the tape is inserted). Use the black remote control for the VCR to program the VCR (it should be located on top of the VCR).

    a) Press PROG/CLOCK.
    b) A blue screen appears with 3 options:
        1. Set clock
        2. Set program
        3. Calendar
    c) Select #2
    d) Select #1 (out of 4)
    e) Use the remote to set DATE/TIME/CHANNEL. (Enter each separately. AM or PM can be entered using the "1" or "2" button. Press CLEAR/RESET two times if you need to change something you just entered.)
    f) Press PROG/CLOCK to exit
    g) Turn off VCR. The TIMER light will appear and the TV screen will turn black.

9. When the recording period is over, the VCR will stop and turn itself off. Turn the VCR ON. Rewind the tape and press the **EJECT** button to retrieve the videotape.

Appendix B.8

Miami-Dade Incident Scene Safety Management Guideline

MIAMI/DADE FREEWAY MANAGEMENT TEAM

INCIDENT SCENE SAFETY OPERATING GUIDELINES ON LIMITED ACCESS HIGHWAYS IN MIAME-DADE COUNTY, FLORIDA

OBJECTIVES:

To provide specific procedures to insure safety of the general public and public safety personnel (Law Enforcement/Fire/Emergency Management Services) while conducting emergency operations on the scene of traffic incidents and to reduce delays by opening the roadway to traffic as quickly as possible.

DEFINITIONS:

A. Limited Access Highway - any Interstate Highway, U.S. Highway, *State* Route. or County Road with limited access.

B. On Scene Coordinator or Incident Commander - that person managing the accident scene.

C. Responsible agencies - those agencies with specific responsibilities on the scene of emergency operations.

NOTIFICATION:

It is the responsibility of the on-scene coordinator/incident commander to notify the necessary agencies needed to provide resources that will successfully mitigate the accident scene and restore normal traffic flow. These may include Florida Department of Transportation (FDOT), Florida Department of Environmental Protection (FDEP), Department of Environmental Resources Management (DERM), Dade County Expressway Authority (DCEA), private contractors, towing agencies, or additional public safety agencies.

COOPERATION:

Cooperation among the personnel at all responsible agencies such as law enforcement and the fire department is essential. When incidents involve injured persons and/or hazardous materials, the Incident Commander shall be the Fire Department Chief Commander until the injured persons have been treated and/or the exposure of hazardous materials is no longer a threat to the public. The Incident Commander shall subsequently be turned over to the law enforcement officer. Law enforcement personnel should provide traffic control, if fire department personnel are working in traffic lanes. Fire department personnel will assist law enforcement personnel in restoring normal traffic flow as soon as it can be safely accomplished.

RESPONSIBILTIES:

A. Law Enforcement:	traffic flow scene security/safety, investigation
B. Fire Department:	scene safety, emergency medical treatment, hazardous material
C. Other Agencies:	DERM, FDEP, FDOT, Miami-Dade County Public Works, Dade County Expressway Authority

RESOURCES:

Specific directions should be conveyed through emergency communications operators by the first arriving units to help direct later arriving units when response problems are encountered, or on-scene situations change. A request should be directed to the communications shift commander to provide an escort or road blockage to expedite emergency response.

PROCEDURES:

A. INCIDENT MANAGEMENT – The first arriving public safety agency representative will serve as the Incident Commander and advise other responding units of the situation. Upon arrival of other responsible agency representatives, a unified command incident management system will be instituted. The unified command system is responsible for interaction and coordination of individual agencies to develop one unified plan of action.

The first arriving unit will also be responsible for directing the subsequent arriving responsible units to assure safety of the incident scene and oncoming traffic.

The Incident Management System, as adopted by the Miami-Dade County Chief Fire Officers Association, will be used at all incidents.

B. LIAISON - The Incident Commander will establish liaison with all incoming agency personnel upon their arrival on scene. Those personnel arriving later should report to the established commend *post for briefing with* the Incident Commander.

C. RESPONSE - Units responding to the incident should attempt to reach the scene at the reported location in the normal direction of travel, unless advised otherwise by their emergency communications operator. Units will proceed in the opposite direction to normal traffic flow only at the specific request of law enforcement unit(s) on-scene, and only when it is confirmed that all traffic has been stopped in that section of the highway.

D. RESPONSE ZONE - If a specific response zone or responding agency or Department cannot be identified, all on-scene personnel shall cooperate in a “good faith” effort to immediately address all safety and environmental concerns.

County Roads -	Miami-Dade Police Department (MDPD) will contact their dispatcher and request Miami-Dade Public Works for assistance.
State Roads -	FHP will contact their dispatcher and request FDOT for assistance.
Expressway Authority Roads-	FHP will contact their dispatcher and request DCEA or its road-maintaining representative, currently PDOT, for assistance.

E. SCENE SAFETY - Only necessary operations will be allowed at the scene until deemed safe. All public safety personnel on-scene will make a coordinated effort to insure that these incident scene safety operating guidelines are followed. When emergency operations require personnel to work in conflict with motor vehicle traffic, emergency vehicles may be utilized as a shield from oncoming traffic, wherever possible.

When acting as a shield, vehicle warning lights shal1 remain on, and fluorescent and retro reflective, illuminated, or other appropriate warning devices shall be used to warn the oncoming traffic of emergency operations and possible hazards to emergency personnel operating at the incident.

Vehicles should be parked at an angle to protect personnel operating on-scene. To prevent a vehicle from colliding with personnel or equipment at the scene, the front wheels should be turned away from the incident. This procedure will require traffic to be routed into the remaining lanes, decreasing flow speed in those lanes. As soon as the law enforcement officers control traffic flow, the vehicles should be repositioned to assist law enforcement with redemption of normal traffic flow.

Later arriving emergency assistance personnel should park their vehicle in front of the incident, as close as may safely be done, in the same lane, with emergency lights operating. This will provide a safe zone directly in front of the immediate accident scene, without further impeding traffic.

F. TERMINATION - Once emergency activitie are ceased, the Incident Commander shall began to scale down the incident, with the highest priority given to restoring normal traffic flow. This may include; assisting towing agencies to safely remove vehicles assisting environmental agencies and assisting law enforcement investigations.

It is the Incident Commander's responsibility to insure that when incident mangement is transferred to another agency, safety of those still working in the area is maintained.

This includes private waste contractors, towing agencies, and environmental agency personnel.

All required reporting documentation should be completed prior to clearing the scene and transferring management to another agency.

G. INCIDENT CRITIQUE – A post-incident critique and follow up should be accomplished at the Dade County Freeway Management Team Meetings on all large scale incidents or incidents that presented unusual challenges to responders. These meetings may involve multiple agencies if warranted.

H. HAZARDOUS MATERIALS – These Incident Safety Operating Guidelines (ISSOG) do not supersede any Hazardous Materials Response Safety Operating Guidelines. OSHA 29 CFR 1910.120 is the mandated document for response to hazardous material incidents throughout the State of Florida.

I. TRAINING – It is incumbent upon each agency to educate and train their personnel who may be involved in the use of the ISSOG. The delivery of this training will insure the successful implementation of this program.

J. ACKNOWLEDGEMENT:

Merrett R. Stierheim, County Manager
Miami-Date County — Date

Servando M. Parapar, P.E., Executive Director
Dade County Expressway Authority — Date

Major Rebecca P. Tharpe, Florida Highway Patrol
Department of Highway Safety and Motor Vehicles — Date

Jose Abreu, P.E., District Secretary
Florida Department of Transportation — Date

Appendix B.9

Bergen County, New Jersey Traffic Incident Management Diversion Route Plan

BERGEN COUNTY
TRAFFIC INCIDENT MANAGEMENT
DIVERSION ROUTE PLAN

Developed by:

NEW JERSEY
DEPARTMENT OF TRANSPORTATION

BERGEN COUNTY
POLICE CHIEFS ASSOCIATION

BERGEN COUNTY
POLICE TRAFFIC OFFICERS ASSOCIATION

May 1996

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Index for Bergen County
Traffic Incident Management Diversion Route Plan

Traffic Incident Management Background

Highway congestion is a recurring event and a source of frustration and anxiety for numerous motorists. Incidents are a cause of congestion resulting in lost time and huge costs.

The majority of these incidents are disabled vehicles and minor motor vehicle accidents. During off-peak hours when traffic volumes are low, these incidents have little impact on traffic. When traffic volumes are high, their cumulative effect is substantial.

The congestion caused by an incident depends on the duration of an incident, the number of lanes that are closed, traffic volume and the presence of emergency vehicles. Even when an incident is off the roadway the presence of emergency vehicles will result in motorists rubbernecking.

Incident congestion can be minimized by clearing incidents as quickly as possible and diverting traffic before vehicles are caught in the incident queue. The queue will continue to build, increasing the motorist's vehicle-hours delay, until the incident is cleared. Every minute of incident produces from four to eight minutes of congestion. If the normal flow of traffic into the incident site is reduced by diverting traffic to alternate routes, then the vehicle-hours of delay are minimized. If the normal traffic flow is not diverted, then additional vehicle-hours of delay accrue.

The severity of an incident has a direct effect on the duration of an incident. Fatalities, for example, require substantial investigation. Other incidents, due to the complexity of the situation, number of vehicles involved, hazardous material spill or special removal equipment needs will severely impact the duration.

Incidents prove particularly vexing because of the randomness of their occurrence. Motorists can adapt to recurrent congestion caused by rush hour traffic. However, non-recurrent congestion due to an incident leads to unexpected delay and magnifies driver frustration.

Incident management is the spectrum of activities involved in the detection, response and clearing of incidents. It is the coordinated pre-planned use of resources to establish normal conditions after an incident occurs. It also provides motorists with information and guidance during the incident.

By having a coordinated Traffic Incident Management Plan, all agencies involved can operate from a sanctioned plan and work as a cohesive group to conclude the incident in a timely manner.

Impact of Incidents

The most common types of incidents cause capacity reductions ranging from fifteen to eighty percent. These capacity reductions result in congestion, delay and possible secondary incidents. Approximately twenty percent of all incidents are caused by previous incidents. Therefore it is essential to minimize the time that a capacity reducing incident remains on the highway.

Loss of Highway Capacity

Number of Lanes in One Direction	Number of Lanes Blocked	Capacity Reduction
2	Shoulder	25 %
2	1	70 %
3	Shoulder	15 %
3	1	50 %
3	2	80 %

Introduction to the
Bergen County Traffic Incident Management Plan

Effective incident management programs must be built upon existing procedures and relationships. To support a traffic incident management process it will be necessary to identify sources at which the incident assessment and decision-making coordination are carried out. While it is envisioned that the information exchange network would be a "network of equals" supporting each other, it is essential that a single "responsibility center" be defined for overall coordination of an incident.

The Bergen County Traffic Incident Management Plan is the combined effort of the New Jersey Department of Transportation (NJDOT), the Bergen County Police Chief's Association and the Bergen County Police Traffic Officer's Association. It has been developed to provide improved guidance when responding to traffic incidents on state highways. The plan is intended to improve traffic incident management through better communications and more efficient use of available resources.

The Bergen County Traffic Incident Management Response Team (BCTIMRT) is composed of personnel from the investigating police agency, other involved police agencies, NJDOT and Bergen County Police. It is the responsibility of the BCTIMRT to clear incidents and reopen the highway as soon as safely possible.

Post-incident critiques will be held to afford an opportunity to evaluate the effectiveness of the Bergen County Traffic Incident Management Diversion Route Plan. The participating agencies are requested to attend the critique to encourage inter-agency participation, resolve area issues and solicit suggestions on possible improvements.

Role of Investigating Police Agency

A. The investigating police agency has primary responsibility to ensure the health and safety of both the public and responders at an incident. The investigating police agency should implement the Incident Command System (ICS) and assume the role of Incident Commander (IC). The IC will assign personnel and resources as they feel necessary to mitigate such incident to a safe and efficient termination.

B. Upon arrival at an incident, investigating police agency will assess the scene to determine whether the Bergen County Traffic Incident Management Response Team is to be activated. This determination will be based on the nature of the incident, anticipated duration, impact on traffic and the guidelines set forth in the Levels of Implementation.

C. Once it has been determined that the BCTIMRT will be activated, clear and concise information regarding the location, nature, extent and duration of the incident, as well as closed or affected highways should be transmitted by the investigating police agency to the Bergen County
Traffic Incident Management Response Team at
1-800-INCIDENT (1-800-462-4336).

D. When the emergency operation and investigation are completed, the IC will then transfer responsibility of any necessary repair and maintenance of the highway to an appropriate NJDOT designee.

Role of Bergen County Traffic Incident Management Response Team (BCTIMRT)

A. The objective of the BCTIMRT is to improve the efficiency of the transportation network so as to alleviate congestion, reduce fuel consumption and pollution, effectively reduce congestion related delay, enhance motorist safety, and amplify overall mobility such that the productivity and economic competitiveness of the County of Bergen is maximized.

B. Upon notification by the Investigating Police Agency to activate the BCTIMRT, the following personnel will respond to the command post:
    * Investigating police agency's BCTIMRT representative
    * NJDOT's BCTIMRT representative
    * Bergen County Police's BCTIMRT representative

C. The BCTIMRT will inform the NJDOT Incident Management Response Vehicle to verify the feasibility of utilizing the intended diversion route. Once the diversion route has been verified the BCTIMRT will make notification to the police agencies and their BCTIMRT representative through which the diversion route traverses.

D. The BCTIMRT will establish and maintain a traffic information network throughout the duration of the incident.

E. A post-incident critique will be scheduled by the BCTIMRT in a timely fashion for all the agencies involved to attend. The results of the critique will be utilized to enhance and update the Bergen County Traffic Incident Management Plan.

Role of the New Jersey Department of Transportation (NJDOT)

A. NJDOT Policy on Incident Management

1. The NJDOT will make its equipment and resources available to the Bergen County Traffic Incident Response Management Team at traffic incidents and/or incidents that may have an impact on traffic on a state highway (i.e. special events, etc.). NJDOT resources will be used to assist in managing traffic, assist in clearing the incident and for improving safety.

B. NJDOT Responsibilities and Operating Procedures

1. NJDOT will respond to any police agency request for assistance and provide equipment and manpower to:

   a. Assist in conducting lane and roadway closures
   b. Move spilled cargo from travel lanes
   c. Relocate small (100 gallons or less) motor vehicle-based hydrocarbon fluid spills

2. NJDOT will not remove any material (including motor vehicle fluids) from the scene but will relocate material off the travel portion of the highway. The responsible party is liable for the removal of any material and cargo from the shoulder or berm portion of the highway.

3. NJDOT will relocate non-hazardous spilled cargo off the travel portion of the highway and will relocate small (100 gallons or less) quantities of. motor vehicle hydrocarbon-based products by spreading sand and/or absorbent material and moving same to the highway shoulder or berm portion of the highway. Such material then must be removed by the responsible party.

4. NJDOT-will provide traffic safety for the responsible party while their operations impact the traveled portion of the highway.

5. When the emergency operations and investigation are completed, the NJDOT designee will accept scene command responsibility to complete required repair and maintenance of highway.

Role of the New Jersey Department of Transportation (NJDOT)
(continued)

C. NJDOT Maintenance Crew Mobilization and Response Time

1. During normal operating hours, the NJDOT Maintenance Crew requires approximately one hour to respond to a scene. After hours or on weekends, the NJDOT Maintenance Crew will take approximately two hours to respond to a scene. **Normal Maintenance operating hours for the North Region are 0800 to 1630 hours.**

2. NJDOT maintenance yards have the following equipment; traffic cones, traffic control signs, dump trucks, front end loaders and sand.

3. At the Regional level, NJDOT can provide electronic arrow **boards and variable** message signs.

D. Maintenance Crew Supervisors and Area of Responsibility

1. **Crew Supervisor** **Lodi Yard**
   a. Route 17 (From Paterson Plank Road to Route 4)
   b. Route 46 (From Route 20 to Route 93 - Grand Avenue)
   c. Route 80 (From Union Boulevard in Totowa to Route 95)

2. **Crew Supervisor** **Ramsey Yard**
   a. Route 17 (From Route 4 to NJ/NY State Line)
   b. Route 287 (From Paterson-Hamburg Turnpike to NJ/NY State Line).

3. **Crew Supervisor** **Secaucus Yard**
   a. Route 1&9 (From Route 3 to Ridgefield Circle)
   b. Route 3 c. Route 17 (From Route 7 to Paterson Plank Road) d. Route 120.

4. **Crew Supervisor** **Paterson Yard**
   a. Route 4
   b. Route 208

5. **Crew Supervisor** **Fort Lee Yard**
   a. Route 1&9 (From Ridgefield Circle to Route 46)
   b. Route 5
   c. Route 9W
   d. Route 46 (From Route 93 - Grand Avenue to Route 9W)
   e. Route 63 (Known as Bergen Boulevard)
   f. Route 67 (Known as Palisade Avenue and Lemoine Avenue)
   g. Route 93 (Known as Grand Avenue)

Levels of Implementation for the Bergen County Traffic Incident Management Plan

Level I

An incident has resulted in lane closures on a state highway and is expected to have a prolonged duration and impact on traffic.

- Investigating police agency notifies the Bergen County Traffic Incident Management Response Team, (BCTIMRT) at **1-800-INCIDENT (1-800-462-4336).**

- The appropriate Bergen County Traffic Incident Management Response Team personnel will respond to the scene or command post to determine what actions may be taken to relieve congestion and enhance traffic safety.

Level II

An incident has resulted in a complete closure of the highway and is anticipated to last more than 90 minutes.

- Level I is implemented.

- The Incident Command System is established.

- Bergen County Traffic Incident Management Diversion Route Plan is implemented by the BCTIMRT.

- The diversion route is signed and maintained by the NJDOT Incident Management Response Vehicle.

- Variable Message Signs and Highway Advisory Radios are activated by NJDOT and TRANSCOM.

- The BCTIMRT will establish and maintain a traffic information network throughout the duration of the incident.

Levels

Hours	**Estimated Duration**	**Lanes Closed**			**Lanes Closed**	
		1	**2**	**3**	**1**	**2**
2100 - 0500	Less Than 90 Minutes	-	-	-	-	-
	More Than 90 Minutes	-	1	2	1	2
0500 - 2100	Less Than 90 Minutes	-	1	1	-	1
	More Than 90 Minutes	1	1	2	1	2

Form for Amendments to Bergen County
Traffic Incident Management Diversion Route Plan

In the event a diversion route needs to be updated, please photocopy the appropriate page and make the amendments on the photocopy. Also, photocopy this page and return both to the address at the bottom.

If there is a change of the Officer assigned to the Bergen County Traffic Incident Management Response Team, please photocopy and complete this page and return to the address at the bottom.

Police Department of ____

Amendments should be made to the attached photocopied diversion route plan
page(s) # ____

The following Officer has been assigned to the Bergen county Traffic Incident Management Response Team:

________________________ ____________________________
Rank Please print name

Please return photocopied pages to:

Bergen County Traffic Incident Management
66 Zabriskie Street
Hackensack, New Jersey 07601

TRANSCOM

TRANSCOM, the Transportation Operations Coordinating Committee, is a coalition of fourteen transportation and public safety agencies in New Jersey-New York-Connecticut metropolitan region. It was created in 1986 to provide a cooperative, coordinated approach to regional transportation management.

TRANSCOM's Operation Information Center (OIC) operates an extensive 24hour-a-day notification and response network to inform over 100 member agencies and affiliates (including police agencies) of congestion, collisions, emergency construction, service changes, delays, and other incidents on the region's transportation system. Information on incidents comes from a variety of sources, including calls from agency contacts, private traffic services, observations by TRANSCOM staff, closed-circuit television, and intelligent transportation systems.

OIC staff confirm the information (when not directly from the agency affected), code it, and send it out over a pager, phone, and fax network to all agencies that may be affected. TRANSCOM can also help marshal regional resources for incident response, such as permanent and portable variable message signs and highway advisory radio.

TRANSCOM's role is to serve as a resource to all police and transportation agencies in the region. There is no fee for the services TRANSCOM provides and one call to TRANSCOM assures that additional, non-emergency notifications are made. Notifications are immediate and a log of the transactions is maintained.

References and Acknowledgements

1. Incident Management Executive Summary, prepared by: Cambridge Systematics, Inc. for the Trucking Research Institute, October 1990.

2. Freeway Incident Management Handbook, Report # FHWA-SA-91-056, July 1991.

3. Incident Management Workshop, U.S. Department of Transportation, Federal Highway Administration, Demonstration Project No. 86, May 1994.

4. Incident Management Detection, Response and Operations, I-95 Corridor Coalition, prepared by: I-95 Northeast Consultants, January 1995.

Text by:

- Members of Bergen County Police Chief's Association
- Members of Bergen County Police Traffic Officer's Association
- Jean Servideo - Manager, NJDOT Traffic Operations-North
- John Gahwyler - Senior Engineer, NJDOT Traffic Operations-North
- David Lortz - Crew Supervisor, NJDOT North Region Maintenance
- Sgt. Vincent DeRienzo - Bergen County Police Department
- Sgt. Paul Einreinhofer - Bergen County Police Emergency Management

Maps by:

New Jersey Department of Transportation - Traffic Operations-North
- Timothy Bourne - Senior Engineer
- Silvia Eskander - Engineering Technician 1
- Michael Kinley - Engineering Technician 4

Cover Design by:

° Detective Samuel H. Upchurch - Bergen County Police Department

Legend of Diversion Route Symbols

Street	ST
Avenue	AVE
Boulevard	BLVD
Drive	DR
Road	RD
Left Arrow Detour Sign	[<-DS]
Right Arrow Detour Sign	[->DS]
Straight Arrow Detour Sign	[IDS]
Police Officer (Traffic Control)	{PD}
State Traffic Signal (N]DOT)	(STS)
Bergen County Traffic Signal	(CTS)
Bergen County Flashing Signal	(CFS)
Municipal Traffic Signal	(MTS)
Municipal Flashing Signal	(MFS)
Traffic signal located in Essex County	(Essex CTS)
Traffic signal located in Hudson County	(Hudson CTS)
Traffic signal located in Passaic County	(Passaic CTS)
Traffic signal located in New York State	(NY Traffic Signal) or (NY Flashing Signal)
Metropolitan Area Guidance Information Control	MAGIC
MAGIC Variable Message Sign	#S17S13.5 S - Sign 17 - Route S - Direction 13.5 - Milepost (Location)

ROUTE 4

WEST

ROUTE 4 WESTBOUND
WEST OF ROUTE 93 (GRAND AVENUE) SOUTH EXIT
TO
EAST OF SOUTH VAN BRUNT STREET EXIT
ENGLEWOOD

MAP

APPROXIMATE INCIDENT LOCATION PRIMARY ROUTE AND DIRECTION OF TRAVEL

SIGNALIZED INTERSECTION ***SECONDARY ROUTE AND DIRECTION OF TRAVEL***

ROUTE 17

NORTH

ROUTE 17 NORTHOUND
NORTH OF MIDLAND AVENUE ENTRANCE RAMP
TO
SOUTH OF RIDGEWOOD AVENUE WEST ENTRANCE RAMP
PARAMUS

MAP

APPROXIMATE INCIDENT LOCATION PRIMARY ROUTE AND DIRECTION OF TRAVEL

SIGNALIZED INTERSECTION ***SECONDARY ROUTE AND DIRECTION OF TRAVEL***

APPENDIX C
PROCUREMENT AND AGREEMENTS

Appendix C.1

Texas State Purchasing Catalog Information

PURPOSE: To establish procedures for the use of catalog purchases which are required for certain commodities and services.

BACKGROUND: Senate Bill 381 created Section 3.081, Article 601b VTCS requiring commodities or services identified by the Information Resources Management Act as automated information systems be purchased using catalog purchase procedures. The General Services Commission has adopted Rule 113.19 governing these purchases.

DEFINITION: <u>Automated information systems</u> are defined as "—the computers on which they are automated, or a service related to the automation of information systems or the computers on which they are automated, including computer software...or any telecommunications apparatus or device that serves as a component of a voice, data, or video communications network for the purpose of transmitting, switching, routing, multiplexing, modulating, amplifying or receiving signals on that network."

See Section 02, Chapter 03, Subject 02 for a list of commodity classes which will require use of catalog purchase procedures.

PROCEDURE: The following steps will be used for items or services requiring the use of catalog procedures:

- For Purchases $1000 and Under: Select a HUB vendor, if possible, from the catalogs who has the needed item or service and place the order. Competitive pricing is not a consideration.

- For Purchases Over $1000 and up to $15,000: Select a minimum of three catalog vendors who have the item(s) or service listed, at least two of them Hubs if available. Solicit their best price (either verbal or written depending on the complexity of the purchase) based on quantity, any other additional terms, conditions or delivery. Without divulging competitor's prices, purchaser may request vendor to lower his/her catalog price or to negotiate additional value to the department at no additional cost. Award to the vendor who meets all requirements and provides the best price and/or best overall value to the department. Be sure the file is documented with responses received and the reason for award if other than on the basis of lowest price.

- **For Purchases Exceeding $15,000:** Prepare a written description of the commodity(ies) or service required in a Request for Proposal format including:

    - Mandatory requirements - must be met by the offeror;

    - Desired requirements- those that we may desire, but failure to provide will not disqualify offeror;

    - Optional requirements- those that we or the offeror may add to the offer.

The RFP shall include criteria by which offers will be evaluated.

Mail RFP's to all approved Catalog Vendors who offer the item or service being requested. Only those offers meeting mandatory requirements will be considered. Purchaser will tally the offers according to the evaluation criteria. The purchaser can then select the offeror providing the best offer and negotiate additional requirements or lower cost prior to issuing the purchase order. The file must be documented as to how the eventual vendor was selected.

PURCHASE ORDERS. Purchase orders for catalogs purchases will be issued on Form 133, Open Market Purchase Order with the words “CATALOG PURCHASE” prominently displayed at the top of the item description portion of the form.

UNLISTED ITEMS

- <u>If time is not of the essence</u> and the item needed is not listed in any vendors catalog and if time permits, an attempt should be made to have an existing catalog vendor add the item to his/her catalog. Normally it takes the General Services Commission about two weeks for an item to be added to a catalog.

- <u>If time is of the essence</u> and we can not get a vendor to add an item to an existing catalog, or if the purchaser is unable to entice a vendor to submit a catalog to the General Services Commission, the purchaser may purchase the item using another method of purchase available under Article 601b, i.e.: delegated, contract or open market purchase. The purchase file must be documented as to why catalog procedures were not used.

END OF PROCEDURE

Authority

- Chapter 2157, Government Code
- 1 TAC 113.19

Policy

Purchases of automated information systems be made using the catalog purchase procedures unless the purchaser determines that the best value available accrues from an alternative purchase method (such as purchase from the state contract, open market purchase, small purchase, etc.), in which case the purchase shall be made using that method of purchase.

Definitions

The definition of *automated information systems* includes any automated information system; the computer on which it is automated; any service related to the automation of information systems or the computers on which they are automated, including computer software; or any telecommunications apparatus or device that serves as a component of a voice, data, or video communications network for the purpose of transmitting, switching, routing, multiplexing, modulating, amplifying or receiving signals on that network.

A *Qualified Information Systems Vendor (QISV) is* a vendor whose catalogs of automated information system items have been approved by the General Services Commission (GSC). A listing of approved catalog vendors is available on the GSC Outside Agency Purchasing System.

A Tx*DOT Contract for Automation Hardware and Software is* the best value contract or contracts that the General Services Division negotiates with one or more QISVs for the majority of the automaton hardware and software approved by the Information Systems Division (ISD) for use by districts and divisions.

The *best value available is* defined as the lowest overall cost considering the following as well as any other relevant factors:

- the overall life cycle cost of the system or equipment, including the purchase price, installation costs, hardware, and operational costs, including maintenance
- the estimated cost of employee training and estimated increase in employee productivity
- the estimated software and software maintenance costs
- the compatibility to facilitate exchange of existing data
- the system capacity for expansion and upgrade to more advanced levels of technology

Definitions (Contd.)

- the quantitative reliability factors of the system
- the level of training required to bring end-users to stated level of proficiency
- the technical support requirements for maintenance of data across a network platform and management of the network's hardware and software
- the vendor's compliance with applicable statewide standards adopted by the Department of Information Resources (DIR) or a subsequent entry as validated by criteria established by administrative rule.

Coordination

Each district and division is responsible for insuring that requests for automated information systems are submitted to and approved by the Information Systems *Division prior to district purchase* or *prior to submission to the General Services Division for purchase so* that the department's planning and technical review considerations can be addressed.

Information Systems Division approval of automated information systems requests is evidenced by an *ISD/DIR-approved* configuration report for those items contained on PJS or by documentation verifying Information Systems Division approval for those items requested outside PJS.

District Procedures

District purchasing personnel should review the TxDOT Contract(s) for automation equipment and software.

- If the item needed is covered by a contract, prepare a purchase order, Form 133-A. See 01434541, Preparing Form 133-A.
- If the item is not covered by a TxDOT contract, use the following procedures:

  For individual purchases under the no-bid limit, select a HUB vendor, if possible, from the list of approved automation information systems catalog vendors who have the item(s) or service listed in their catalog. Confirm availability and pricing and issue a purchase order in accordance with '"Purchase Orders" below.

Catalog Purchases (Continued)

District Procedures (Contd.)

For individual purchases over the no bid limit of items approved through the Procurement Justification System, select a minimum of three catalog vendors who have the items or services listed, at least two of them Hubs (if available).

1. Establish any conditions, such as delivery, necessary to secure the best value available to the department.

2. Solicit the selected vendors' best price, either verbally or in writing, depending on the complexity of the procurement.

3. Award the order to the vendor who meets all requirements and provides the best value available.

4. Prepare a purchase order in accordance with “Purchase Orders” below.

Be sure the file is documented with responses received and the reason for award if other than on the basis of lowest price.

For purchases of items that have not been reviewed under the PJS or undergone Information Systems Division Technical Review, submit a copy of the proposed specifications, as well as terms and conditions of the purchase, by memorandum to the General Services Division for review prior to soliciting price quotations. Upon review, the General Services Division may recommend changes to the specifications or terms and conditions, or may concur entirely with the proposed submission and notify the district to proceed with the procurement.

Purchase Orders

Purchase orders for catalog purchases shall be prepared and issued by district personnel on Form 133-A or on the Small Purchases System (SPS) of the Automated Purchasing System. Send the original to the vendor and copies to the Voucher Processing Branch of the Budget and Finance Division and to the General Services Division. Other copies may be distributed to all pertinent areas within the district.

NOTE: Districts with SPS will use that system to issue purchase orders of up to ten line items. If the purchase order contains more than ten line items, use a Form 133-A until the full APS comes on line. Follow the instructions in the *SPS Users Manual to* create the bidmaster, select the vendor, and make the award. The “Bid Code" for a catalog purchase is CT.

Unlisted Items

If the items or services needed are *not* listed in any QISV catalog, and if time permits, the purchaser should attempt to have an existing QISV add the item or service to its catalog. Normally, the General Services Commission requires about two weeks to add a product or service to an existing catalog. If time does not permit, or the purchaser cannot get a QISV to add a needed item or service to an existing catalog, the purchaser may purchase the item or service using another method of purchase (i.e., small purchase, state contract, open market, or, in the case of software, direct publication purchase) following the established procedures and limits for those types of purchases. The purchase order file *must* be documented as to why catalog procedures were not used.

Division Procedures

Divisions will submit their needs for procurement of goods, equipment, and services for automated information systems to the General Services Division on Material Request Form 1593 or by a memorandum bearing an authorized signature.

Catalogue Purchase Procedures

After a vendor has been approved as a Qualified Information Systems Vendor (QISV) by the GSC, a catalogue listing of all products and services will be provided by the vendor to all eligible purchasers upon request. Updates will be provided by the vendor to those who have already received a catalogue. A list of QISVs is available from the GSC.

Each agency is responsible for evaluating, negotiating, and ordering items in the catalogue(s) which meet their needs and which the agency determines to be the "best value." The GSC is limited to approval of the formatting of the catalogue. The GSC's approval is not to be considered an approval of products or pricing contained in the catalogues. Any QISV may include the following classes and items in their catalogues. These are the only commodities that may be purchased under the Catalogue Purchase Procedure.

Class	Items
285	90
287	12 (Communications & Computer Only), 36 (Computer Racks Only), 54, 70, 96 (Data, Computer Hook-up Only)
476	All items, except 99
477	All items, except 99
478	All items, except 99
479	All items, except 99
480	All items, except 99
481	All items, except 99
482	All items, except 99
483	All items, except 99
484	All items, except 99
525	90
600	61, 64
610	56, 63
840	45, 76, 80
906	20,84
915	05 (Non-Regulated Automated Information systems [AIS] only), 28 (Electronic Information only), 68 (optical Disk only), 77, 78 (provided by Non-regulated Carrier), 95
920	All items

Class	Items
924	75, 76
939	21, 61, 68, 72
962	46 (AIS only), 56 (AIS only), 69 (AIS only)
964	26, 30

SPECIAL NOTES:

1. All catalogues must have an approval letter from the GSC, placed in the front of the catalogue, before being sent to the agency.
2. Printer paper and transparencies are not to be included in any vendor catalogue, because they are not included in any of the class/items listed above.

Appendix C.2

AZTech Contract and Licensing Agreements

CONTRACT

BETWEEN

MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION

AND

ETAK, INC.

TO PROVIDE

CONSULTING SERVICES

IN SUPPORT OF THE

MODEL DEPLOYMENT INITIATIVE
IN THE PHOENIX Metropolitan AREA

CONTRACT NO. CY 1997 20

C-64-97-245-1

CONTRACT

BETWEEN

MARICOPA COUNTY DEPARTMENT OF TRANSPORTATION

AND

ETAK, INC.

TO PROVIDE

SERVICES

FOR

AZTECH MODEL DEPLOYMENT INITIATIVE

1. PARTIES

The parties to this Contract are Maricopa County Department of Transportation, heinafter referred to as "COUNTY" and "ETAK, INC., hereinafter referred to as "CONSULTANT".

2. RECITALS

This Contract is entered into with reference, in part, to the following:

2.1 Pursuant to the provisions of the Arizona Revised Statues, Section 11-201, the Maricopa County Board of Supervisors has the authority to enter into contracts.

2.2 The COUNTY desires that CONSULTANT perform certain services, specifically, to establish a regional intergrated traveler information system in Phoenix metropolitan area.

2.3 CONSULTANT desires to perform such services and has represented that it is professionally and technically qualified to perform such services and the COUNTY has relied on such representation when entering into this Contract.

3. ENTIRE CONTRACT; MODIFICATIONS

This Contract embodies the entire agreement between the COUNTY and CONSULTANT and shall supersede all prior contracts, proposals, representations, negotiations, or letters pertaining to the services, whether written or oral. The parties shall not be bound by or liable for any statements, representations, promise, or understanding of any kind not set forth in this Contract, and this Contract shall only be modified by an Amendment or Change Order, executed by both parties. This Contract includes all documents either attached hereto or incorporated herein by reference. Specifically included as exhibits to this Contract and attached hereto are:

Exhibit A - Scope of Work
Exhibit B – Consultant's Fee Schedule
Exhibit C - End-User License Agreement for Government Funded Developments
Exhibit D - End-User License Agreement for Pre-Existing Products
Exhibit E - FHWA Letter- Intellectual Property Provisions

4. DEFINITIONS

When initially capitalized in this Contract, or amendments thereto, the following words and phrases shall have the meaning specified below:

AGENT - The duly authorized representative to act as a sole contact for administering this Contract, appointed by the Director of the COUNTY'S Department of Transportation.

COUNTY - Maricopa County Department of Transportation.

CONSULTANT - Etak, Inc.

CONTRACT - This document, including all referenced material which forms a contract between the COUNTY and the CONSULTANT for the performance of the work by the CONSULTANT, including all Change Orders and Amendments hereto.

BEST EFFORTS - Those efforts which a skilled, competent, experienced, and prudent CONSULTANT would use to perform and complete the requirements of this Contract in a timely manner, exercising the degree of skill, care, competence and prudence customarily imposed on a CONSULTANT performing similar work.

DOCUMENTATION - All drawings, plans, studies, surveys, specifications, reports, design analysis, data, information, proposals, and other similar documents or material, including the contents thereof, which is to be gathered, prepared or delivered by CONSULTANT in connection with the work.

FORCE MAJEURE - An act of God or an event beyond the control of the party, including, but not limited to, an act or omission of the federal government, act or omission of civil or military authority, strike or lockout, act of a public enemy, war, blockade, insurrection, riot, epidemic, landslide, earthquake, fire, storm, lightning, flood, washout, civil disturbance, or non-performance and/or performance delays by either public or private partners, excluding CONSULTANT'S agents, subcontractors or material suppliers, which could not have been avoided through exercise of reasonable care, prudence, and diligence.

GOVERNMENT - Federal Highway Administration, the State of Arizona, and Maricopa County.

5. WORK

CONSULTANT shall perform and complete the work specified in Exhibit A, Scope of Work, and shall furnish all personnel, supervision, equipment and materials required to perform and complete the services, except equipment and materials specified in this Contract as being furnished by the COUNTY.

6. PERFORMANCE PERIOD

CONSULTANT shall perform and complete the services according to the schedule provided in Exhibit A, Scope of Work. Any abnormal expenses such as premium time or overtime incurred by CONSULTANT to meet the schedule shall become by the CONSULTANT, unless specifically approved by the COUNTY and authorized in writing.

7. PAYMENT TO CONSULTANT

7.1 COUNTY shall compensate CONSULTANT for complete and satisfactory performance of the services and CONSULTANT'S other obligations under this Contract a total lump sum fixed price in accordance with the Maricopa County Procurement Code. However, the COUNTY does not guarantee either a minimum or maximum fee under this Contract, and CONSULTANT, in accepting this Contract, does not expect the payment of either a minimum or maximum fee. For the not-to-exceed portion of this contract, payment will be made for the actual expenses incurred as provided in Exhibit B, Consultant's Fee Schedule.

7.2 The COUNTY will pay CONSULTANT upon completion of the work or portions thereof, as accepted by the COUNTY, subject to the limitations set forth in Exhibit B, Consultant's Fee Proposal.

7.3 If CONSULTANT'S ASSIGNMENT has DBE participation and CONSULTANT desires a partial payment in accordance with the provisions above, CONSULTANT shall complete and forward a COUNTY provided form indicating payment distribution as it pertains to DBE firms.

7.4 The COUNTY shall compensate CONSULTANT for work performed by any and all Subconsultants, as specified in Exhibit A, Scope of Work, at the actual level of work completed by the subconsultant's and in accordance with Exhibit B, Consultant's Fee Proposal, regardless of CONSULTANT'S level of work completed.

7.5 The overhead rate stated in Exhibit B, Consultant's Fee Schedule, is a provisional rate and is subject to adjustments based on audit findings.

7.6 The COUNTY will pay CONSULTANT upon completion of the work as accepted by the COUNTY, except that progress payments may be made as billed by CONSULTANT based on approved monthly progress reports subject to the limitations set forth in Exhibit A, Scope of Work. Ten percent (10%) of all contract payments made on an interim basis shall be retained by t

se or claim requiring a greater amount to be retained. After the Contract is fifty percent (50%) completed, no more than five percent (5%) of the amount of any subsequent progress payments shall be retained provided CONSULTANT is making satisfactory progress on the project, except if at any time the COUNTY determines satisfactory progress is not being made, ten percent (10%) retention shall be reinstated for all progress payments made under the Contract subsequent to the determination.

7.8 Any retention shall be paid or substitute security returned or released, as applicable, to CONSULTANT within forty-five (45) calendar days after:

- final completion of all work under Exhibit A, Scope of Work;
- acceptance of work under the Contract;
- invoicing for any retained monies has been received by the COUNTY; and,
- a document stating the total payments received by the prime as well as total payments the prime has made to DBE subcontractors, vendors, and suppliers.

8. INDEMNIFICATION

8.1 CONSULTANT agrees to indemnify and save harmless the COUNTY, any of its departments, agencies, officers, or employees; Arizona Department of Transportation, its employees, and agents; the Federal Highway Administration, its employees, and agents from all suits, including attorney's fees and costs of litigation, actions, loss, damage, expense, cost of claims, of any character or any nature arising out of CONSULTANT'S wanton, willful or negligent acts, errors or omissions in-the performance of work under this Contract, and any wanton, willful or negligent acts, errors or omissions by any subconsultant or other AGENT used by CONSULTANT in the performance of work under this contract.

9. LIMITATION OF LIABILITY

Except as provided by the insurance coverage to be furnished by the CONSULTANT pursuant to Section 10 of this Contract, CONSULTANT'S and sucontractor's liability to the COUNTY under this Contract shall be limited to the amount of the Contract. CONSULTANT and/or its subconsultants shall not be liable to the COUNTY for any indirect or consequential loss or damage incurred by the COUNTY.

10. INSURANCE

CONSULTANT and subconsultants of any tier shall provide and maintain for the duration of the contract the following insurance coverages:

10.1 Comprehensive General Liability Insurance with a combined single limit of one million dollars ($1,000,000) each occurrence. The policy shall include coverage for bodily injury liability, property damage liability, personal injury liability (including coverage for contractual and employee acts), and blanket contractual. Said policy shall contain a severability of interest provision.

10.2 Comprehensive Automobile Liability Insurance with a combined single limit for bodily injury and property damage of one million dollars ($1,000,000) each occurrence with respect to CONSULTANT'S vehicles whether owned, leased, or non-owned, assigned to or used in the performance of the work under this Contract.

10.3 Workers Compensation Insurance to cover obligations imposed by federal and state statues having jurisdiction of CONSULTANT'S employees engaged in the performance of the services, with a limit mandated by state statues.

10.4 The policies required under Sections 10.1 and 10.2, above, shall be endorsed to include the COUNTY and its employees and elected officials and Arizona Department of Transportation and its employees as additional insured and shall stipulate that such insurance shall be primary insurance and that any insurance carried by the COUNTY, its employees and elected officials, shall not be contributory insurance.

[PLEASE NOTE THAT SECTIONS 10.5-35.3 CONTAIN STANDARD CONTRACT LANGUAGE AND ARE NOT INCLUDED HERE.]

36. <u>WARRANTY</u>

36.1 CONSULTANT warrants for the period of one (1) year from the date of installation that the equipment (hardware) installed under this Contract, shall conform to Exhibit A, Scope of Work, shall be useable for the use intended, and shall be free from any security interest, lien, or encumbrance. CONSULTANT further warrants that any corrections made by CONSULTANT shall also conform to the warranty requirements stated above.

36.2 CONSULTANT warrants for the period of ninety (90) calendar days from the date of installation that the software provided under this Contract, shall conform to Exhibit A, Scope of Work, shall be useable for the use intended, and shall be free from any security interest, lien, or encumbrance. CONSULTANT further warrants that any corrections made by CONSULTANT shall also conform to the warranty requirements stated above.

36.3 In the event of non-conformance with this warranty, CONSULTANT shall take all necessary actions to correct the non-conformance, at its sole expense, in the most expedient manner, as dictated by the existing circumstances. CONSULTANT, upon notification by the COUNTY of any non-conformance with this warranty, shall correct the non-conformance within ten (10) calendar days from receipt of such notice. If CONSULTANT fails to correct the non-conformance with in the time specified, the COUNTY may, in addition to any rights and remedies it may have by law or otherwise, correct the non-conformance by any means the COUNTY deems appropriate and CONSULTANT shall reimburse the COUNTY for all expenses and costs incurred in performing such corrective action.

37. <u>INTELLECTUAL PROPERTY AND PROPRIETARY INFORMATION</u>

37.1 General - CONSULTANT and Subconsultants of any tier shall identify and segregate in advance all intellectual property which was or will be developed solely with non-federal funds and for which no license will be granted to the GOVERNMENT.

37.2 Trade Secrets - The GOVERNMENT, will not publicly disclose information obtained as a result of this Contract which is marked and identified as proprietary or confidential, and which consists of information such as trade secrets or commercial and financial information that is privileged or confidential within the meaning of §552 (b) (4) of Title 5, U.S.C.

To the extent permitted by Title 39 of the Arizona Revised Statutes, and the Maricopa County Procurement Code, MC1-104, the COUNTY will not publicly disclose information obtained as a result of this Contract which is marked and identified as proprietary or confidential, and which consists of information such as trade secrets or commercial and financial information that is privileged or confidential within the meaning of §552 (b) (4) of Title 5, U.S.C.

37.3 Copyright - In accordance with GOVERNMENT policy, the copyright of work produced under this Contract shall remain with the authors. The GOVERNMENT reserve a royalty-free, non-exclusive and irrevocable license to reproduce, publish, or otherwise use and authorize others to use copyrightable work produced with Federal funds for Federal Government purposes.

37.4 Patents - Rights to inventions developed with Federal funds under this Contract shall be determined in accordance with 37 CFR Part 401. The clause at 37 CFR §401.14, as modified below, is hereby incorporated by reference.

37.4.1 The term, "to be performed by a small business firm or domestic nonprofit organization" shall be deleted from paragraph (9) (1) of the clause;

37.4.2 Paragraphs (9) (2) and (9) (3) of the clause shall be deleted; and

37.4.3 Paragraph (1) of the clause, entitled "Communications" shall be modified to read as follows: "(1) Communications - All notifications required by this clause shall be submitted to the FHWA Division Office."

37.5 The County concurs with the terms of Exhibit E of this Contract insofar as it represents an explanation of the intention and understanding of portions of Section 37 of this Contract.

(END OF SECTION 37)

EXHIBIT A - SCOPE OF WORK

**MODEL DEPLOYMENT INITIATIVE
IN THE PHOENIX METROPOLITAN AREA**

1. PROJECT OBJECTIVE

On October 24, 1996 the Federal Highway Administration awarded a 7.5 Million Intelligent Transportation Model Deployment Grant to the AZTech public/private partnership for the Phoenix metropolitan area.

The AZTech objective is to integrate the existing intelligent transportation infrastructure into a regional system by establishing a regional integrated traveler information system for the multimodel traveler and by expanding the transportation management system for the Phoenix metropolitan area. Under the terms of the Model Deployment Grant, AZTech is required to provide roadway, transit and aviation information to travelers across jurisdictional boundaries, thereby enhancing safety and regional mobility. The AZTech Integrated Regional Advanced Travel Information System (ATIS) will guide the Phoenix metropolitan area's multimodal transportation system into the 21st century.

2. GENERAL

CONSULTANT, in cooperation with other participants of the AZTech public/private partnership, or by contracting with subconsultants, shall establish a regional integrated traveler information system for the multimodal travelers in the Phoenix metropolitan area by gathering and integrating multimodal traveler information from a variety of existing and future private and public sector sources and disseminate such information to various governmental agencies, commercial establishments and to individual travelers, by marketing to a variety of products and services providers the right to disseminate such information. Services shall include but not necessarily be limited to the following:

2.1 Establish a traffic information database for the Phoenix metropolitan area;

2.2 Convert the available traffic data into standard and customized formats;

2.3 Transmit traffic information to participating product and service providers and users under license agreements;

3. SPECIFIC TASKS

CONSULTANT, in cooperation with other participants of the AZTech public/private partnership, or by contracting with subconsultants, shall provide a regional integrated traveler information system for the Phoenix metropolitan area.

The COUNTY will provide data fusion, formatting and management of available traffic information from public sources and automatic transmission of the fused public sector traffic data to the workstations provided by CONSULTANT in mutually agreed communication protocols.

CONSULTANT'S services shall include but not necessarily be limited to the following specific tasks:

3.1 Submit to the COUNTY a Project Schedule for the AZTech Advanced Traveler Information System for the Phoenix Metropolitan Area with specific milestones no later than thirty (30) calendar days after the Notice to Proceed has been issued.

3.2 Identify sources of relevant data for the AZTech Advanced Traveler Information System for the Phoenix Metropolitan Area no later than three (3) months after the Notice to Proceed has been issued;

3.3 Define and design the AZTech Advanced Traveler Information System for the Phoenix Metropolitan Area no later than three (3) months after the Notice to Proceed has been issued;

3.4 Develop a comprehensive product and service provider business/ marketing strategy to establish a self-supporting and sustainable advanced traveler information system for the Phoenix metropolitan area. This strategy shall be completed no later than four (4) months after the Notice to Proceed has been issued;

3.5 Enter into agreements with public agencies and/or private sector entities for the collection of and/or access to traffic data for the AZTech Advanced Traveler Information System for the Phoenix Metropolitan Area, no later than (9) months after the Notice to Proceed has been issued. CONSULTANT is not required to pay for the traffic data or to assume any liability under such agreements;

3.6 Agreement(s), a minimum of two (2) Etak Traffic Work stations at the Arizona Department of Transportation Traffic Operations Center with open architecture design, the flexibility to adapt to new technologies, and capable of receiving collected data, merging, managing, and converting traffic information for transmission to participating product and service providers. The services described in this section shall be completed no later than nine (9) months after the Notice to Proceed has been issued.

3.7 Prepare a minimum of ten (10) each, Operation, Maintenance, and Service Manuals, to be completed no later than nine (9) months after the Notice to Proceed has been issued:

3.8 Participate with other AZTech participants in the preparation and execution of the system's integration and test plan and the system's acceptance plan for the AZTech Advanced Traveler Information System for the Phoenix Metropolitan Area, in accordance with the requirements of the COUNTY;

3.9 Prepare and deliver to COUNTY, in accordance with the terms of the Contract and the End-User License Agreement(s), customized databases for the AZTech Advanced Traveler Information System for the Phoenix Metropolitan Area, which shall include but not necessarily be limited to digital maps, location tables, and traffic messages/information lists. This task shall be completed no later than nine (9) months after the Notice to Proceed has been issued;

3.10 Identify to the COUNTY interfaces to be developed for individual product and service providers. Prepare interface control documents for every identified interface, considering the protection of proprietary information requirements, if appropriate. Interface development shall not proceed without the express written approval of the COUNTY;

3.11 Prior to the development of the individual interfaces, CONSULTANT shall submit copies of the agreements pertaining to the deployment of the applicable devices to the COUNTY, considering the protection of proprietary information requirements, if appropriate. CONSULTANT shall not proceed with the development of the interfaces without a written mutual agreement.

3.12 Participate in the preparation and execution of the systems training plan for the AZTech Advanced Traveler Information System for the Phoenix Metropolitan Area, in accordance with the requirements of the COUNTY, which shall include but not be limited to a minimum of forty (40) hours of training for up to twenty (20) persons. In the event the training requirements exceed forty (40) hours, a Change Order specifying the additional training requirements and compensation therefore, shall be issued by the COUNTY upon mutual agreement with the CONSULTANT. The training shall be performed in accordance with the training plan schedule but shall be completed no later than nine (9) months after the Notice to Proceed has been issued;

3.13 Enter into commercial agreements to sell or license the AZTech Advanced Traveler Information System for the Phoenix Metropolitan Area output information to product and service providers to enable such product and service providers to provide AZTech Advanced Traveler Information System for the Phoenix Metropolitan Area information in standard or customized formats either via landline or wireless communication systems to fixed, portable and mobile end user platforms on an ongoing basis, commencing no later than nine (9) months after the Notice to Proceed has been issued. CONSULTANT shall not be required to incur costs as part of the agreements, unless mutually agreed to by the parties to the Contract.

3.14 Provide services, consisting of traffic data collection for the AZTech Advanced Traveler Information System for the Phoenix Metropolitan Area, which shall include but not necessarily be limited to data on traffic speeds, accidents and/or incidents, road closures and road work activities from public agencies and private sector entities, allowing automatic transfer or manually enter collected data on to workstations, and the merging, management and dissemination of such data, on a twenty-four (24) hours per day, seven (7) days per week basis, commencing no later than nine (9) months after the Notice to Proceed has been issued;

3.15 Convert data identified in Section 3.13, above into standard and customized formats in accordance with the requirements of the individual product and service providers and, where appropriate, independent of the base map used. The conversion shall commence no later than nine (9) months after the Notice to Proceed has been issued and shall be provided on an ongoing basis;

3.16 Pursuant to License Agreement(s) identified in Section 3. 13, above, between the participating product and service providers and CONSULTANT, transmit to participating product and service providers in standard and customized formats the AZTech Advanced Traveler Information System for the Phoenix Metropolitan Area information commencing no later than nine (9) months after the Notice to Proceed has been issued. This information is for product and service providers who shall furnish the information either via landline or wireless communication systems to fixed, portable and mobile end user platforms on an ongoing basis.

3.17 Deliver the information, identified in Section 3.14, above, to participating public sector agencies on a proprietary basis, free of charge, via standard delivery protocols, pursuant to the terms of the End-User License Agreement(s) to be executed between Public Sector Agencies and CONSULTANT, on an ongoing basis, commencing no later than nine (9) months after the Notice to Proceed has been issued. The public agencies shall recognize and agree that such traffic information and other CONSULTANT technology is proprietary to CONSULTANT, agree to use such traffic information for their own, internal use only and agree not to provide such traffic information to the public or any public or private sector agency, company or other entity which may provide such traffic information to the public;

3.18 Sell or license the AZTech Advanced Traveler Information System f
ay require additional funding from the new product and service providers or other sources;

3.19 Participate in the development and execution of the system's evaluation plan in accordance with the requirements of the COUNTY. CONSULTANT'S efforts for this task shall be a minimum of two hundred (200) hours, a Change Order specifying the additional evaluation requirements and compensation therefore, shall be issued by the COUNTY upon mutual agreement with the CONSULTANT.

3.20 Services provided shall be in accordance with the evolving national and international standards and protocols, where applicable.

3.21 Operate the advanced traveler information system for a five (5) year period, from the date the system is fully operational. The level of operation shall be determined by the commercial feasibility of the AZTech Advanced Traveler Information System for the Phoenix Metropolitan Area and shall be as mutually agreed to in writing between the COUNTY and CONSULTANT.

4. DELIVERABLES

4.1 Pursuant to the terms of the Contract and the End-User License Agreement(s), CONSULTANT shall provide and furnish licenses to the COUNTY for the following deliverables:

4.1.1 Two (2) Traffic Workstations including graphical user interface for accepting manual traffic information;

4.1.2 Workstation application software;

4.1.3 Customized dynamic database for the Phoenix metropolitan area, which shall include but not necessarily be limited to traffic speeds, traffic accidents and/or incidents, road closures, road construction activities;

4.1.4 CONSULTANT'S standard database for the Phoenix metropolitan area; including the digital maps, creation of location tables, traffic messages/information lists;

4.1.5 Interface(s) for accepting automatic traffic information from public sector information sources;

4.2 Interfaces capable of transmitting and disseminating traffic information to various media, which shall include but not be limited to the following:

4.2.1 Conventional Radio and television broadcasts;

4.2.2 One (1) Cable television channel;

4.2.3 One (1) Web page;

4.2.4 One (1) for commercially and public sector deployed Kiosks;

4.2.5 One (1) interactive television network;

4.2.6 Four (4) wireless communications services;

4.2.7 Three (3) types of end user products;

4.3 Ten (10) Training Operations, Service and Maintenance Manuals;

4.4 Licenses for the software, the databases and the workstations, for the duration of the implementation and operational period;

4.5 Document the COUNTY'S right to any hardware and/or software upgrade subsequent to the implementation period.

5. ADDITIONAL SERVICES

CONSULTANT may be requested to perform any or all of the following services for the COUNTY:

5.1 Negotiate agreements with emergency response agencies pertaining to emergency notifications, response plans and policy;

5.2 Establish communication networks for high speed FM sub-carrier systems;

5.3 Develop and/or modify software for personal digital assistant systems and/or handheld personal computers;

5.4 Procure a minimum of ten (10) personal digital assistants and twenty (20) high speed FM sub-carrier receivers for test purposes.

6. MILESTONES

	TASK DESCRIPTION	DATE OF COMPLETION
6.1	Submit Project Schedule	One (1) month after the Notice to Proceed has been issued
6.2	Identify all sources of relevant data	Three (3) months after the Notice to Proceed has been issued
6.3	Define and design the AZTech advanced traveler information system	Three (3) months after the Notice to Proceed has been issued
6.4	Develop product and service provider business/marketing strategy	Four (4) months after the Notice to Proceed has been issued
6.5	Enter into agreements with public agencies and/or private sector entities	Nine (9) months after the Notice to Proceed has been issued
6.6	Furnish and install a minimum of two (2) Etak Traffic Work stations, complete with data bases and interfaces	Nine (9) months after the Notice to Proceed has been issued
6.7	Prepare Operation, Maintenance and Service Manuals;	Nine (9) months after the Notice to Proceed has been issued
6.8	Participate in the preparation and execution of the system’s integration and test plan, and the system’s acceptance plan	At request of the COUNTY
6.9	Prepare and deliver customized databases	Nine (9) months after the Notice to Proceed has been issued

6.10	Identify and prepare interface control documents	Ongoing
6.11	Submit copies of the agreements for the individual interfaces	Ongoing
6.12	Participate in the preparation and execution of the system's training plan	At the request of the COUNTY
6.13	Enter into commercial agreements	Nine (9) months after the Notice to Proceed has been issued
6.14	Commence operation of the AZTech advanced traveler information system	Nine (9) months after the Notice to Proceed has been issued
6.15	Convert data into standard and customized formats	Nine (9) months after the Notice to Proceed has been issued
6.16	Transmit to participating product and service providers, in standard and customized formats	Nine (9) months after the Notice to Proceed has been issued
6.17	Deliver the information to participating public sector agencies	Nine (9) months after the Notice to Proceed has been issued
6.18	Sell or license to product and service providers the AZTech advanced traveler information	Ongoing
6.19	Participate in the development and execution of the system's evaluation plan	At the request of the COUNTY
6.20	Provide services in accordance with the evolving standards and protocols	Nine (9) months after the Notice to Proceed has been issued

6.21	Operate the advanced traveler information system for five (5) year period	Ongoing
6.22	Deliver licenses	Nine (9) months after the Notice to Proceed has been issued

7. <u>DELIVERY</u>

7.1 Consultant shall deliver all equipment specified in Sections 3.6, 3.7, 3.9, 4 and 5, above, FOB Traffic Center of the Arizona Department of Transportation at 2302 West Durango Street, Phoenix, AZ 85009.

7.2 Consultant shall assume all Risk of Loss and retain title to the equipment until the equipment has been delivered at the location specified above.

All services specified in this Scope of Work, with the exception of the operation and maintenance of the system and the addition of new product and service providers, shall be completed no later than twelve (12) months after the Notice to Proceed has been issued.

EXHIBIT C

ETAK END-USER LICENSE AGREEMENT
FOR GOVERNMENT FUNDED DEVELOPMENTS
ON THE AZTECH MODEL DEPLOYMENT

1. GRANT OF LICENSE. Etak, Inc. grants Maricopa County Department of Transportation (User) a royalty-free, non-exclusive and irrevocable license to reproduce, publish or otherwise use, and to authorize others to use, the government funded software, data and/or documentation as defined in the attached Exhibit 1 (the "Government Funded Products"), solely, for official governmental purposes (Government Purposes).

User does not receive any, and Etak retains all, ownership rights in the Government Funded Products. The Products are copyrighted and may only be used for Government Purposes even if modified or merged with other Products. User shall not alter or remove any copy right notice or proprietary legend contained in or on the Products. User shall include a copy of this License Agreement with any authorization to others to use the Government Funded Products.

2. LIMITED WARRANTY AND LIABILITY. Etak warrants that the Products in the version and level that is current on the date of acceptance by User will, for ninety (90) days from that date, conform to specifications mutually agreed to by User and Etak (the "Specifications"), when used for the intended use on the AZTech project (the "Intended Use") in a computer environment provided by Etak. The Products are complex and may contain some imperfections, defects or errors (e.g., missing streets, misspelled street names, etc.). Etak does not warrant that the Products will be error free, that operations of the Products will be error free or uninterrupted, or that all imperfections can or will be corrected. Etak does warrant, however, that the Products will comply with the Specifications and that they will be suitable for the Intended Use.

User must notify Etak within the 90-day warranty period of any warranty claim. Etak's SOLE OBLIGATION and User's SOLE REMEDY under this Limited Warranty is for Etak, at Etak's option, to repair or replace the Products or to provide an avoidance procedure within a reasonable time so that the Products conform to the Specifications. Etak further warrants that any repair, replacement, or avoidance procedure provided by Etak shall also conform to the warranty requirements stated above for a period not to exceed an additional ninety (90) day from the end of the original warranty period.

This Limited Warranty is void if any non-conformity has resulted from accident abuse, misuse, misapplication, or modification by someone other than Etak. This Limited Warranty is non-transferable.

The express warranty in this Section 2 is a limited warranty and it is the only warranty made by Etak under this End-User License Agreement. Etak makes and user receives no other warranty whether expressed or implied, and all warranties of merchantability and fitness for any purpose other than the intended use are expressly excluded under this End-User License Agreement.

Etak's liability to User under this End-User License Agreement: (1) for warranty claims shall be limited to the amounts actually paid by User to Etak, and (2) for other claims shall be limited to the amount of the contract between Etak and User. Etak shall not be liable to User for any indirect or consequential loss or damage incurred by User.

3. MISCELLANEOUS. If any provision of this Agreement is declared invalid or unenforceable, the remaining provisions of this Agreement shall remain in effect. Any notice under this Agreement shall be delivered by U.S. certified mail, return receipt requested, or by overnight courier to Etak, Inc.

EXHIBIT D

ETAK END-USER LICENSE AGREEMENT
FOR ETAK PRE-EXISTING PRODUCTS
AND PRIVATELY FUNDED DEVELOPMENTS
PROVIDED TO THE AZTECH MODEL DEPLOYMENT

1. GRANT OF LICENSE. Etak, Inc. grants the Maricopa County Department of Transportation (User) a non-transferable, non-exclusive five (5) year license to use the software, data and/or documentation as defined in the attached Exhibit 1 (the "the Products"), solely for use on the Aztech model Deployment (the "Intended Use"). User may not copy, reverse engineer, translate, port, modify or make derivative works of the Products. User may not rent, disclose, publish, sell, assign, lease, sublicense, market, or transfer the Products or use them in any manner not expressly authorized by this Agreement. User shall not derive or attempt to derive the source code or structure of all or any portion of the Products by reverse engineering, disassembly, decompilation or any other means.

User does not receive any, and Etak retains all, ownership rights in the Products. The Products are copyrighted and may not be copied, even if modified or merged with other Products. User shall not remove any copyright notice or proprietary legend contained in or on the Products.

2. LIMITED WARRANTY AND LIABILITY. Etak warrant that the Products in the version and level that is current on the date of acceptance by User will, for ninety (90) days from that date, conform to specifications mutually agreed to by User and Etak (the "Specifications"), when used for the Intended Use in a computer environment provided by Etak. The Products are complex and may contain some imperfections, defects or errors (e.g., missing streets, misspelled street names, etc.). Etak does not warrant that the Products will be error free, that operations of the Products will be error free or uninterrupted, or that all imperfections can or will be corrected. Etak does warrant, however, that the Products will comply with the Specifications and that they will be suitable for Intended Use.

User must notify Etak within the 90-day warranty period of any warranty claim. Etak's SOLE OBLIGATION and User's SOLE REMEDY under this Limited Warranty is for Etak, at Etak's option, to repair or replace the Products or to provide an avoidance procedure within a reasonable time so that the Products conform to the Specifications. Etak further warrants that any repair, replacement, or avoidance procedure provided by Etak shall also conform to the warranty requirements stated above for a period not to exceed an additional ninety (90) day from the end of the original period.

This Limited Warranty is void if any non-conformity has resulted from accident abuse, misuse, misapplication, or modification by someone other than Etak. This limited Warranty is non-transferable.

The express warranty in this Section 2 is a limited warranty and it is the only warranty made by Etak under this End-User License Agreement. Etak makes and user receives no other warranty whether expressed or implied, and all warranties of merchantability and fitness for any purpose other than the intended use are expressly excluded under this End-User License Agreement.

Etak’s liability to User under this End-User License Agreement: (1) for warranty claims shall be limited to the amounts actually paid by User to Etak, and (2) for other claims shall be limited to the amount of the contract between Etak and User. Etak shall not be liable to User for any indirect or consequential loss or damage incurred by User.

3. MISCELLANEOUS. This is the exclusive Agreement between Etak and User regarding its subject matter. User may not assign any part of this Agreement without Etak’s prior written consent.

If any provision of this Agreement is declared invalid or unenforceable, the remaining provisions of this Agreement shall remain in effect. Any notice under this Agreement shall be delivered by U.S. certified mail, return receipt requested, or by overnight courier to Etak, Inc.

U.S. GOVERNMENT RESTRICTED RIGHTS

If any Product is used in any fashion, directly or indirectly, in connection with foreign or domestic government contracting or subcontracting, including without limitation, User’s performance of any government contracts or subcontracts, then User shall ensure that the government entity receives nothing more than RESTRICTED RIGHTS to use the Products pursuant to a sublicense agreement equivalent to that allowed under section 1 of this Agreement. User shall inform any government entity or prime contractor with which it is contracting exactly how it intends to use the products in connection with its government contracts, that such Products are proprietary to Etak and that Licensee has no right to grant to the government entity or prime contractor any rights in the Products. The software is a “commercial item”, as that term is defined at 48 C.F.R. 2.101 (Oct. 1995) consisting of “commercial computer software” and “commercial computer documentation,” as such terms are used in 48 C.F.R. 12.212 (Sept. 1995). Consistent with 48 C.F.R. 12.212 and 48 C.F.R. 227.7202-1 through 227.7202-4 (June 1995), all U.S. Governmental End Users acquire the software with only those license rights set forth herein. For purpose of any public disclosure provision under any federal, state or local law, it is agreed that these products are trade secret and proprietary commercial products and not subject to disclosure, to the extent permitted by such laws.

In WITNESS WHEREOF, the parties have executed this Contract.

EXHIBIT E

FHWA Letter – Intellectual Property Provisions

[Please refer to Appendix A.1.]

Appendix C.3

AZTech Intergovernmental Agreement

A.G. Contract No. KR97-2103TRN
ADOT File: JPA 97-124
Project: H4450 02X
Section: AZTech Project:
Signal Synchronization

INTERGOVERNMENTAL AGREEMENT
BETWEEN
THE STATE OF ARIZONA
AND
THE TOWN OF PARADISE VALLEY

THIS AGREEMENT is entered into 1997, pursuant to Arizona Revised Statutes, Sections 11-951 through 11-954, as amended, between the STATE OF ARIZONA, acting by and through its DEPARTMENT OF TRANSPORTATION (the State) and the TOWN OF PARADISE VALLEY, acting by and through its MAYOR AND TOWN COUNCIL (the "Town").

I. RECITALS

1. The State is empowered by Arizona Revised Statutes Section 28-108, 28-112 and 28-114 to enter into this agreement and has by resolution, a copy of which is attached hereto and made a part hereof, resolved to enter into this agreement and has delegated to the undersigned the authority to execute this agreement on behalf of the State.

2. The Town is empowered by Arizona Revised Statutes Section 48-572, to enter into this agreement and has by resolution agreed to enter into this agreement and has authorized the undersigned to execute this agreement on behalf of the Town.

3. The US Department of Transportation has allocated $7,500,000.00 to the **metropolitan** Phoenix area to be administered by the State and Maricopa County to accomplish the program via a State, Town and private sector partnership known as the "AZTech Project", for the expressed purpose of implementing an Integrated Regional Advanced Traveler Information System, and demonstrate intelligent transportation systems throughout the area and involve State, Town, regional and local jurisdictions

4. The AZTech concept is to integrate the existing intelligent transportation infrastructure into a regional system. The State with Maricopa County, regional and local jurisdictions, are jointly developing the AZTech Project to establish and implement an integrated traveler information system for the multimodal traveler. The Project will enhance the transportation management systems for the Phoenix metropolitan area by providing up-to-the-minute travel information and facilitate signal coordination across jurisdictional boundaries, thereby providing increased safety and improved regional mobility.

5. The State and Town are working together with other AZTech Project partners in a common goal of coordinating traffic management systems in direct consideration of a regional transportation system.

6. The State and the Town have identified potential areas where Intelligent Transportation System (ITS) technology can be applied to improve traffic management and establish a Traffic Traveler Information System in the valley for the AZTech Project. The intent of this agreement is to define the terms of the parties with regard to respective responsibilities related to the SMART Corridors instrumentation, (defined as "a systematically managed roadway, utilized at maximum efficiency.) The term of the AZTech Project is five (5) years.

THEREFORE, in consideration of the mutual covenants expressed herein, it is agreed as follows:

II. SCOPE

1. The Town will:

a. Provide representatives to the AZTech Project committees and working groups. Allow for and assist in the communication between the Traffic Operation Centers (TOCs). Allow timely access to the Town's traffic system data bases. Participate in the development and implementation of a system evaluation plan. Participate in the development and implementation of multi-jurisdictional signal system timing plans and establish inter-operability between Town, State and other jurisdictions. Participate in system training as required.

b. Participate in the design, provide staff assistance for construction and maintenance of approximately five (5) field detector stations, as well as provide ongoing operations support and maintenance for the 5 year duration of the AZTech Project.

c. Be responsible for, construction assistance and maintenance of a closed circuit television system for monitoring traffic on the AZTech SMART corridors.

d. Provide right-of-way, utility and environmental clearances as required. Contribute in-kind services which include, but are not limited to, approval of detector construction plans and/or work orders, construction, and contract administration for any sub-contracted work, necessary to implement the AZTech SMART corridors.

e. Provide locations for the installation of the initial KIOSK at the State's expense, at an estimated cost of $20,000.00 per KIOSK, at the location proposed by the Town and agreed upon by the State. Provide ongoing operations support and maintenance for the 5 year duration of the AZTech Project and be responsible for all costs beyond the initial expenditure by the State. Be responsible for additional KIOSKS at a fifty percent (50%) match, at an estimated cost of $10,000.00 per KIOSK, at the location proposed by the Town and agreed upon by the State, provided additional funding is available through the AZTech Project, should the Town desire additional KIOSKS.

f. On a monthly basis, maintain and provide, to the State AZTech Project Administrator, on an approved format, an itemized accounting of all contracts, in-kind services and materials, necessary to implement the AZTech SMART corridors.

9. Be responsible for all video and data communications cost beyond the initial 36 month implementation of the AZTech program at an estimated cost of $500.00/month. At the end of the INITIAL 36 month period, the Town may negotiate with U S West Communications, (the video and data services provider), for video and data service needs beyond the initial implementation period at the current or a reestablished service level.

h. Be responsible for any contractor claims for extra compensation due to delays or whatever reason attributable to the Town.

2. The State will:

a. Allow timely access to the AZTech Server system data bases to facilitate integration into the AZTech Project. Participate in the development and implementation of a system evaluation plan.

b. Provide project planning, design review and construction, to the extent necessary, to implement the AZTech SMART corridors.

c. Be responsible for the initial KIOSK, at an estimated cost of $20,000.00 per KIOSK. Support and maintain all operating systems and traveler information software on the AZTech KIOSKS, at an estimated cost not to exceed $3,000.00 per KIOSK, for the 5 year duration of the AZTech Project. Be responsible for additional KIOSKS at a fifty percent (50%) match, at an estimated cost of $10,000.00 per KIOSK, at the location proposed by the Town and agreed upon by the State, provided additional funding is available through the AZTech Project, should the Town desire additional KIOSKS.

d. Be responsible for all video and data communications costs between traffic operations centers for the initial 36 month implementation of the AZTech program, at an estimated cost not to exceed $20,000.00.

e. Be responsible for any contractor claims for extra compensation due to delays or whatever reason attributable to the State.

III. MISCELLANEOUS PROVISIONS

1. This agreement shall remain in force and effect until 30 June 2003, or until cancelled by either party upon thirty (30) days written notice to the other party, or by other competent authority.

2. This agreement shall become effective upon filing with the Secretary of State.

3. This agreement may be cancelled in accordance with Arizona Revised **Statutes Section** 38-511.

4. The provisions of Arizona Revised Statutes Section 35-214 are applicable to this contract.

5. In the event of any controversy which may arise out of this agreement, the parties hereto agree to abide by required arbitration as is set forth in Arizona Revised Statutes Section 12-1518.

6. All legal notices or demands upon any party relating to this agreement shall be in writing and shall be delivered in person or sent by mail addressed as follows:

Arizona Department of Transportation
Joint Project Administration
205 South 17 Avenue, Mail Drop 616E
Phoenix, AZ 85007
Town of Paradise Valley
Transportation Department
6401 E. Lincoln Drive
Paradise Valley, AZ 85253-4399

7. Attached hereto and incorporated herein is the written determination of each parties legal counsel that the parties are authorized under the laws of this State to enter into this agreement and that the agreement is in proper form.

IN WITNESS WHEREOF, the parties have executed this agreement the day and year first above written.

TOWN OF PARADISE VALLEY

By
MARVIN DAVIS
Mayor

STATE OF ARIZONA
Department of Transportation

By
THOMAS G. SCHMITT
State Engineer

ATTEST

By
LENORE P. LANCASTER
Town Clerk

97-124doc
10 Oct 97

Appendix C.4

Smart Trek Lump Sum Contract

Prenegotiation

Phase I Scope of Work Lump Sum Payment Schedule

Consultants have been utilized to assist the Washington State Department of Transportation (WSDOT) during the scope of work process. For their assistance, the consultants are paid a lump sum amount that varied from $4,000 to $10,000, depending on the budgeted PE funds.

This process allows for a more detailed scope and compatible cost proposals. It provides both sides with a much higher comfort level during the negotiation process. The consultant's are not recovering all of their costs during the Phase 1 scope of work process, but are compensated for their effort in this manner.

The following Phase I Lump Sum scope of work amounts are based upon the budgeted PE funds and the consultant's actual costs on previous Phase I agreements:

$100,000 to $500,000= $5,000
$500,001 to $1,000,000 = $6,000
$1,000,001 to$2,000,000=$7,000
$2,000,001 to $3,000,000= $8,000
$3,000,001 to $4,000,000 = $9,000
$4,000,001 to $5,000,000 = $10,000
$5,000,001 to $6,000,000 = $11,000
In excess of $6,000,001 = $12,000

EXHIBIT B

SEATTLE TimeSaver MODEL DEPLOYMENT INITIATIVE
PHASE 1 - SCOPE OF WORK
SCOPING PROCESS

The Phase I scoping process for this project will require the Consultant to:

1. Create a complete scope of work for this project including all deliverables.
2. Develop a comprehensive workforce spread sheet designating all work elements along with sub-elements. The spread sheet would also indicate any subconsultants workforce breakdown.
3. Prepare an estimate of Cost based on the scope of work, workforce spreadsheet, planned subconsultants, and proposed direct expenses.
4. Provide appropriate agreement exhibits such as workforce hourly rates, etc.
5. Attend two project scoping meetings.

   From these documents, the State and Consultant will negotiate the scope of work and the hours and costs to perform the work for this project.

Appendix C.5

Smart Trek Information Service Provider Contract

AGREEMENT

SEATTLE TIMESAVER PROJECT - Independent Service Provider (ISP) Component

Parties:

State of Washington (the “State”), acting through the Washington State Department of Transportation (“WSDOT”) and the Washington State Secretary of Transportation

SEIKO Communications Systems, Inc. (“SCS”)

SEIKO Communications or America, Inc. (“SCOA”)

Metro Traffic Control, Inc. (“Metro Traffic”)

Effective Date of Agreement	
(“Effective Date”):	The date of execution of this Agreement by WSDOT,
03 /17/97	which shall be the last Party to execute this Agreement

FHWA Project .Number: ITS-9653(002)

State Agreement Number: UC-3315

Maximum Amount Payable by the State to the Parties: $1,115,000

Total Maximum Contributions by the non-State parties: $815,000

Completion Date: December 31, 1998

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AGREEMENT

for the

SEATTLE TIMESAVER PROJECT - Independent Service Provider (ISP) Component

This Agreement for the Seattle TimeSavers ("STS") Project, dated as of the Effective Date set forth on the cover page to this Agreement, is by and among the State of Washington (the "State"), acting through the Washington State Department of Transportation ("WSDOT") and the Washington State Secretary of Transportation; SEIKO Communications Systems, Inc. ("SCS"); SEIKO Communications of America, Inc. ("SCOA"); Metro Traffic Control., Inc. ("Metro Traffic"); and Etak, Inc. ("Etak"). (The State, SCS, SCOA, Metro Traffic, and Etak are sometimes hereinafter referred to individually as a "Party" or collectively as the "Parties". All the Parties other than the State are sometimes hereinafter referred to collectively as the

Recitals

A. The Parties wish to engage in a cooperative project to implement and deploy an Intelligent Transportation System ("ITS") known as the STS ISP Component (the project is hereinafter referred to as the "STS ISP

B. The Parties wish to create a commercially viable and sustainable Advanced Traveler Information System ("ATIS") to provide transit and highway information to the public via a variety of receiver devices.

C. The Parties understand that, during the course of the Project, the Parties expect to exchange proprietary information of the individual Parties, or suppliers of the individual Parties, and that this Agreement shall not be construed as a license or transfer of any such proprietary information to other Parties.

D. The Parties expect the Project will provide to Washington State and the U.S. Federal Highway Administration (the "FHWA") useful information of local and national significance

E. The Parties intend that the legal relationship among them is one of independent contractors.

F. The Parties wish to set forth in this Agreement the objectives, intentions, rights and obligations of the Parties in the STS ISP Component.

Agreement

NOW, THEREFORE, in consideration of the foregoing and the mutual agreements herein contained, and intending to be legally bound hereby, the Parties agree as follows:

1. STS GOALS AND OBJECTIVES

Building on the SWIFT project, this Project endeavors to create a commercially viable and sustainable ATIS to help alleviate traffic congestion, improve highway utilization and increase safety. Specific Project objectives are to:

1.1 Rapidly build the ATIS market by making available a wide range of affordable ATIS display devices and information services that will provide immediate benefits to a large number of travelers;

1.2 Reduce the entrance barrier for display device manufacturers by providing no-charge services and a low cost ($100 each) highly integrated FM subcarrier data receiver that can be readily incorporated into their products, for the first 1,000 units deployed;

1.3 Create demand for ATIS devices by providing other information services that consumers want, such as personal paging, news, sports, financial reports, weather, and business directories, etc.;

1.4 Proactively solicit ATIS device manufacturers to participate in the Project and/or in test marketing their devices in the Seattle area;

1.5 Leverage individual product introduction and marketing activities by joining with other companies and with public agencies to market ITS technologies.

Each Party shall perform its respective obligations under this Agreement. However, since the Project will be a model of a deployable system, there can be no assurance that any or all of the above goals and objectives will be achieved.

Each Party recognizes the difficulties and uncertainties associated with designing, developing and manufacturing products relating to an ITS. Specifically, each Party individually assumes the risk that (1) no Party will develop any products, processes or services that meet customer requirements, and (2) the market will fail to accept any products, processes or services that are developed to the level currently anticipated by any of the Parties.

Each Party recognizes that each other Party's ability to perform its obligations under this Agreement is dependent on the cooperation of the Parties hereto and others, as set forth in the Statements of Work attached hereto as Exhibits B, C, D and E.

2. WORK RESPONSIBILITIES

2.1 **Federal Highway Administration.** The Parties understand that under an ITS Partnership Agreement dated as of September 25, 1996 (the "Cooperative .Agreement"), between the FHWA and the State, a copy of which is attached hereto as Exhibit A, the FHWA has agreed to perform the following and the non-State Parties are entering into this Agreement with the expectation that the FHWA will perform such obligations:

2.1.1 Assign a FHWA project manager responsible for the coordination of FHWA responsibilities under the Cooperative Agreement.

2.1.2 Provide monetary funding in an amount not to exceed $892,000 for the STS ISP Component Project.

2.1.3 Provide timely review of and action on Project work orders.

2.2 **State of Washington.** The State agrees to:

2.2.1 Assign a WSDOT project manager to serve as the STS project manager and provide direction for the entire Project.

2.2.2 Act as contracting authority for the Project.

2.2.3 Provide monetary funding in an amount not to exceed $223,000 for the Project.

2.2.4 Allow non-exclusive use or the existing WSDOT Transportation System Management Center ("TSMC") in Seattle as a data source for the STS Project.

2.2.5 Provide adequate staff support at the TSMC to respond to requests for assistance or information from the Parties.

2.2.6 Allow non-exclusive access to existing communications networks for the transmission of STS data.

2.2.7 Assist in the design, implementation, testing, operation, and evaluation of the STS system.

2.2.8 Perform its obligations under the Cooperative Agreement.

2.3 **Etak. Inc.** Etak agrees to:

2.3.1 Assign an Etak project leader, responsible for day-to-day Etak operational requirements and interactions with the Parties.

2.3.2 Subject to Section 5.6 below, contribute cost-share to the Project in a maximum required contribution amount of $290,000 in the form of equipment, services, and/or software licenses, which contribution shall be counted toward the non-State Parties' Funding Ratio (as described in Section 5.1 below).

2.3.3 Maintain an accounting system that tracks and supports costs incurred by Etak; under the Project.

2.3.4 Perform the work specified on the Statement of Work attached hereto as Exhibit B, which Statement includes (i) the major tasks and activities to be completed by Etak, and (ii) Etak's cost estimates.

2.4 **Metro Traffic Control, Inc.** Metro Traffic agrees to:

2.4.1 Assign a Metro Traffic project leader, responsible for day-to-day Metro Traffic operational requirements and interactions with the Parties.

2.4.2 Subject to Section 5.6 below, contribute cost-share to the Project in a maximum required contribution amount of $225,000 in the form of equipment and/or services, which contribution shall be counted toward the non-State Parties' Funding Ratio (as described in Section 5.1 below).

2.4.3 Maintain an accounting system that tracks and supports costs incurred by Metro Traffic under the Project.

2.4.4 Perform the work specified on the Metro Traffic Statement of Work attached hereto as Exhibit C, which Statement includes (i) the major tasks and activities to be completed by Metro Traffic. and (ii) Metro Traffic's cost estimates.

2.5 **Seiko Communications Systems, Inc.** SCS agrees to:

2.5.1 Assign an SCS project manager, responsible for day-to-day SCS operational requirements and interactions with the Parties.

2.5.2 Subject to Section 5.6 below, contribute cost-share to the Project in a maximum required contribution amount of $150,000 in the form of equipment and/or services, which contribution shall be counted toward the non-State Parties' funding Ratio (as described in Section 5.1 below).

2.5.3 Maintain an accounting system that tracks and supports costs incurred by SCS under the Project.

2.5.4 Perform the work specified on the SCS Statement of Work; attached hereto as Exhibit D, which Statement includes (i) the major tasks and activities to be completed by SCS, and (ii) SCS's cost estimates.

2.6 **SEIKO Communications of America, Inc.** SCOA agrees to:

2.6.1 Assign an SCOA project manager, responsible for day-to-day SCOA operational requirements and interactions with the Parties.

2.6.2 Subject to Section 5.6 below, contribute cost-share to the Project in a maximum required contribution amount of $150.000 in the form of equipment and /or services, which contribution shall be counted toward the non-State Parties' Funding Ratio (as described in Section 5.l below).

2.6.3 Maintain an accounting system that tracks and supports costs incurred by SCOA under the Project.

2.6.4 Perform the work specified on the SCOA Statement of Work attached hereto as Exhibit E, which Statement includes (i) the major tasks and activities to be completed by SCOA, and (ii) SCOA's cost estimates.

3. OPERATIONAL STRUCTURE

3.l **State (WSDOT).** The State, acting through WSDOT, will be responsible for contract administration and will direct the Project.

4. TERM

4.1. **Term.** The term of this Agreement shall commence on the Effective Dare and shall continue until the earliest to occur of the following: (a) the Project Completion Date; or (b) the date the State (WSDOT) withdraws from this Agreement.

4.2 **Withdrawal.** In the event of withdrawal by one of the Parties as described in Section 6 below, the Agreement shall terminate with respect to that Party, but it shall continue in effect with respect to the remaining Parties. However, the termination of this Agreement with respect to one or more Parties shall not affect any of the Parties rights or obligations (including any rights or obligations of the withdrawing Party) that are expressly intended to survive any such termination.

5. FUNDING

5.1 **Funding Ratios.** It is currently expected that the total funding value of this STS ISP Component shall be $1,930,000. The Parties intend and expect that the sources of the total Project funding will be as follows:

Source	Dollar Amount	Percentage of Total Funds
FHWA	$892,000	46.2%
State	$223.000	11.6%
Parties to this Agreement (other than the State)	$815.000	42.2%
TOTAL	$1,930,000	100%

The funding provided by the FHWA and the State shall be monetary; the "funding" provided by the Parties hereto (other than the State) shall be in the form of their contributions to the Project described in Section 2 above. The 46.2%, 11.6% and 42.2% figures set forth above are referred to as the "Funding Ratios."

5.2 **FHWA Funds.** The FHWA, pursuant to 23 USC 307, has committed the federal funds to STS through the Cooperative Agreement. The Parties acknowledge that although federal funds are presently available for payment upon performance of services under the Cooperative Agreement, the FHWA's obligation to disburse funding under the Cooperative Agreement is contingent upon the availability of appropriated governmental funds from which payment can be made. The Parties understand that, subject to the foregoing, the FHWA shall disburse funds to the State for the Project pursuant to work orders that shall be attached as addenda to the Cooperative Agreement. The FHWA requires that each work order shall be supported by the Parties' commitment to maintain the Funding Ratios.

5.3 **Summary Cost Estimates.**

5.3.1 **Summary.** A summary of the Project cost estimates is attached hereto and by this reference incorporated herein as Exhibit F, which includes (i) the total cost estimates for the work to be performed be each Party, (ii) the maximum required contribution amount that each Party will make to the Project, and (iii) the maximum required amount that the State will reimburse each Party for such Party's costs.

5.3.2 **Not-to-Exceed Amounts.** No Party is obligated to incur costs in excess of that Party's total estimated Project costs. If at any time a Party anticipates that it will incur costs in excess of its total estimated costs, it shall promptly notify the other Parties in writing to that effect and state in such notice whether that Party intends to continue to perform work and incur costs under this Agreement in excess of its total estimated cost at its own expense or stop work when its actual costs reach its total estimated costs.

5.4 **<u>Reports and Invoices.</u>**

5.4.1 **<u>Monthly Reports.</u>** Each non-State Party shall submit to WSDOT, on a monthly basis within 20 days after the end of each month, a detailed status report on the work items accomplished, remaining work to be completed, and the Party's performance relative to the work milestones associated therewith during the prior month. An itemized detail of total hours spent on the Project and non-salary items will be provided as an attachment to the monthly status report submitted by each Party.

5.4.2 **<u>Invoice Mechanics.</u>** Each non-State Party shall submit to WSDOT, on a quarterly basis within 20 days after the end of each quarter, such Party's invoice for its costs hereunder (which invoices shall be in the form and shall contain the information described herein). Within thirty (30) days after its receipt of an invoice from one of the Parties the State (WSDOT) shall review and verify the invoice and shall make allowable payments to the Party.

5.4.3 **<u>Invoices and Costs.</u>** The form of each Party's quarterly invoices described in Section 5.4.2. shall, at the option of each Party, be either (i) Standard Form 270 Request for Advance or Reimbursement, or (ii) such Party's standard commercial invoice provided that it contains substantially the same information as required by Standard Form 270, including the certification set forth at the bottom of Standard Form 270 verbatim. Each invoice shall set forth the Party's labor costs, overhead, employee benefits, material and travel costs for that quarter, as further specified below:

a. **Direct and indirect costs which are allowable under Title 48, Code of Federal Regulations ("CFR"), Part 31.**

b. **Overhead expenses for indirect costs equal to the direct labor costs multiplied by an overhead rate determined as described herein.** Until an overhead rate is established as described in the next sentence, each non-State Party shall either use an initial overhead rate that it believes to be reasonable, but not in excess of 165%, of its direct labor costs, or not include indirect expenses on its invoices. At the State's request, within 120 days after the Effective Date of this Agreement, each non-State Party will permit an independent auditor (which auditor may be, at such Party's option, the Defense Contract Audit Agency (the "DCAA") (initiated be the State), the State's audit department or the firm that serves as the Party's independent accounting firm) to perform an audit to verify that the overhead rate is in accordance with 48 CFR, Part 31 and such non-State Party shall thereafter use such verified overhead rate to calculate its cost reimbursements and contributions and shall thereafter include such verified overhead rate on its invoices. The State shall not require a new audit under this paragraph (b) if a Party already has an overhead rate established in accordance with 48 CFR, Part 31 (for example, resulting from an audit performed by the DCAA, the State, another state, another state agency, or a private accounting firm). Advance agreements as discussed in 48 CFR, Part 3l.109 are acceptable in determining the methodology for establishing overhead rates. If a Party's overhead rate verified be such audit differs from the initial overhead rate used by the Party, the State and such non-State Party shall make any appropriate adjustments with respect to invoices previously submitted that used the initial overhead rate, provided that the not-to-exceed reimbursable amount (referred to in clause (iii) of Section 5.3.1) payable to each non-State Party hereunder shall not be adjusted as a result of any overhead adjustments. If the State's audit department performs the audit for a Party under this paragraph (b), that Party shall give access to the State to its books, documents, papers, and records directly relating to the Project for purposes of the audit. If a third party (for example, the DCAA or an independent accounting firm) performs the audit for a Party under this paragraph (b), that Party shall permit the State to review such third party's working papers relating to the audit. The costs incurred by each Party for the audits described in this paragraph (b) (up to $5,000 per audit) will be considered part of the Project costs.

c. **The value of equipment, services and software licenses provided as in-kind non-reimbursable contributions by the Party to the Project.** The Parties agree that the value of such equipment, services and software licenses shall be no greater than the standard price which the Party would typically charge commercial customers for the same items sold in similar quantities under similar circumstances. Evidence of a Party's standard commercial price may include, but shall not be limited to, published commercial price lists and comparable commercial sales data. The Parties shall provide such evidence of standard commercial prices to WSDOT upon request. At WSDOT's request, the Parties shall also provide to WSDOT for WSDOT's review and approval supporting documentation for prices of items that are not commercial available.

d. **Identification of which costs, or the portion thereof, are to be counted toward the Party's contribution amount and which costs are to be reimbursed by the State.**

5.5 **<u>Payment for Work (Costs); Cost Records.</u>**

5.5.1 **<u>Prior Costs.</u>** The Parties acknowledge that, prior to the Effective Date hereof, each or the Parties has incurred costs in preparation of the performance of its obligations hereunder. The Parties agree that the Parties shall not be entitled to be reimbursed for such costs incurred prior to the Effective Date hereof; however, each of the Parties may treat costs incurred by it after (but not before) the effective date of the Cooperative Agreement (September 25, 1996) as contributions made hereunder for purposes of the Funding Ratios and its Minimum Contribution Percentage (as defined in Section 5.6). The amount of such costs shall be determined in the same manner as costs are determined under Section 5.4.3.

5.5.2 **<u>Payments.</u>** Each Non-State Party shall be entitled to be paid by the State (with State and FFIWA funds) for its allowable costs that are directly attributable to the Project and incurred in performing its obligations hereunder from and after the Effective Date hereof; provided, however, a Party shall not be entitled to be paid an amount in excess of its not-to-exceed reimbursable amount referred to in clause (iii) of Section 5.3.1 without the prior approval of the State (WSDOT).

5.5.3 **<u>Full Compensation.</u>** The payments made by the State under Section 5.5.2 shall be full compensation for work performed or services rendered by the non-State Parties under this Agreement. Each non-State Party agrees that it may not make a claim for additional compensation hereunder more than ninety 90) calendar days after either (a) the completion or the final audit described in Section 5.5.4 with respect to such Party, or (b) the date after the Completion Date on which the State notices such Party in writing that the State will not request a time Limit with respect to such Party. The payments made by the State (WSDOT), under Section 5.5.2 shall not be a bar to and claims that WSDOT may have against the non-State Parties or to any remedies WSDOT may pursue with respect to such claims

5.5.4 **<u>Cost Records; Final Audit.</u>** Each Party shall keep, and cause its agents (if any) to keep, for a period of three years after final payment, the Party's cost records pertaining to this Agreement, provided that if any litigation, claim, or audit involving the cost records is started before the end of the three year period, such Party shall keep such records until all litigation, claims, and audits involving the records are resolved. At any time during the three year period after final payment, the State may require that any Party permit, at the Party's election, the DCAA (initiated by the State), the State audit department, or any independent auditor selected by the Party to perform an audit of such Party's cost records pertaining to this Agreement. The final audit report shall be delivered to the State. If the State's audit department performs the audit for a Party under this Section 5.5.4, that Party shall give access to the State to its books, documents, papers and records directly relating to the Project for purposes of the audit. If a third party (for example, the DCAA or an independent accounting firm) performs the audit for a Party under this Section 5.5.4, that Party shall permit the State to review such third party's working papers relating to the audit. The costs incurred by each Party for the final audit (up to S5,000 per audit) will be considered part of the Project costs.

5.5.5 **Cost-Share.** This Agreement is a cost-sharing, non-profit agreement and, as such, the Parties will be reimbursed only for the following types of costs: direct labor, overhead and direct non-salary reimbursable expenses incurred on this Project. These types of costs will be billed at the Party's actual costs.

5.6 **Contribution Percentages.** For purposes hereof, a Party's "Minimum Contribution Percentage" shall mean the percentage obtained be dividing (i) the maximum required contribution dollar amount that the Party agreed to contribute to the Project as set forth in Section 2, by (ii) the total not to exceed amount of the Party's estimated costs (including reimbursable costs and contributed amounts) for the Project as set forth on the Party's Statement of Work attached hereto. The Parties' respective Minimum Contribution Percentages are as follows:

Etak:	$290,000 / $690,000	=	42%
Metro Traffic:	$225,000 / $465,000	=	48.4%
SCS:	$150,000 / $573,000	=	26.0%
SCOA:	$150,000 / $200,000	=	75.0%

For purposes hereof, a Party's "Actual Contribution Percentage" shall mean the percentage obtained by dividing (i) the amount of the Party's actual contribution to the Project by (ii) the amount of the Party's actual Project costs and contribution.

If a non-State Party withdraws from the Project under Section 6, the Project manager shall, promptly after the withdrawal, calculate the withdrawing Party's "Actual Contribution Percentage" calculated through the withdrawal date. If the Actual Contribution Percentage is less than the withdrawing Party's minimum Contribution Percentage, the withdrawing Party shall be obligated to make additional contribution to the Project such that its Actual Contribution Percentage (calculated after such additional contribution) is equal to the Party's Minimum Contribution Percentage. The form of such Party's additional contribution (equipment, services or licenses) shall be agreed upon through good faith negotiations between the withdrawing Party and WSDOT, and shall be subject to WSDOT final approval.

5.7 **Adjustments for Variances Between Actual and Estimated Costs.**

5.7.1 **Reallocation of Compensation Amounts.** If, at the time a Non-State Party completes its work obligations hereunder or withdraws from the Project under Section 6, the amount of the total costs actually incurred by that Party in the Project is less than the total amount of the costs that the Party had estimated as set forth in its Statement of Work hereto, the State (WSDOT) shall determine whether it is appropriate to pay to one or more of the other Parties for work performed (or agreed to be performed) hereunder some or all of the funds that it had expected to pay to such Party. Any such reallocation of funds shall be made pursuant to a written supplemental agreement signed by the State (WSDOT) and the Party or Parties receiving such reallocated funds. Any such supplemental agreement may contain a provision requiring any Party that, pursuant to a reallocation of funds described in this Section 5.7.1, receives any payments for costs hereunder in excess of that Party's estimated Project costs to increase its contribution to the Project in an amount specified in the supplemental agreement.

5.7.2 **Adjustments of Contributions.** If, at the time a Non-State Party completes its work obligations hereunder or withdraws from the Project under Section 6, the amount of the total costs actually incurred by that Party in the Project is less than the total amount of the costs that the Party had estimated as set forth in its Statement of Work attached hereto, the amount of the contribution that such Party shall be required to make under Section 2 above shall be reduced to an amount equal to the Party's actual total Project costs (including reimbursable costs actually incurred by such Party and non-reimbursable contributions made by such Party that were incurred after the effective date of the Cooperative Agreement (September 25, 1996)) multiplied by the Party's Minimum Contribution Percentage. Notwithstanding the foregoing, in no event shall a Party be entitled to any refund of any contribution that it makes hereunder.

5.8 **Contributions From Others.** The Parties may individually and/or collectively solicit contributions from private sources that are not Parties to this Agreement to obtain and maintain the Funding Ratios specified in Section 5.1 and their Minimum Contribution Percentages during the term of this Agreement. If and when any Party solicits such contributions, the Party shall inform such outside sources that their contribution is specifically for the STS ISP Component.

Such contributions from outside sources may be in the form of money, equipment, facilities, software licenses, and/or services. The dollar value of any such contribution made to the Project shall be verifiable by the Party or Parties that solicited the contribution and shall be treated as part of the contribution to the Project of the soliciting Party or Parties for purposes of the Funding Ratios. If more than one Party solicited a specific contribution from a specific outside source, the soliciting Parties shall agree through good faith discussions the relative amounts of the contribution that shall be credited toward each soliciting Party's contribution hereunder.

5.9 **Other Projects.** This Agreement shall not prohibit any Party to this Agreement from conducting research,. Development, testing, or evaluation outside the scope of its responsibilities defined in Section 2. Such projects (whether funded by outside sources or by any of the Parties) shall not be included as part of the STS ISP Component and the funding for such projects shall not be included as part of a Party's contribution to the STS ISP Component.

6. WITHDRAWAL

6.1 **Withdrawal.** A Non-State Party may withdraw from the STS ISP Component upon 30 days written notice to the STS project manager at the withdrawing Party's sole discretion and for any reason whatsoever. The STS project manager shall send a copy of any such written notice to the other Parties promptly after the STS project manager's receipt of the notice from the withdrawing Party. The withdrawing Party will not be compensated for any work subsequent to the date of notice. If the withdrawal is not due to lack of state or federal appropriation authority, the withdrawing Party shall (i) pay any amounts it became obligated to third parties to pay prior to the termination date and (ii) make any contribution to the Project that may be required of such Party under Section 5.6 above. Any disagreements relating to these amounts and contribution shall be resolved be the Secretary of Transportation of the State of Washington. These amounts include: all non-cancelable obligations such as contracts, cost of goods and services, and completion of term appointments for conduct of research up to 12 months from the termination date. If the withdrawal is due to lack of state

or federal appropriation authority, the obligations of the withdrawing Party relating to the work on the Project will cease immediately without penalty or any further work or contribution being required. If the State withdraws from the Project, the State shall, to the extent required by this Agreement, continue to be obligated to reimburse the non-State Parties for work performed prior to the withdrawal. The State will provide 10-day written notice to the Non-State Parties of the State's intent to withdraw from the Project during which 10-day period all parties will negotiate together in good faith an agreement for orderly transition or termination of the Project.

6.2 **Continuation.** Notwithstanding the withdrawal of a Party, the remaining Parties shall have, with WSDOT's concurrence, the right to (i) replace the withdrawing Party with a new party approved be the unanimous consent of the remaining Parties, or (ii) continue the STS ISP Component without the withdrawing Party and without replacing the withdrawing Party. In the event of a withdrawal of a Party, the STS project manager will determine the feasibility and desirability of one or more of the remaining Parties to perform the work that was not completed by the withdrawing Party. The State (WSDOT) shall determine whether it will reimburse one or more of such remaining Parties for costs incurred in completing such unfinished work with funds that WSDOT had originally intended to pay to the withdrawing Party. Any such reallocation of work and funds shall be evidenced by a written supplemental agreement signed by WSDOT and the remaining Parties.

7. ADDITIONAL PARTIES

Any agency, organization, or individual may petition the STS project manager to become part of the Project and a Party to this Agreement. Any such petition shall be in the form of a written request. The petitioner must demonstrate how its involvement will be beneficial to the successful implementation of the STS ISP Component. The Parties will be the sole judge as to the merits of the petition. A unanimous decision of all the Parties is required for the admission of the petitioner to the Project and this Agreement. Any such admission shall be effected by an addendum to this Agreement, the terms and conditions of which shall be subject to the prior written approval of all the Parties hereto.

8. INTELLECTUAL PROPERTY

8.1 **Definitions.**

8.1.1 **"Intellectual Property"** consists of copyrights, trademarks, patents, trade secrets, and any other form of proprietary rights, including without limitation, rights to information sources, data sources, databases, products, software, inventions, discoveries, works of authorship, training manuals, systems design, or other proprietary information in any form or medium.

8.1.2 **"Government-Funded Developments"** means Intellectual Property made, created or developed using Federal and/or State government funding.

8.1.3 **"Party Intellectual Property"** consists of Intellectual Property owned by, licensed to, or otherwise under the control of any one or more of the Parties to this Agreement (including without limitation, Intellectual Property, developed by a Party prior to or during the STS ISP Component Project using its own funding). A Party's Party Intellectual Property that is incorporated. in whole or in part, into Government-Funded Developments shall remain Party Intellectual Property and such incorporation shall not alter or reduce such Party's rights in its Party Intellectual Property.

8.1.4 **"Privately Funded Developments"** means Intellectual Property made, created or acquired as part of the STS ISP Component Project without government funding. Privately Funded Developments that are incorporated, in whole or in part, into Government-Funded Developments shall remain Privately Funded Developments and such incorporation shall not alter or reduce such Party's rights in its Privately Funded Developments.

8.2 **Licenses.** Where Etak grants licenses hereunder to any party for Etak Privately funded Developments or Etak Party Intellectual Property, such licenses shall be granted pursuant to mutually acceptable license terms.

8.3 **Information Identified as Party Intellectual Property** shall be the property of that Party and shall be so labeled by that Party. No Party grants or transfers to any of the other Parties or to anyone else ownership, license or any other type of rights to or in any Party Intellectual Property.

Any third party participants in the Project who are not signatories to this Agreement and who obtain access to Party Intellectual Property w ill do so pursuant to a written license or sublicense agreement consistent with the standard agreements used by the owner or rights holder of' such Party Intellectual Property.

8 4 **Government-Funded Developments.** The parties are responsible for identifying and segregating in advance intellectual property which was or will be developed solely with non-federal and non-stare funding and for which no license will be granted to the Federal or State governments.

It is the policy of the FHWA and the State to allow parties in a model deployment project such as the STS ISP Component to retain all Government-Funded Developments with certain limitations. Therefore, in accordance with this policy, the FHWA and the State agree that the Parties in the STS ISP Component Project shall retain all Government-Funded Developments, with the limitations described in this Section 8.4.

8.4.1 **Copyrights.** In accordance with Federal and State governmental policy, the copyright of work produced under this Agreement with Federal and/or State funds shall remain with the authors.

The FHWA reserves a royalty-free, non-exclusive and irrevocable license to reproduce, publish or otherwise use, and to authorize others to use, solely for non-commercial use a copyrightable work produced with Federal funds for a Federal Government purpose.

The State (including its cities, counties and governmental regional transportation authorities) reserve a royalty-free, non-exclusive and irrevocable right to reproduce, publish or otherwise use, and to authorize others to use, solely for non-commercial use, for official governmental purposes by the State (and its cities, counties and governmental regional transportation authorities):

a. The copyright to any Government-Funded Developments developed hereunder and the copyright in any Government-Funded Developments developed under a subgrant or subcontract hereunder, and

b. Any rights of copyright purchased by the State, any non-State Party, or any subgrantee or contractor of any Party, with Federal or State financial assistance provided hereunder.

8.4.2 **Patents.** The Parties agree that rights to inventions made hereunder shall be determined in accordance with 37 CFR Part 401. The standard patent rights clause at 37 CFR § 401.14(a) (a copy of which is attached hereto as Exhibit G), as modified below, is hereby incorporated by reference.

a. The State and its cities, counties, and governmental regional transportation authorities shall be given the same rights and protections as provided to the Federal Government in the standard patent rights clause as 37 CFR § 401.14, except that the rights and protections in paragraph (j) of the clause shall not be given to the State and its cities, counties, and governmental regional transportation authorities.

b. The terms “to be performed by a small business firm or domestic nonprofit organization” shall be deleted from paragraph (g)(1) of the clause.

c. Paragraphs (g)(2) and (g)(3) of the clause shall be deleted.

d. Paragraph (1) of the clause, entitled “Communications,” shall read as follows: “(1) Communications. All notifications required by this clause shall be submitted to the FHWA Division Office.”

8.5 **Privately Funded Developments.**

8 5.1 Each Party shall own and retain all rights to its Privately Funded Developments.

8.5 2 Privately Funded Developments that are made or created jointly be the non-State Parties shall be jointly owned by those Parties as agreed to in a separate agreement.

8.5.3 Use by a Party of another Party’s Privately Funded Development shall require the prior written approval of the other Party.

A Party may elect to file a patent application for its Privately Funded Development. The expenses associated with the filing and prosecution or such an application shall be paid by the filing Party.

8.6 **Restricted Rights.** All Party Intellectual Property that is provided to the U.S. Department of Transportation ("USDOT") under the STS ISP Component Project is provided to the USDOT with Restricted Rights. Use, Duplication, or disclosure by the USDOT is subject to restrictions as set forth in subparagraphs (c)(l) and (2) of the Commercial Computer Software -- Restricted Rights at 48 CFR 59.227-19, except that "U.S. Department of Transportation" shall be substituted for the term "Government" at each location it appears in that clause. All Party Intellectual Property provided to the USDOT shall be designated with the legend: "THIS PROPERTY IS COPYRIGHT @ [DATES] BY [OWNER]. UNPUBLISHED -- ALL RIGHTS RESERVED UNDER THE COPYRIGHT LAWS OF THE UNITED STATES."

8.7 **Confidentiality.**

8.7.l Each Party agrees to use reasonable care to prevent the disclosure to non-Parties of written information that is clearly labeled "Party Intellectual Property" or "Party Confidential" and to use this information only in fulfillment of its obligations in the STS ISP Component Project; provided, however, that written information provided to the State shall be kept confidential and not disclosed, except as required be law. A Party's "reasonable care" shall be at least the same degree of care and diligence that it uses with respect to its own proprietary and confidential information. Nothing herein shall be deemed to constitute a breach of this Agreement, or create any liability where the FHWA, or State is required by law to disclose any information, materials or documents.

8.7.2 Each Party's obligations in Section 8.7.1 shall last for five (5) years after the receipt of restricted information, but these obligations shall not apply to any information which: a) is or becomes publicly known through no wrongful act on the receiving Party's part; or b) is, at the time of disclosure under this Agreement, already known to the receiving Party (as evidenced by such Party's written records) without restriction on disclosure; or c) is, or subsequently becomes, rightfully and without breach of this Agreement, in the receiving Party's possession without any obligation restricting disclosure; or d) is independently developed be the receiving Party without breach of this Agreement; or e) is furnished to a third party by the disclosing Party without a similar restriction on the third party's rights; or f) is explicitly approved for release by written authorization of the disclosing Party; or g) is required to be disclosed by the Washington Public Records Act, Chapter 42.17 of the Revised Code of Washington, the Federal Freedom of Information Act, or other applicable laws or discovery or court proceedings. In any dispute under this Section 8.7.2 (except clause (g) above), the burden of proof shall be on the Party that is claiming one of these exceptions to the obligations to protect another Party's restricted information.

8.7.3 In the event the State (WSDOT) receives a public records request or discovery request relating to the Parties' written information that has been labeled "Party Intellectual Property" or "Party Confidential," the State (WSDOT), will give timely notice to the affected Party or Parties to enable the affected Party or Parties to take action necessary to prevent the disclosure of the written information without prejudice. The Parties expressly understand that the State (WSDOT), cannot make any guarantees that information provided to it will not be disclosed. The State (WSDOT), shall cooperate with any Party in opposing the disclosure of Party Intellectual Property by providing documents consistent with its position regarding the request, provided that the State (WSDOT) shall not be required to take any other action, legal or otherwise.

8.8 **Publication.** Each Party shall be permitted to present or publish methods and results of its work, at its own choosing, provided, however, that the other Parties shall have been furnished copies of any proposed presentation or publication thirty (30) days in advance for review for items deemed confidential as defined in Section 8.7; provided, however, that nothing herein shall be construed as authorizing a Party to disclose to others or publish any confidential information without the prior written approval of the Party that owns or has rights in the information.

8.9 **Survival.** Notwithstanding any other terms of this Agreement, the provisions of Section 8 shall survive the termination or expiration of this Agreement and shall continue to bind a Party who has withdrawn from the Project.

9. PRESS RELEASES AND PUBLICITY

The Parties will develop and jointly approve a project overview “boilerplate” that will be attached to any press releases issued by any Party to assure that the release gives appropriate and adequate recognition to the respective roles and contributions of all Parties. The Parties will develop and jointly approve procedures for the review and approval of press releases proposed to be issued by any Party.

10. LIMITATIONS OF LIABILITY; WARRANT DISCLAIMERS; INDEMNIFICATION

10.1 **Limitations of Liability.** NOTWITHSTANDING ANYTHING TO THE CON'TRARY HEREIN, IN NO EVENT SHALL ANY PARTY BE LIABLE TO ANY OTHER PARTY FOR ANY DIRECT, INCIDENTAL, INDIRECT, SPECIAL, CONSEQUENTIAL, OR EXEMPLARY DAMAGES, LOST PROFITS, LOST SALES OR BUSINESS, OR LOSS OF ANY GOODWILL RESULTING FROM OR IN ANY WAY RELATING TO THE STS ISP COMPONENT PROJECT OR THIS AGREEMENT, IRRESPECTIVE OF WHETHER THE PARTY HAD BEEN INFORMED OR KNEW OF OR SHOULD HAVE KNOWN OF THE LIKELIHOOD OF SUCH DAMAGES OR LOSS, EXCEPT FOR (i) DAMAGES ARISING FROM A PARTY’S INTENTIONAL OR RECKLESS BREACH OF SECTION 8.7 OF THIS AGREEMENT, (ii) DAMAGES ARISING FROM A PARTY’S INTENTIONAL TORTIOUS CONDUCT OR RECKLESS ACTION TOWARD ANOTHER PARTY TO THIS AGREEMENT, AND (iii) LOSSES ARISING FROM SPECIFIED THIRD PARTY CLAIMS (AS DEFINED IN SECTION 10.4.1). THIS LIMITATION APPLIES REGARDLESS OF WHETHER SUCH DAMAGES, CLAIM OR LOSS ARE SOUGHT BASED ON BREACH OF CONTRACT, BREACH OF WARRANTY, NEGLIGENCE, STRICT LIABILITY, MISREPRESENTATION, OR ANY OTHER LEGAL OR EQUITABLE THEORY. IN NO EVENT SHALL.ANY PARTY BE LIABLE TO ANY OTHER PARTY FOR DAMAGES HEREUNDER UNLESS SUCH DAMAGES ARE CAUSED BY THE PARTY SOUGHT TO BE HELD LIABLE.

10.2 **Warranty Disclaimers.** Any deliverable hereunder of a Party’s standard commercial product shall be delivered to the Project with such Party’s standard commercial product warranty (including all the warranty disclaimers therein). Except for such standard commercial product warranties, no Party makes any warranty regarding any deliverable hereunder (including without limitation, any data, information, system, product or equipment), whether express or implied, and all warranties of merchantability and fitness for any particular purpose are expressly excluded. Without limiting the foregoing, no Party makes any warranty that: (i) any data that it provides to others will be provided in an uninterrupted manner or that the data will be free of' errors, or (ii) any data that it receives from others will be processed and transmitted by it in an uninterrupted manner or that the data processed and transmitted will be free of errors. Except for the standard commercial product warranties for standard commercial products described in the first sentence of this Section l0.2, deliverables will be delivered on an “AS IS,” “AS AVALABLE,” and “WITH ALL FAULTS” basis. Data will be provided, processed and transmitted on an “AS IS,” “AS AVAILABLE,” and “WITH ALL FAULTS” basis.

No Party shall have any liability to any other Party under tort, contract or any other legal or equitable theory arising from the “AS IS,” “AS AVAILABLE,” and “WITH ALL FAULTS” basis described in the previous two sentences. Notwithstanding the above warranty disclaimers, with respect to non-standard products (other than data) for which standard commercial product warranties do not apply, each non-State Party agrees that it shall use reasonable efforts to support and maintain such non-standard products to work toward the goals and objectives of the Project.

10.3 **Force Majeure.** No Party shall be liable for any unforeseeable event beyond its reasonable control not caused by the fault or negligence of such party, which causes such Party to be unable to perform its obligations under this Agreement (and which it has been unable to overcome by the exercise of reasonable diligence) (a "Force Majeure event"), including, but not limited to, flood, drought, earthquake, storm, fire, pestilence, lightning and other natural catastrophes, epidemic, war, riot, civic disturbance or disobedience, strikes, labor dispute, failure or threat of failure of the Party’s subcontractors, sabotage of the Party’s or its subcontractor’s facilities, or any order of injunction made by a court or public agency. In the event of the occurrence of such a Force Majeure event, the Party unable to perform shall promptly notify the other Parties. It shall further use its reasonable efforts to resume performance as quickly as possible and shall suspend performance only for such period of time as is necessary as a result of the Force Majeure event.

10.4 **Indemnification.**

10.4.1 **Intentional and Reckless Actions.** Each Party agrees to indemnify the other Parties (including their respective officers, directors, employees and agents) against all claims, causes of actions, suits, proceedings, losses, damages, demands, fees, expenses, fines, penalties and costs (including without limitation, reasonable attorney’s fees, costs and disbursements) (collectively, “Losses”) arising from (i) any bodily injury or alleged bodily injury to the employee of' another Party or for tangible property damage of another Party caused by the intentional or reckless actions of such Party under this Agreement, or (ii) any bodily injury or alleged bodily injury to any third person or for tangible property damage of such third person or business caused by the intentional or reckless actions of such Party hereunder or (iii) any claims made by a private source providing a private contribution under Section 5.8 hereof for or at the request of the indemnifying Party (the injuries and damages described in this clause (ii) and (iii)are referred to herein as “third party claims”). If the bodily injury or alleged bodily injury to the employee of' another Party or to any third person or tangible property damage or the private source claim of damage is caused by the intentional or reckless actions of two or more Parties, such Parties shall indemnify the other Parties (and each other) against all Losses arising therefrom based on their comparative fault. For the purposes of this Agreement, the Parties, by mutual negotiation, hereby waive, as respects the other Parties only, any immunity that would otherwise be available against such Losses under the industrial insurance provisions of Title 51 of' the Revised Code of Washington.

10.4.2 **Mechanics.** A Party (the “indemnitee”) which intends to claim indemnification under this Section 10.4 shall promptly notify the Party(ies) from whom indemnification is sought (the “indemnitor(s)”) in writing of any action, claim or liability in respect of which the indemnitee or any of its employees or agents intends to claim such indemnification. With respect to third party claims, the indemnitee shall permit, and shall cause its employees and agents to permit, the indemnitor(s), at its own expense to defend and settle any such action, claim or liability and agree to the control of such defense or settlement by the indemnitor(s); provided, however, that such settlement does not adversely affect the indemnitee’s rights hereunder or impose any obligations on the indemnitee in addition to those set forth herein. In addition, with respect to third parry claims, if requested in writing by the indemnitee, the indemnitor(s) shall at its own expense defend and settle any such action, claim or liability, provided, however, that such settlement does not adversely affect the indemnitee’s rights hereunder or impose any obligations on the indemnitee in addition to those set forth herein. The indemnitor(s) shall not settle any such third party claim without the prior written consent of the indemnitee, which consent shall not be unreasonably withheld, and the indemnitor(s) shall not be responsible for any attorneys' fees or other costs incurred other than as provided herein. The indemnitee, its employees and agents, shall cooperate fully with the indemnitor(s) and its (their) legal representatives in the investigation and defense of any third party claim covered by this indemnification; provided that the indemnitor(s) shall reimburse the indemnitee, its employees and agents for all reasonable out-of-pocket expenses incurred in providing such cooperation. With respect to third party claims that the indemnitor(s) elects to defend and/or settle, the indemnitee shall have the right, but not the obligation, to be represented by counsel of its own selection and at its own expense.

10.5 **Survival.** Notwithstanding any other terms of this Agreement, the provisions of Section 10 shall survive the termination or expiration of this Agreement and shall continue to bind a Party who has withdrawn from the Project.

11. COOPERATION

The Parties agree to make a reasonable effort to promptly resolve any questions or problems that may arise between them. The Parties will perform their obligations hereunder in the spirit of cooperation and will attempt to make the Project function efficiently and smoothly. Each Party will use reasonable efforts to ensure that personnel involved in the Project under such Party's control will cooperate fully in carrying out such Party's obligations hereunder.

12. SPECIFIC REQUIREMENTS OF THE STATE OF WASHINGTON'

12.1 **Employment.**

12.1.1 Each Party warrants that it has not employed or retained any company or person, other than a bona fide employee working for such Party, to solicit or secure this Agreement and that it has not paid or agreed to pay any company or person, other than a bona fide employee working solely for the Party, any fee, commission, percentage, brokerage fee, gift or any other consideration, contingent upon or resulting from the award or making of this Agreement. For breach or violation of this warranty, the State shall have the right to annul this Agreement without liability, or in its discretion, to deduct from the consideration to be paid to the breaching Party hereunder or otherwise recover from the breaching Party the full amount of such fee, commission, percentage, brokerage fee, gift, or contingent fee.

12.1.2 Each Party agrees that any and all employees of the Party or other persons while engaged in the performance of any work or services required of the Party under this Agreement, shall be considered employees of such Party only and not of the State and any and all claims of such employees or other persons while so engaged, and any and all claims made by a third party as a consequence of any act or omission on the part of the Party's employees or other persons while so engaged on any of the work or services provided to be rendered herein, shall be the sole obligation and responsibility of the Party, except as provided in section 10.4 hereof.

12.1.3 Each Party agrees that it shall not engage on a full or part time basis, or other basis, during the term of the Agreement, any professional or technical personnel who are, or have been, at any time during the term of the Agreement, in the employ or the USDOT or the State, except regularly retired employees, without written consent of the public employer of such person.

12.2 **Nondiscrimination.**

12.2.1 Each Party agrees not to discriminate against any client, employee or applicant for employment or for services because of race, creed, color, national origin; marital status, sex, age, or handicap except for a bona fide occupational qualification with regard to, but not limited to the following: employment upgrading, demotion or transfer, recruitment or any recruiting advertising, a layoff or termination, rates of pay or other forms of compensation, selection for training, rendition of services. Each Party understands and agrees that if it violates this Section 12.2.1, this Agreement may be terminated by the State and further that the Party shall be barred from performing any services for the S rate now or in the future unless a showing is made satisfactory to the State that discriminatory practices have terminated and that recurrence of such action is unlikely.

12.2.2. During the term of this Agreement, each Party, for itself, its assignees and successors in interest agrees as follows:

a. Compliance with Regulations: Such Party shall comply with Chapter 49.60 of the Revised Code of Washington (the "Statute") in the same manner as it shall comply with the Federal Regulations applicable to Federally-assisted programs of the Department of Transportation, Title 49, CFR Part 21, as amended (the "Federal Regulations"), which are herein incorporated by reference and made a part of this Agreement. Such Party shall comply with the American Disabilities Act of 1992, as amended.

b. Nondiscrimination: Such Party, with regard to the work performed by it during the term of this Agreement, shall not discriminate on the grounds of race, creed, color, sex, age, marital status, national origin or handicap except for a bona fide occupational qualification in the selection and retention of subconsultants, including procurement of materials and leases of equipment. Such Party shall not participate either directly or indirectly in the discrimination prohibited by Section 21.5 of the Federal Regulations, including employment practices when the Agreement covers a program set forth in Appendix II of the Federal Regulations.

c. Solicitations for Subcontractors, including Procurement of Materials and Equipment: In all solicitations by competitive bidding or negotiation made by such Party for work to be performed under a subcontract, including procurement of materials or leases of equipment, each potential subconsultant or supplier shall be notified be such Party of the Party's obligations under this Agreement and the regulations relative to nondiscrimination on the grounds of race, creed, color, sex, age, marital status, national origin and handicap.

d. Information and Reports: At the request of the FHWA and/or the State, such Party shall provide all information and reports relating to the Project required by the Federal Regulations, directives issued pursuant thereto, the Statute or Chapter 162 of the Washington Administrative Code ("Chapter 162 WAC"). Such Party shall permit access to the FHWA only to its information relating to the Project for the FHWA and/or the State to ascertain compliance with the Federal Regulations or directives; provided that such Party shall also permit access to the State to its information relating to the Project for the State to ascertain compliance with the Statute or Chapter 162 WAC if the State is unable to otherwise obtain the information from the FHWA. Where any information required of the Party is in the exclusive possession of another who fails or refuses to furnish this information, the Party shall so certify to the United States Department of Transportation and shall set forth what efforts it has made to obtain the information.

e.	Sanctions for Noncompliance: In the event of such Party's noncompliance with the nondiscrimination provisions of this Agreement, the State shall have the right to terminate this Agreement.

f.	Incorporation of Provisions: Such Party shall include the provisions of paragraphs (a) through (e) of this Section 12.2 in every subcontract under this Project, unless exempt by the Federal Regulations, directives issued pursuant thereto, the Statute or Chapter 162 WAC. Such Party shall notify the FHWA and the State if it learns that any subcontractor is violating these provisions of its subcontract. Such Party shall reasonably cooperate with the FHWA and the State if the United States or the State, as the case may be, brings an enforcement action against the violating subcontractor.

12.3	**Maximum Total Amount Payable.** The maximum total amount payable by the State to the Parties under this Agreement shall not exceed $1,115,000 ($223,000 in State funds).

12.4	**Meeting Attendance.** Representatives of Etak, Metro Traffic Control and SCS shall attend a reasonable number of STS Project Coordination progress and presentation meetings as may reasonably be required to complete the Project.

12.5	**Certifications.** Each Party agrees that it shall execute and deliver to WSDOT from time to time such certifications that the FHWA reasonably requires under the Cooperative Agreement, and the following certifications that WSDOT reasonably requires: (a) Certification of Consultant, (b) Certification Regarding Debarment, Suspension and Other Responsibility Matters, Primary Covered Transactions, and (c) Certification Regarding the Restrictions of the Use of Federal Funds for Lobbying, a copy of each of which is attached hereto and by this reference incorporated herein as Exhibit I.

13. GENERAL PROVISIONS

13.1	**Independent Contractors.** The Parties to this Agreement are independent contracting parties, and nothing contained in this Agreement shall be deemed to create a partnership, joint venture, or agency relationship among them, nor does it grant any Party any authority to assume or create any obligation on behalf of or in the name of any other Party. Furthermore, nothing herein shall be construed as providing for the sharing of profits or losses arising out of the activities of any of the Parties hereunder or as creating a separate legal entity.

13.2	**Entire Agreement.** This Agreement (including the Exhibits attached hereto and by this reference incorporated herein) constitutes the entire agreement among the Parties and supersedes all prior discussions, agreements and understandings, whether oral or written with respect to the subject matter hereof.

13.3	**Waiver.** A waiver by any Party of the breach of or failure to comply with any provision of this Agreement by another Party shall not be construed as, or constitute, a continuing waiver of such provision, or a waiver of any other breach of or failure to comply with any other provision of this Agreement.

13.4 **Governing Law and Severability.** This Agreement shall be construed and enforced in accordance with, and governed by, the laws of the State of Washington. In the event any provision hereof is determined to be unenforceable or invalid then the meaning of that provision shall be construed, to the extent feasible, to render the provision enforceable, and if no feasible interpretation would save such provision, it shall be severed from the remainder of this Agreement which shall remain in full force and effect unless the provisions that are invalid or unenforceable substantially impair the value of the entire Agreement to any Party. In such event, the Parties shall use their respective reasonable efforts to negotiate a substitute, valid and enforceable provision which most nearly effects the Parties' intent in entering into this Agreement. To that extent, this Agreement is deemed severable.

13.5 **Nonassignment.** None of the Parties may assign this Agreement, nor any right granted hereunder, in whole or in part, without the unanimous consent of the other Parties, provided, however, that any Party may assign the Agreement without such consent (i) to any parent, subsidiary or other affiliate of the assigning Party, or (ii) in connection with the sale or transfer of all or substantially all of the assets of that part of the assigning Party's business to which this Agreement pertains. Any other attempt to assign or transfer this Agreement, or the rights and/or obligations arising hereunder shall be voidable at the option of any Party that did not give such advance consent.

13.6 **Jurisdiction.** In the event that any Party deems it necessary to institute lega1 action or proceedings to enforce any right or obligation under this Agreement, the Parties agree that any such action shall be initiated in the Superior Court of the State of Washington, situated in Thurston County. The Parties agree that all questions shall be resolved by application of Washington law and that the Parties to such action shall have the right of appeal from such decisions of the Superior Court in accordance with the laws of the State of Washington. Each Party hereby consents to the personal jurisdiction of the Superior Court of the State of Washington, situated in Thurston County.

13.7 **Compliance with Law.** The Parties to this Agreement shall promptly observe, comply with and execute the provisions of any and all federal, state, and local laws, rules, and regulations which apply to the work provided for or rendered pursuant to this Agreement.

13.8 M**odification.** No waiver, alteration, or modification of any of the provisions of this Agreement shall be binding upon Parties unless in writing and signed by the duly authorized representative of each Party intended to be bound thereby.

13.9 **Subject to Cooperative Agreement.** The Parties agree and acknowledge that this Project is part of a national Intelligent Transportation Infrastructure Model Deployment called Operation Time Saver for which the State has obtained a grant of federal assistance. The Parties agree that this Agreement is subject to the terms and conditions of the Cooperative Agreement, which is attached hereto as Exhibit A.

13.10 **Notices.** .All notices, requests, consents and other communications required or permitted hereunder shall be: (i) in writing, (ii) either (A) mailed by certified or registered mail, return receipt requested, (B) mailed by a reputable next day air courier service, (C) delivered by hand or messenger, or (D) sent by facsimile transmission provided the receipt of the transmission is confirmed, and (iii) addressed as follows (or, in any such case, at such other address or address as shall have been furnished in writing by such Party to the others):

If to SCS, to:

SEIKO Communications Systems, Inc.
1625 NW Amber Glen Court, Suite 140
Beaverton, Oregon 97006
Attn: Lee Balzer
Fax: 503/531-1600

If to the State, to:

Washington Department of
Transportation
1107 NE 45th, Suite 535
Seattle, Washington 98105-4631
Attn: Peter Briglia, Project Manager
Fax. 206/685-0767

with a copy to:

Paul DePalma
Consultant Administration
Washington State Department of
Transportation
P.O. Box 47300
Olympia, WA 98504
Fax: 360/705-6838

If to Etak, to:

Etak, Inc.
1430 O'Brien Drive
Menlo Park, CA 94025
Attn: Larry Sweeney
Fax: 415/617-0142

If to Metro Traffic Control, to:

Metro Traffic Control, Inc
111 Grand Ave.
Oakland, CA 94612
Attn: Joan Ravier
Fax: 510/286-5238

If to SCOA, to:

SEIKO Communications of America, Inc.
1695 NW Amber Glen Ct., Suite 140
Beaverton, OR 97006
Attn: Yoshi Narahashi
Fax: 503/531-1550

IN WITNESS WHEREOF, the Parties have caused this Agreement to be signed and delivered by its duly authorized officer or representative as of the date set forth below its signature.

STATE OF W ASHINGTON, acting through the Washington State Department of Transportation and Washington Secretary of Transportation

By: ______________________________
Title: ______________________________
Date: ______________________________

SEIKO COMMUNICATION'S OF AMERICA, INC.

By: __________________________
Title: __________________________
Date: __________________________

SEIKO COMMUNICATIONS SYSTEMS, INC.

By: ________________________________
Title: ________________________________
Date: ________________________________

ETAK, INC.

By: ___________________________
Title: ___________________________
Date: ___________________________

METRO TRAFFIC CONTROL, INC.

By: ________________________________
Title: ________________________________
Date: ________________________________

List of Exhibits

Exhibit A	Cooperative Agreement dated September 25, 1996 between FHWA and the State
Exhibit B	Etak's Statement of Work
Exhibit C	Metro Traffic's Statement of Work
Exhibit D	SCS's Statement of Work
Exhibit E	SCOA's Statement of Work
Exhibit F	Summary Cost Estimates
Exhibit G	37 CFR § 401.14
Exhibit H	FHWA Letter Agreement
Exhibit I	Certifications
Exhibit J	Letter Regarding FHWA's Rights

EXHIBIT H

FHWA Letter of Agreement

TO: State of Washington, acting through the Washington Department of Transportation and the Secretary of Transportation

SEIKO Communications Systems, Inc.
SEIKO Communications of America, Inc.
Metro Traffic Control, Inc.

Etak, Inc.

Gentlemen:

Reference is made to the Agreement dated as of the date hereof that each of you has entered into relating to the Seattle TimeSaver ("STS") Project (the "Agreement"). This letter confirms the undersigned's agreement with the second sentence of the second paragraph of Section 8.4 and with Section 8.6 of the Agreement. This letter also confirms the undersigned's agreement with the second paragraph of Section 8.4.1 which clarifies that the license described in the Cooperative Agreement (as defined in the Agreement) is solely for "non-commercial

UNITED STATES FEDERAL
HIGHWAY
ADMINISTRATION

Date: ______________

By ______________________

Title ______________________

U.S. Department
of Transportation

**Federal Highway
Administration**

400 Seventh St., S. W.
Washington, D.C. 20590

VIA FACSIMILE AND EXPRESS MAIL
Mr. Peter Briglia
Project Manager, Seattle Timesaver Project
Washington State Department of Transportation
1107 NE 45th, Suite 535
Seattle, Washington 98105-4631

Dear Mr. Briglia:

The purpose of this letter is to reiterate the Federal Highway Administration's ("FHWA" or "Agency") policy regarding the Government's retained license to copyrightable material and patentable inventions developed under an Intelligent Transportation Systems (ITS) Model Deployment Initiative (MDI) Partnership Agreement. This letter is provided as requested by the Microsoft Corporation which is negotiating a contractual arrangement with the Washington State Department of Transportation to provide software and/or other services as part of the Seattle Timesaver MDI Project. A brief discussion of the FHWA's rights in copyright and patents is provided because both may be applicable to software developed with Federal assistance.

As explained below, the FHWA's use, if any, of the copyrightable or patentable products developed by Microsoft for the Seattle Timesaver Project would be limited to Agency, non-commercial purposes, only.

FHWA's Rights in Copyrightable Material Developed with Federal Assistance

The *Uniform Administrative Requirements for Grants and Cooperative Agreements to State and Local Governments,* codified at 49 C.F.R. Part 18 and often referred to as the Common Rule, provides regulations and guidelines for Federal agencies to follow when awarding grants and cooperative agreements to State and local governments. The Common Rule at 49 C F.R. § 18.34 provides standard language detailing the Government's rights in copyrightable works developed with Federal assistance This language, included in the FHWA's ITS MDI Partnership Agreements with the States, provides the Government with "a royalty-free, nonexclusive and irrevocable license to reproduce, publish, or otherwise use and to authorize others to use for Federal Government purposes" copyrightable work produced with Federal funds.

The FHWA does not interpret its rights in copyright to include the authority to distribute software or other copyrightable products outside of the Agency. With regard to the ITS program, the Intermodal Surface Transportation Efficiency Act (ISTEA) mandates that one of the goals of the program is to "promote an intelligent transportation system industry." (Pub. L. No. 102
license in any copyrightable work outside of its immediate needs would diminish the market for industry and would be contradictory to the broad mandate provided in the ISTEA.

Exhibit J
Page 1 of 2

FHWA's Rights in Inventions Developed with Federal Assistance

The Government's policy governing rights to inventions created in the course of a Federal funding agreement (including an ITS MDI Partnership Agreement) is set forth in 37 CFR Part 401. The standard patent rights clause of this provision at § 401.14(b) provides contractors with title to patents made with Federal assistance in exchange for royalty-free use by the Federal Government. The standard patent rights clause also requires recipients of Federal assistance (in this case, the Washington State Department of Transportation) to include this provision in all contracts, subcontracts and subgrants for experimental, developmental or research work.

The FHWA construes the scope of its license to include (1) use for research and development and support services performed under an FHWA procurement contract and (2) use of the subject invention on a federally-owned road (e.g., national forests, parks, and Indian reservations).

The FHWA does not construe the scope of its license to include sublicensing the technology to a State or local government, bridge, tunnel or turnpike authority, or private entity for uses unrelated to the two described above.

Conclusion

The FHWA's objectives in this project are to test, evaluate and demonstrate ITS deployment in a metropolitan area featuring fully integrated transportation management systems and strong regional traveler information services provided by a vigorous public-private partnership. The reason behind the FHWA retaining rights in copyright and inventions made with Federal assistance is to ensure that the Agency's minimum needs are adequately met, leaving contractors with the rights to generate private sector investment and develop commercial applications in the copyrightable work or patentable invention.

I trust that this information will resolve the intellectual property rights question that the Microsoft Corporation has raised with the Washington State Department of Transportation. If you would like to discuss this issue further, please contact me at 202-366-0780 or Beverly Russell, attorney-advisor at 202-366-1355.

Sincerely yours,

(signed)

Wilbert Baccus
Associate Chief Counsel for
General Law

Exhibit J
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Appendix C.6

City of Bellevue, Washington
Equipment Rental Fund Policies

FINAL DRAFT

EQUIPMENT RENTAL FUND POLICIES

September 24, 1997

FINAL DRAFT ERF POLICIES

INDEX

Policy Final Draft
ERF REPLACEMENT AND OPERATIONS POLICIES

1. SUMMARY

1.1 Purpose

1.1.1 The purpose of Equipment Rental Fund (ERF) is to manage maintenance and replacement funds to assure that sufficient dollars are always available when needed. This allows the city to proactively use maintenance and efficiency indicators to drive equipment replacement decisions freeing the city from the ups and downs of the funding process.

1.2 History

1.2.1 ERF was created as an internal process designed to rent ERF owned equipment to other funds, maintain and repair equipment administered by ERF, and provide equipment replacement through the establishment of replacement reserves. ERF consists of three major sub-funds: the Mechanical Equipment Rental Fund (MERF), the Electronic Equipment Rental Fund (EERF), and the Information Services Replacement Fund (IS).

1.3 Services

1.3.1 ERF is designated an Internal Service Fund. There are two separate service components for MERF and for EERF. The replacement function supports asset management and the process to provide for replacement of existing assets. The operations function supports maintenance, fuel, motor pool, and intergovernment activities. Separate rates are established to provide for specific services.

1.4 Structure

1.4.1 ERF provides management, maintenance and administration. These services are grouped into the following functions, each of which has a separate revenue stream:

ERF Revenue Stream

I.S. Replacement Reserves	**Replacement**	**Administration** Reserves	**Operations**
Workstation (WRP) Computer (CRF)	Electronic (EERF) Mechanical (MERF)	Assist Mgmt. Operations Mgmt	Maintenance Motor Pool Car Wash Fuel

1.5 **Definition of Terms**

1.5.1 Accounting Life: Defined period of time that a replacement or depreciation rate is collected. It does not affect retention or replacement decisions.

1.5.2 Asset: A capital item that qualifies to be part of EERF or MERF.

1.5.3 ECS: Electronic Communication Services provide maintenance services for EERF assets.

1.5.4 EERF: Electronic Equipment Rental Fund is a subfund that charges fees for replacement and maintenance operations for communication, electronic, and related systems.

1.5.5 ERF: Equipment Rental Fund is an internal service fund incorporating two major subfunds, EERF and MERF, under central management. IS Replacement Reserves are a replacement program managed by the Information Services Department.

1.5.6 Fee: Amount being charged for maintenance, service, or replacement.

1.5.7 Fleet Operations: Provides maintenance, fuel, and related services for MERF assets.

1.5.8 Fund Manager: Fleet and Communications Manager.

1.5.9 Fund Owned: All assets purchased with ERF replacement funds or acquired through the transfer of ownership from a purchasing department.

1.5.10 IS Reserves: Funds managed by Information Services to assist in the replacement of desktop workstations, mainframe, telecommunications and network equipment.

1.5.11 Leasing: Process by which a department contracts for use of equipment without acquiring ownership, and uses funds other then those maintained by ERF.

1.5.12 MERF: Mechanical Equipment Rental Fund is a subfund that charges fees for replacement and maintenance operations for vehicles, equipment, and related systems.

1.5.13 Miscellaneous Asset Account: An account created to provide a temporary method to track and process charges for items not set up as assets in the funds. Can hold money in reserve to fund designated purchases or money associated with special reserves.

1.5.14 Non-Fund Owned: All assets owned by another fund or not owned by the City. These assets may be maintained and /or have a replacement account in ERF.

1.5.15 Rate: Method of determining fees for maintenance, services and replacement.

1.5.16 Renting: Process by which a department contracts for short term use without acquiring ownership and does not use ERF Funds.

1.5.17 Rental Fund: Legislative term used to describe the process of charging departments a fee to create a replacement account for assets.

1.5.18 Replacement Account: Money collected through rates, interest earnings, donations, and asset sales to replace an existing asset.

1.5.19 Replacement Reserves: Total of all Replacement Accounts.

1.5.20 Special Reserves: Money placed into a reserve asset account to be used to purchase items that normally do not have individual reserve accounts (e.g., 800 MHZ).

1.5.21 Telecommunications: Networking components (e.g., hubs, routers, gate-ways, multiplexors). Does not include radios, cell phones, or other wireless technologies.

1.6 **Responsibilities**

1.6.1 Operating Departments:

1.6.1.1 Furnish documentation that will enable the fund manager to identify costs, system components, replacement life, and all other pertinent information for any asset owned or maintained by ERF (e.g., Traffic Signals).

1.6.1.2 Work with the fund manager to identify assets needing to be replaced and/or new assets to be purchased during the budget process.

1.6.1.3 Provide prudent use, care and stewardship of fund owned assets. This includes ensuring routine and major maintenance is done, responsible use of the asset, and adherence to policies.

1.6.1.4 Operationally manage specialty equipment not maintained by ERF (e.g., medical, restaurant, traffic signal, survey).

1.6.1.5 Initiate the request to start replacement collections on assets in new ERF categories.

1.6.2 Fund Manager (EERF and MERF portions of ERF):

1.6.2.1 Is responsible for managing all ERF items.

1.6.2.2 Manages budget and financial operations of ERF in accordance with all existing laws, policies, and generally accepted accounting practices.

1.6.2.3 Manages ERF assets in accordance with existing policies (e.g., color, use, safety, operator licenses).

1.6.2.4 Determines equipment that will be maintained by ERF.

1.6.2.5 Establishes the accounting life for all ERF asset classes by recognizing the average life of groups of assets. The fund Manager makes changes to the accounting life based on actual experience.

1.6.2.6 Establishes a replacement schedule and rate for all eligible ERF asset acquisitions. The goal of the replacement rate is to provide funding within 5 % of the replacement price for the asset being replaced.

1.6.2.7 Maintains all titles for City owned licensed vehicles and equipment.

1.6.2.8 During the budget process develops ERF financial plan for the budget period.

- Prepares the asset replacement plan and recommend new purchases.

- Recommends new asset categories as potential additions to ERF.

- Works with budget office to present to CMO all requests for collecting replacement reserves for new categories of ERF.

- Sets maintenance and replacement charges to user Departments.

1.6.2.9 Manages all ERF operations including vehicle and radio maintenance, motor pool, and all COB automated fuel systems.

1.6.2.10 Requisitions supplies, vendor provided services, and capital items. Requisitions placed by anyone other than ERF staff will not obligate ERF funds and will not be paid with ERF funds.

1.6.2.11 Determines when surplused assets are retained and rented beyond their expected disposal date.

1.6.3   Information Services Department (IS portion of ERF):

1.6.3.1 Manages those assets participating in the IS portion of ERF, to insure compliance with ERF policies and management practices.

1.6.3.2 Develops and maintains a replacement plan for IS managed Information Technology (IT) assets in accordance with the Information Technology Strategic Plan.

1.6.3.3 Works with departments to develop replacement strategies for departmentally owned desktop computer and other (IT) assets.

1.6.3.4 Develops and maintains a city-wide schedule for desktop (IT) equipment replacement.

1.6.3.5 Coordinates disposal of retired (IT) assets with Finance.

1.6.4   Finance Department:

1.6.4.1 During the budget process:

- Analyzes and make recommendations to the City Manager on ERF financial plan for the budget period.

-Reviews asset replacement plan.

-Reviews proposed new asset purchases.

-Reviews total rates as they change (e.g., maintenance, fuel, and replacement).

1.6.4.2 Approves unbudgeted ERF asset purchases and appropriation adjustments to accommodate unbudgeted asset purchases. Unbudgeted technology asset purchases also require Information Services approval.

1.6.4.3 Approves the movement of surplus ERF replacement funds to other asset replacement accounts.

1.6.4.4 Approves the retention of special reserves that are not identified to an asset.

1.6.4.5 Works with fund manager to present to CMO all requests for collecting replacement reserves for new categories of ERF assets.

1.6.4.6 Processes Equipment Rental Billing System (ERBS):

- Bills monthly for ERF Services.

- Merges Budget data with ERBS master files.

1.6.4.7 Prepares ERF financial statements and recommends potential improvements.

1.6.4.8 Ensures City property and equipment is disposed of in accordance with State and COB regulations.

1.6.4.9 Invests fund money to gain interest.

1.6.5 City Manager

1.6.5.1 During the budget process approves the ERF financial plan for the budget period.

1.6.5.2 Approves the establishment of replacement accounts for new ERF asset categories.

1.6.5.3 Approves exceptions to established policies on a case by case basis.

1.6.6 City Council

1.6.6.1 Adopts the appropriation and operating budget for ERF during the budget process.

1.6.6.2 Authorizes transfer of ERF replacement reserves to other funds.

1.6.6.3 Approves interlocal agreements to provide services to other agencies.

Note: The following sections: Replacement Reserve Management; Replacement Rules; ***Acquisition*** *and Disposal of Assets; and Maintenance & Operations relate to the EERF and MERF portions of ERF. The IS Replacement Fund portion of the policies are covered in Appendix A, which are currently being developed.*

2. REPLACEMENT RESERVE MANAGEMENT

2.1 The fund manager will establish reserves thru the use of rates for the replacement of assets.

2.2 ERF may maintain replacement reserves for non-fund owned assets (e.g., assets belonging to other funds like Utilities, Special Reserves, EPSCA).

2.3 All reserves will be allocated to individual assets or asset classes. The only exception are special reserve accounts. Special reserve accounts are created for a specific purpose, with specific funds normally for a short term (e.g., 800 MHz Radio Fund, King County Aid Car).

2.4 ERF replacement reserves will be managed in a manner that insures all money within the fund is identifiable to specific assets.

2.5 Replacement and operation reserves may be co-mingled for investment purposes only. All money collected will be invested by an appropriate City Agent to gain interest. All Interest earned on invested ERF reserves will be posted to individual asset replacement accounts by the Finance Department.

2.6 ERF replacement reserves will not be used to fund construction projects, purchase non-capital equipment, or purchase capital items that are not authorized to have a replacement schedule.

2.7 ERF replacement reserves will be not be permanently transferred to other funds unless directed by Council.

2.8 ERF replacement reserves will not be expended without an approved capital sheet.

2.9 Generally an item is replaced by a like item. ERF reserves can be combined from one or more assets that are being replaced to obtain one new asset. It is permitted to obtain more than one new asset when replacing only one asset. Based on the needs of the department a different type of asset may be requested when replacing an old asset. Exceptions may be requested and approved during the budget process.

2.10 Reserves from assets that have been declared surplus or removed without being replaced will be retained in the ERF fund accounts. The money will be available to the using department to either:

2.10.1 Allocate to the replacement balances of other assets within the Department to reduce replacement rates.

2.10.2 Posted to a Misc. reserve account for a maximum of 3 years to fund new assets. Capitalize major modifications/rebuilding equipment, or augment shortfalls in replacement funds. A one year extension is available based on extraordinary circumstances with documentation.

2.10.3 If no use of miscellaneous reserves occurs within three years the money can be removed from the miscellaneous reserve account and will be used to lower that department's replacement rate.

2.11 Replacement reserves in excess of the purchase price of the replacement asset will be credited to the replacement balance of the new item.

2.12 Funds available in a miscellaneous reserve account or an established special reserve account can only be used to acquire capital equipment, or reduce replacement collection.

2.13 When ERF replacement reserves are not sufficient to purchase a new asset, ERF will pay the amount due and bill the department for the remaining balance after salvage is credited. ERF reserves will not be a source of short funding other than authorized in Paragraph 2.11.

3. REPLACEMENT RULES

3.1 The fund manager will establish rate levels to provide funding within 5% of the anticipated purchase price for a replacement asset by the end of the current asset's accounting life. Replacement rates will be reviewed to insure that over/under collection is not occurring.

3.2 The normal replacement rate will be computed based on the purchase price and collected in equal amounts over the accounting life of the asset. The rate is not adjusted for expected interest or salvage, as this income provides for the effects of inflation.

3.2.1 Replacement rates may be changed from normal policy when accounting life of an asset is changed or the cost of a new assets within a class are significantly higher or lower then the norm.

3.2.2 Rates will be reduced by the amount of any surplus exceeding the purchase price of the asset.

3.2.3 A replacement rate will be established for fully matured assets that are kept beyond the accounting life of the asset, provided the asset reserve is below established funding needs.

3.3 The following criteria must be met for replacement reserve collection:

3.3.1 Useful life must be two years or longer.

3.3.2 Minimum individual value is $1,500.

3.3.3 New item categories must be nominated by the operating departments to the fund manager, and confirmed thru the budget process.

3.4 Equipment items that do not participate in replacement will be asseted as equipment rental items when:

3.4.1 They use fuel and/or maintenance services provided by ERF.

3.4.2 They have a Washington State issued title.

3.4.3 Directed by City Manager.

3.4.4 They are Utility owned items that do not participate in replacement.

3.5 The accounting life is established based on industry standards and the normal life expectancy of similar. Normally asset classes affect large groups of similar assets; however, special applications and unique items may have separate lives. Normally the accounting life is changed when the actual average disposal age deviates by more than one year at replacement. Accounting life can also be changed due to valid customer requests, and technological changes in the equipment.

3.6 CMO approval must be obtained prior to collecting replacement for assets in new ERF categories. The request to start replacement will be submitted to the fund manager at the time the asset is being acquired. The fund manager and the budget office will present the request to the City Manager.

3.7 SYSTEMS: A system is defined as a group of components with interrelated functions that collectively form an asset. The requirements and rules for a system are as follows:

3.7.1 All components within the system must be specifically identified. Components may include items normally considered to be non-capital. Training is a component only when it is related to system setup. This does not include maintenance contracts.

3.7.2 The functionality of the system must be identified, along with the relationship(s) of the components and the stated functionality. This interconnectivity must be demonstrable.

3.7.3 If a system needs to expand due to increased functionality (technological changes, etc.), this expansion and budget must be approved during the budget process.

3.7.4 Once it is a system, it cannot be downgraded into a series of individual assets.

3.7.5 The customer is specifically responsible to provide the fund manager with a definition of the system, assistance in replacement analysis, and any re-build replacement analysis.

3.7.6 Replacement rates will be computed based on the cost and life expectancy of each component.

4. ACQUISITION AND DISPOSAL OF ASSETS

4.1 Approval for acquisition and disposal of assets is decided during the Capital Budget process which starts when the fund manager reviews all assets to determine those that should be replaced and those that should be retained. The fund manager meets with the operating departments to agree on the selection of items to be replaced. The formal approval for acquisition and disposal of assets occurs when the budget is approved by Council.

4.2 Lease contracts will be reviewed by the ERF fund manager for all items that are leased for greater than a six month period of time, or different periods of time that total six months during a budget year, or successive leases in multiple budget years. Total costs will be analyzed to determine if ownership is more cost effective than leasing. If ownership is more cost effective, the department must budget to purchase the item being leased. The department may not lease items in order to avoid the capital purchase screening process.

4.3 All assets placed in the ERF fund will have a minimum purchase price determined by the fund manager. The fund manager can change the minimum to match COB standards and approve exceptions on a case by case basis.

4.4 All assets placed in the ERF fund will have a replacement schedule with the following exceptions:

4.4.1 Any asset with a useful life of less then two years.

4.4.2 Any utility asset unless replacement is specifically requested by the utility.

4.4.3 Any asset with an initial cost less then $1500.

4.4.4 Any confiscated asset.

4.4.5 Any non-fund owned asset unless replacement is specifically requested by the department or agency.

4.4.6 Any asset so directed by the City Manager (example: PC and workstation assets managed within the IS Replacement Fund).

4.5 Assets acquired for service by means other than purchase will have a replacement rate established similar to a purchased asset (e.g., senior center van, civic group horse trailer donation).

4.6 All ERF assets will be returned to ERF for disposal when the asset is replaced or declared surplus. Out-of-service assets will be withdrawn from the account of the using department and will be available for rental on a time and charge basis until sold or salvaged. Assets will be removed from the fund upon disposal.

4.7 Assets being replaced must be physically resumed to ERF as soon as the new asset is issued and fully operational.

4.8 Internal resale price of City owned ERF assets will be equal to "Trade in" listed in industry price guides or 75% of historical sales price for similar items sold at auction. Sales tax does not apply.

4.9 Transfer of fund owned assets without receiving compensation:

4.9.1 Assets may be transferred to other governments without compensation upon direction/approval of the City Manager. ERF will bill the department(s) for any replacement shortfall resulting from the transfer.

4.9.2 Assets may be transferred to private entities under contract to the City of Bellevue to provide services in lieu of direct cash payments. The department responsible for the contract will be charged the salvage value of the asset being transferred.

5. MAINTENANCE AND OPERATIONS

5.1 Maintenance Rates

5.1.1 The fund manager will establish rates for various operational costs and services provided by Electronic Communications Services and Fleet Operations. Separate accounting will be maintained for replacement and operations.

5.1.2 ERF Maintenance rates will be established to recover actual direct and indirect costs, as well as provide sufficient resources to fund inventory growth, salary increases, inflation, and special programs. Rates will be adjusted based on the fund balance if revenue exceeds or is below needs.

5.1.3 All ERF asseted items will be assigned either a maintenance contract rate or a time and charge rate. The rates charged will include all direct costs and a markup to recover indirect costs. The rates will be formalized using the budget process and will not be increased during a budget period.

5.1.4 All fuel, maintenance, parts, and outside service work will be billed to the asset receiving the service.

5.2 Maintenance and Services

5.2.1 Fleet and Communications will manage/maintain all ERF assets except IS assets and specialty equipment that has specifically been delegated to other departments.

5.2.2 Fleet and Communications may perform maintenance and provide services on equipment not assigned to the ERF fund.

5.2.3 Maintenance and services provided to other government agencies will be billed as authorized by interlocal agreements (e.g., contracts, verbal agreements, memoranda of understanding).

5.3 Fuel System

5.3.1 Fleet Operations will manage the automated fuel system to insure cost effectiveness, meet customer needs, and comply with regulations.

5.3.2 Fleet Operations will provide portable fuel systems to use in fueling fixed site locations, generators etc.

5.4 Motor Pool

5.4.1 Motor Pool is intended to provide staff cars, vans, and equipment for short term use by departments that cannot justify a dedicated vehicle.

5.4.2 Vehicles and equipment may be provided for motor pool rental when full cost recovery allows rates to be competitive with the private sector.

5.5 Out of Service Equipment

5.5.1 All assets returned to the ERF fund may be available for short term rental. Vehicles and equipment will be rented on a time and charge basis until sold or salvaged. All rental revenue exceeding expenses for non-fund owned assets will be paid to the owning fund.

5.5.2 Replaced and/or surplused assets may be retained and rented beyond their expected disposal date only when approved replacement equipment has not been delivered.

6. APPENDIX

6.1 Appendix A: Information Services (IS) ERF management specifics (To be developed later).

6.2 Appendix B: Chronology of Significant Events:

6.2.1 The Mechanical Equipment Rental Fund (MERF) was created December 2, 1964 by Ordinance No 699.

6.2.2 The Electronic Equipment Shop/Reserve Fund (EERF) was created on February 10, 1973 by Ordinance No. 3235.

6.2.3 In 1984 a City of Bellevue motor pool was created to provide a pool of vehicles and common use equipment for short term use by all city departments.

6.2.4 Special Purpose Reserve Accounts have been created at the direction of the Finance Department with the approval of the City Manager. These funds have been used to purchase new assets when no existing assets is being replaced. They include:

6.2.4.1 “Computer reserve” established March 1990 by the Information Services Executive Committee (ISEC) at the direction of the City Manager.

6.2.4.2 “Annexation Signal Reserve’ established May 1993.

6.2.4.3 “P.C. Reserve” established January 1994.

6.2.4.4 “800 MHZ Reserve” established January 1994.

6.2.5 Prior to 1991 the EERF and MERF funds were part of the Operating Budget. During the 1991 Council Budget Retreat held in July 1990, the Council approved including both funds in the nonoperating budget. A two year appropriation was approved by Council.

6.2.6 On January 1, 1997 Equipment Rental Fund (ERF) was created as a result of Council approving Ordinance 4907. The effect of this ordinance was the joining of EERF and MERF funds into one fund. This improved central management and a reduced duplicate financial reporting requirements.

Appendix C.7

iTravel Subcontractor Request for Information

REQUEST FOR INFORMATION -- NY/NJ/CT INTELLIGENT TRANSPORTATION SYSTEM (ITS) MODEL DEPLOYMENT INITIATIVE

DUE 040698
POC Sharon Russell, NYSDOT, (518) 485-8295; Ron Wolcott, PB Farradyne, (212) 465-5516, fax: (212) 631-3779

The New York State Department of Transportation (NYSDOT) responded to a federal solicitation and was subsequently awarded a federal grant for the NY/NJ/CT ITS Model Deployment Initiative. As a result of this federal award, NYSDOT anticipates entering into a contract with The Northeast Consultants (NEC), a joint venture of PB Farradyne and TransCore. In anticipation of its contract with NYSDOT, NEC is currently seeking support services from qualified subcontractors and/or vendors to provide design support during Phase I and/or deployment services in Phase 2. The MDI project is designed to provide real-time multi-modal surface transportation information to the traveling public in the New York / New Jersey / Connecticut metropolitan area. The components will allow the public to obtain general and customized information on the most direct route based on original destination preference via telephone and the Internet. The NEC is interested in securing services of experts with experience in providing the following: * Outreach * Marketing * Advertising * Mapping * IVR * Personalized Traveler System * Telecommunications.

For more information, please contact Ron Wolcott from NEC at the number identified below. Interested parties are requested to send Letters of Interest (in writing or by fax) to the NYSDOT Contract Official shown below. Letters must contain the following information:

1. Company profile, experience, products, and services, and ability to meet this request.
2. Availability of proprietary off-the-shelf software packages, demonstrating timeliness for integration and installation.
3. The letter of interest must be signed by a responsible company official.

Responses are encouraged from minority, women, and disadvantaged business enterprises. Submittals should present options and/or alternatives for providing these services/products to the MDI project. Team submittals are encouraged. Service purchased from out-of-state firm in past 3 years: [ ] MBE GOAL NA% WBF GOAL NA%

Proposal Due Date: 4/6/98.
Contract Term: 1 to 3 years.
Location where goods are to be delivered or services performed: Metropolitan NY TRAVEL

CONTACT:
Ron Wolcott
PB Farradyne
One Penn Plaza
New York, NY 10119
Phone: (212) 465-5516

Appendix C.8

Smart Trek Letter of Understanding on Access to Video Images

The following constitutes a letter of understanding between the Washington State Department of Transportation (WSDOT) and the City of Bellevue (City)

BACKGROUND

WSDOT, as part of its Traffic Systems Management Program, monitors freeway traffic conditions in the greater Seattle metropolitan area. One method of monitoring conditions utilizes a closed circuit television (CCTV) system in which the video is transmitted to a central location.

The City of Bellevue, as part of its traffic and signal operations system, monitors arterial traffic conditions in the Bellevue metropolitan area. One method of monitoring conditions utilizes a CCTV system in which the video is transmitted to a central location.

WSDOT presents this CCTV information to the general public as part of its programs. These include allowing local media and other public agency access to real-time video images and display of continuously updated snapshots of video images via the Internet. Presentation of this information is consistent with WSDOT's policy of providing public information. The City does not currently present this information to the public, nor does it have the means to.

AGREEMENT

The City is hereby authorized the non-exclusive right to access WSDOT's video surveillance system under the terms and conditions stated herein. WSDOT is similarly authorized the non-exclusive right to access the City's video surveillance system under the conditions stated herein.

WSDOT will continue to monitor traffic in a manner consistent with the needs of its Traffic Systems Management Program. The City agrees to monitor and use WSDOT-provided information in a manner, as directed by WSDOT, that does not impact any of WSDOT's operations or use in any way.

The City will continue to monitor traffic in a manner consistent with the needs of its traffic and signal operations system. WSDOT agrees to monitor and use City-provided information in a manner, as directed by the City, that does not impact any of the City's operations or use in any way.

WSDOT will create and provide continuously updated snapshots of the City's video images for display on the Internet. These will be accessible via a symbolic map showing approximate camera location, shall include location information with each snapshot image, and shall credit the City as the source of the images. This will be done in a form consistent with WSDOT's existing video snapshot display on the Internet and shall be acceptable to both the City and WSDOT.

The City shall supply all required equipment, as reasonably determined by WSDOT, needed to tap into WSDOT's systems at the demarcation point stated herein, and to transmit this information back to the City's building. The City will retain ownership of this equipment and therefore, all costs and responsibility for purchasing, installing, and maintaining this equipment shall be the City's responsibility.

WSDOT shall supply all required equipment, as reasonably determined by the City, needed to tap into City's systems at the demarcation point stated herein, and to transmit this information back to WSDOT's building. WSDOT will retain ownership of this equipment and therefore, all costs and responsibility for purchasing, installing, and maintaining this equipment shall be WSDOT's responsibility.

The City will access WSDOT's video signal at a demarcation point in Levett Building in Bellevue. The demarcation point is defined as the output of WSDOT's video receiver. The City will maintain and repair as necessary the fiber optic cable installed between WSDOT right-of-way and the Levett Building.

WSDOT will access the City's video signal at a demarcation point in Levett Building in Bellevue. The demarcation point is defined as the output of the City's video receivers.

Any damage to WSDOT equipment and/or facilities resulting from the City's operations shall be repaired at no cost to WSDOT. WSDOT will be responsible for determining how the damage is to be repaired and who will make the repairs. The City agrees to reimburse WSDOT its reasonable costs and expenses incurred within thirty (30) days of the date of WSDOT's invoice.

Any damage to City equipment and/or facilities resulting from WSDOT's operations shall be repaired at no cost to the City. The City will be responsible for determining how the damage is to be repaired and who will make the repairs. WSDOT agrees to reimburse the City its reasonable costs and expenses incurred within thirty (30) days of the date of the City's invoice.

Should any of the City's transmitting equipment impact WSDOT's operation in any way, the City shall immediately remedy the situation in a manner satisfactory to WSDOT. Similarly, should any of WSDOT's transmitting equipment impact the City's operation in any way, WSDOT shall immediately remedy the situation in a manner satisfactory to the City.

This agreement is solely between WSDOT and the City. Should another city or other jurisdiction wish to receive (a) WSDOT's traffic surveillance video through the City, or (b) the City's traffic surveillance video through WSDOT, the party must enter into a separate agreement with the video source owner.

WSDOT has existing agreements with the following television stations, local agencies, and companies for transmission and use of its real-time video images:
KIRO Television
KOMO Television
KING Television
KSTW Television
KCPQ Television (pending)
Microsoft
King County Metro Transit
City of Seattle (pending)
Washington State Patrol
University of Washington (pending)

These agreements allow each party non-exclusive use of the video images and, in the case that the images are to be transmitted to the public via broadcast, cable television, or the Internet, state that credit shall be given to WSDOT for providing them.

WSDOT will block access to the City's video images from all parties that currently have access to WSDOT's video, and to any future party requesting such. Access will be permitted only after a written request from the City for each party wanting use of the City's video images. It shall be the City's responsibility to enter into agreements with said parties for use of their video images.

WSDOT's video distribution system allows the ability to provide access to parties on a case by case basis. WSDOT will label each City video image with location identification information. WSDOT's system does not currently have the ability to include any information crediting the City as the source owner of the video through a real-time connection, such as the connections used by companies and agencies described above.

Should any conflict arise between the activities covered under this agreement and existing or future federal, state, or city policies, rules, or regulations, the agreement will be discontinued on fourteen (14) days written notice at the discretion of the party affected by the conflict.

The City agrees to indemnify and hold WSDOT harmless against any claims or actions by third parties from misconstrued or inaccurate information disseminated by the City. Further, the City will protect, save, hold harmless, and defend WSDOT, its authorized agents and employees, from all claims, actions, costs, damages, or expenses of any nature whatsoever (including reasonable attorney fees and costs) by reason of the acts or omissions of the City, it agents, service providers, contractors, licensees, invitees, or employees arising out of or in connection with any acts or activities authorized by this letter of understanding. This obligation shall not include such claims, costs, damages, or expenses which may be caused by WSDOT or its authorized agents or employees; PROVIDED, that if the claims or damages are caused by or result from the concurrent negligence or other acts or omissions of (a) WSDOT, its agents or employees and (b) the City, its agents, service providers, or employees, this indemnity provision shall be valid and enforceable only to the extent of the negligence of the City or the City's agents or employees.

The WSDOT agrees to indemnify and hold the City harmless against any claims or actions by third parties from misconstrued or inaccurate information disseminated by the WSDOT. Further, the WSDOT will protect, save, hold harmless, and defend the City, its authorized agents and employees, from all claims, actions, costs, damages, or expenses of any nature whatsoever (including reasonable attorney fees and costs) by reason of the acts or omissions of WSDOT, it agents, service providers, contractors, licensees, invitees, or employees arising out of or in connection with any acts or activities authorized by this letter of understanding. This obligation shall not include such claims, costs, damages, or expenses which may be caused by the City or its authorized agents or employees; PROVIDED, that if the claims or damages are caused by or result from the concurrent negligence or other acts or omissions of (a) the City, its agents or employees and (b) WSDOT, its agents, service providers, or employees, this indemnity provision shall be valid and enforceable only to the extent of the negligence of WSDOT or WSDOT's agents or employees.

WSDOT shall not be held liable if any or all of WSDOT's system is not operational, nor shall the City be held liable if any or all of the City's system is not operational.

Should any conflict arise between the activities covered under this agreement and existing or future federal, state, or city policies, rules, or regulations, the agreement will be discontinued on fourteen (14) days written notice at the discretion of the party affected by the conflict.

If for any reason any of the terms of this agreement are violated by either WSDOT or the City, the innocent party may terminate with thirty (30) days written notice to the defaulting party.

This agreement shall commence on the date of signing and continue without interruption for five (5) consecutive years. However, either WSDOT or the City may terminate, without penalty, this agreement at any time during the five-year period upon thirty (30) days written notice.

If you are in agreement with the terms and conditions set forth in this letter, please sign in the space provided below and return the original to this office.

Signature below signifies agreement with the above listed terms and conditions.

City of Bellevue	WSDOT Representative
Name ____________________	Name ____________________
Title ____________________	Title ____________________
Date ____________________	Date ____________________

Appendix C.9

Smart Trek Letter of Understanding on Access to Signal Systems

Advanced Traffic Management System
Signal System Access
[DRAFT] Letter of Understanding

This letter will serve as a Letter of Understanding between the Washington State Department of Transportation (WSDOT) and the City of *** (CITY) for the purposes of allowing the WSDOT access to the CITY'S signal system data. The CITY, by countersigning in the space provided below, acknowledges and agrees to the following conditions to this Letter of Understanding.

BACKGROUND

The WSDOT has been in the process of designing and building advanced traffic management systems (ATMSs) that will cover the Puget Sound area in three geographic regions: north, as the North Seattle ATMS (NSATMS); east, as the Eastside ATMS (EATMS); and south, as the Southend ATMS (SATMS). The NSATMS was to be the initial phase of ATMS deployment in the area, with expansion to the east and south to occur in later stages, as funding became available.

The Puget Sound area was then selected as one of four Model Deployment Initiative (MDI) sites in the Country in order to demonstrate a complete intelligent transportation system (ITS). Selection as an MDI site provided funding to complete the three ATMSs concurrently. Known as Smart Trek, the Seattle MDI project will gather data from every feasible aspect of the transportation system, including the regional ATMSs, and will make this information available for use in advanced traveler information system (ATIS) applications. These applications may be developed by WSDOT the University of Washington, other public agencies, or by private entities. The applications will be used to disseminate traveler information through a variety of media, including, but not limited to, the Internet, Cable TV, and radio or television broadcasts.

The primary objectives of each of the ATMSs are to

develop and implement a regional monitoring and data sharing system that will allow all jurisdictions in each geographic region to have real-time information on traffic and transit conditions within that region;

foster development of coordinated operations between jurisdictions to enhance the transportation network within each ATMS region and from one ATMS to another;

provide data for use in advanced traveler information system applications byway of an ITS data gathering and distribution backbone.

AGREEMENT

This agreement is made of three separate components: Data Collection; Traffic Management Use of Data; and Traveler Information Use of Data

Data Collection

The CITY agrees to allow WSDOT access to their signal systems in order to gather relevant signal timing data and volume, speed, and occupancy data under the terms and conditions stated herein.

Access to signal system data will be granted for the following signal systems:

A. XXX
B. YYY
C. ZZZ

WSDOT agrees to access and use CITY's systems and data in a manner that does not adversely impact the CITY's operations in any way.

WSDOT will supply all required equipment needed to connect to the CITY's systems and transmit the data back to the WSDOT. This equipment may include, but is not limited to, communication protocol converter computers, traffic signal controller upgrades, communication lines, and modems.

Any damage to CITY equipment and/or facilities resulting from WSDOT's operations shall be repaired by WSDOT at no cost to the CITY.

Should any of WSDOT's connection, communications or transmitting equipment impact CITY's operation in any way, WSDOT shall immediately remedy the situation in a manner satisfactory to the CITY.

This agreement is solely between WSDOT and CITY. Should another entity wish to contribute data and be a participant in any of the ATMS projects, that entity must enter into a separate agreement with the WSDOT.

WSDOT will access CITY's signal systems at the following demarcation points:

A. XXX - [central PC address or signal system master location]

CITY will define the demarcation location(s). CITY may move the demarcation point at CITY's discretion. All access to the location(s) by WSDOT, its employees, agents, contractors, or service providers will require prior notification and arrangement with CITY'S Signal Operations Engineer or Traffic Engineer.

CITY shall not be held liable if any or all of CITY's signal systems are not operational.

Traffic Management Use of Data

The complete data set, shown on the attached table, will be collected and shared among participating agencies within each ATMS region and between each regional ATMS

Traveler Information Use of Data
A limited subset of data to the ITS backbone will be provided for use in ATIS applications. The subset of data will consist of congestion information (volume, speed, occupancy) and incident information. The ATMS network is secure and protected from outside tampering and unintended use. Sufficient safeguards will be used, including password protection and a network firewall server allowing only known users and specific PCs to use the system, to ensure system security.

Should any conflict arise between the activities covered under this agreement and existing or future federal or state policies, rules, or regulations, this agreement will be discontinued on fourteen (14) days written notice at the discretion of either party.

WSDOT agrees to indemnify and hold CITY harmless against any claims or action by third parties from misconstrued or inaccurate information disseminated by WSDOT and the ATMSs. WSDOT will protect, save, hold harmless, and defend the CITY, its authorized agents and employees, from all claims, actions, costs, damages, or expenses of any nature whatsoever (including reasonable attorney fees and costs) by reason of the acts or omission of WSDOT, its agents, service providers, contractors, licensees, invitees, employees, or any person whomsoever, arising out of or in connection with any acts or activities authorized by this letter of understanding. This obligation shall not include such claims, costs, damages, or expenses which may be caused by the sole negligence of the CITY or its authorized agents or employees; PROVIDED, that if the claims or damages are caused by or result from the concurrent negligence of (a) the CITY, it agents or employees, and (b) WSDOT, its agents, service providers, or employees, this indemnity provision shall be valid and enforceable only to the extent of the negligence of WSDOT or WSDOT's agents or employees.

If for any reason any of the terms of this agreement are violated by either Agency or WSDOT, the innocent party may terminate, within thirty (30) days written notice to the defaulting party.

This agreement shall commence on the date of signing and continue without interruption for ### consecutive years. However, either CITY or WSDOT may terminate without penalty this agreement at any time during the ### year period upon 30 days written notice.

If you are in agreement with the terms and conditions set forth in this letter, please sign in the space provided below and return the original to this office.

Signature below signifies agreement with the above listed terms and conditions.

CITY Representative	WSDOT Representative
Name	Name
Title	Title
Date	Date

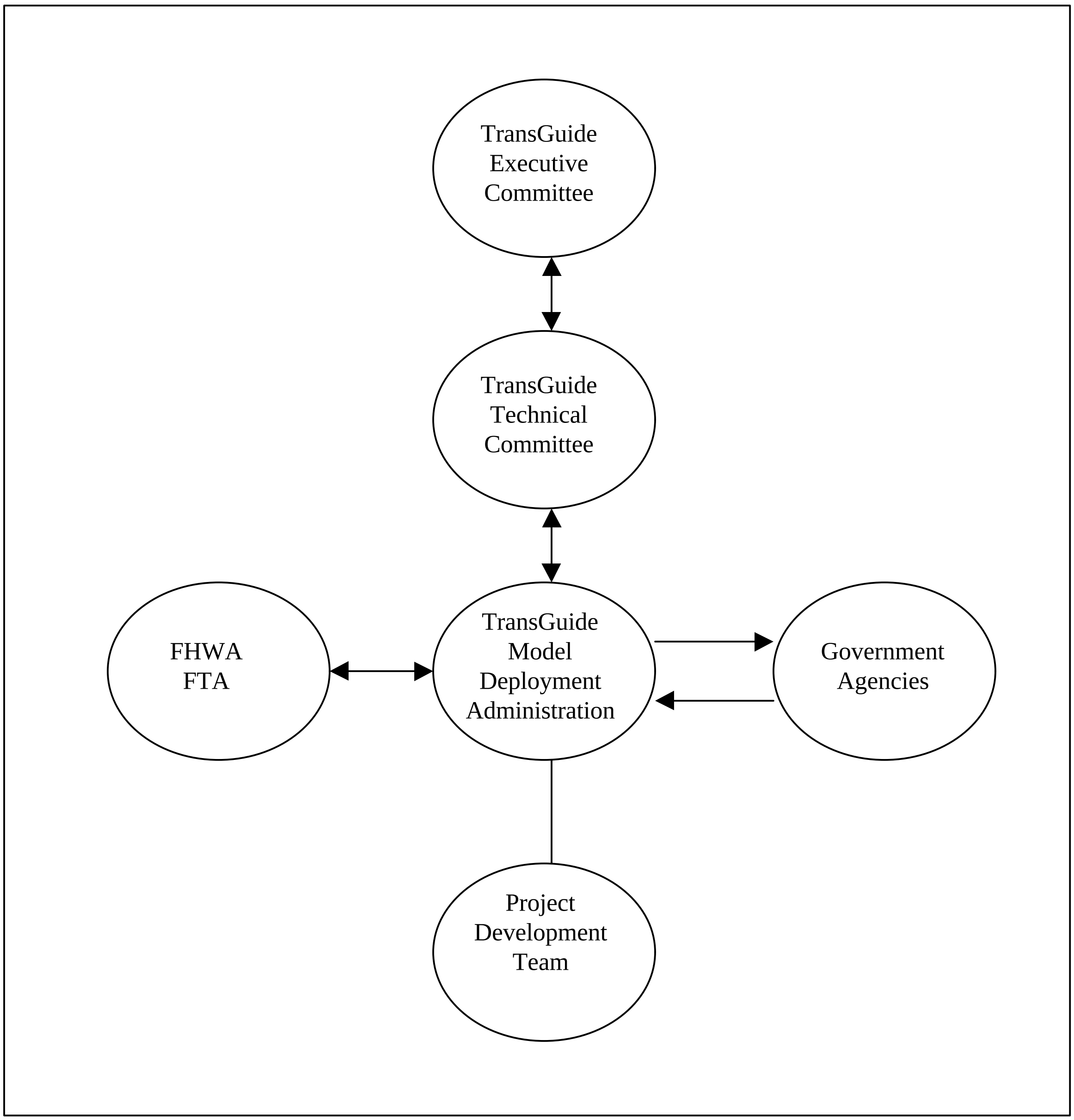
DRAFT 09/23/98

APPENDIX D
ORGANIZATIONS AND COMMITTEES

Appendix D.1

TransGuide Organizational Chart

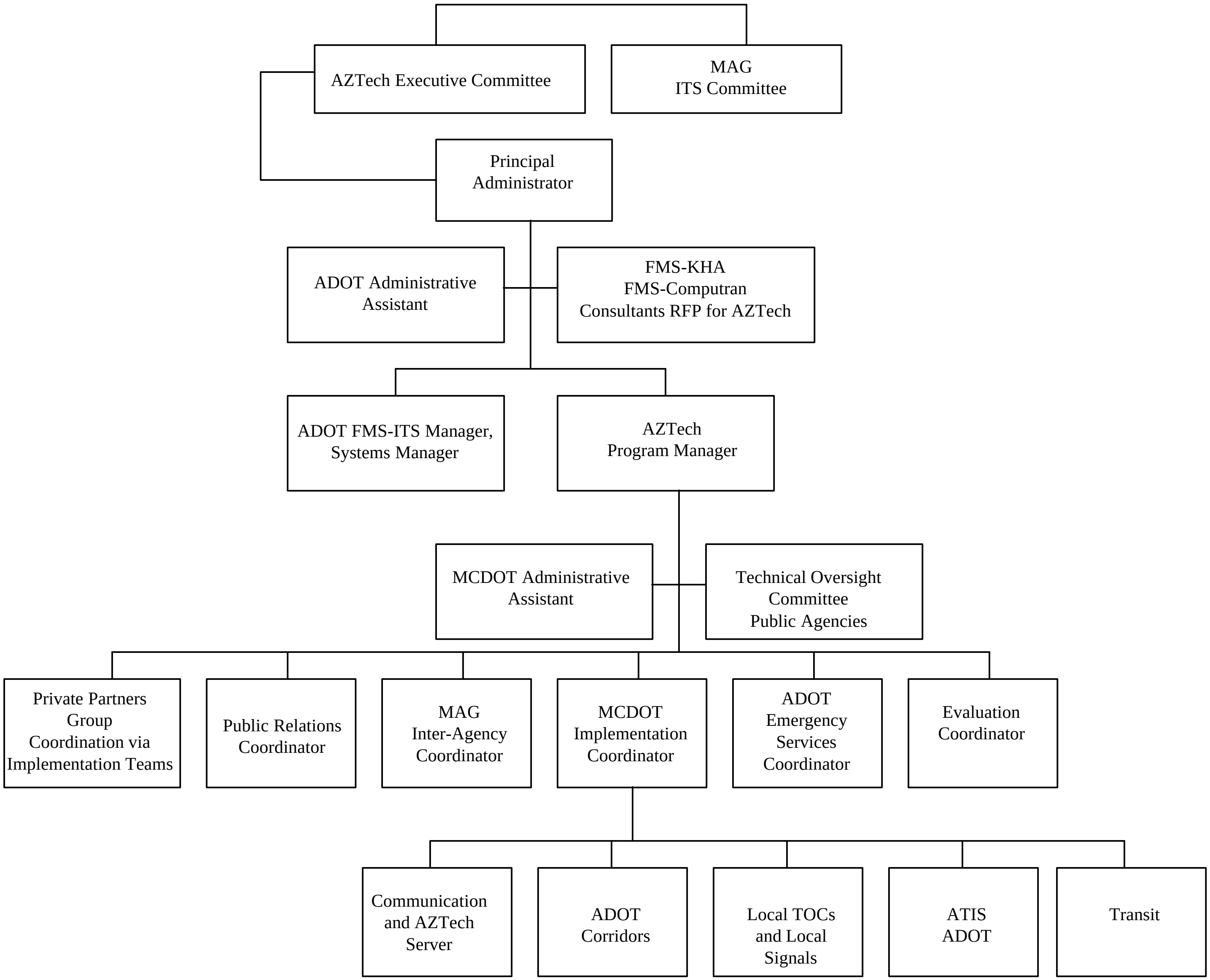
TransGuide Organizational Chart



Appendix D.2

AZTech Project Team and Committees

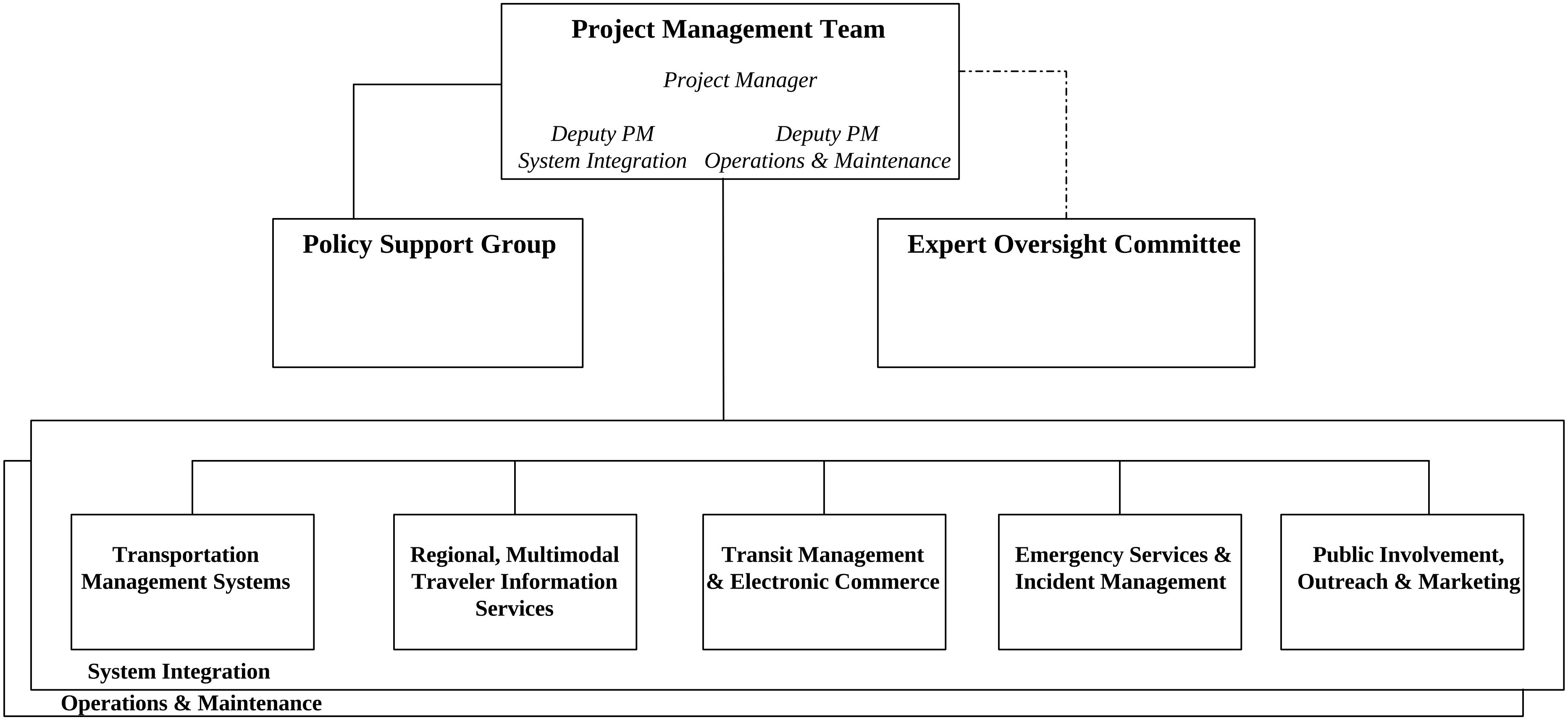
AZTech Project Team



Appendix D.3

Smart Trek Organizational Chart

Smart Trek Organizational Chart



Appendix D.4

Maricopa Association of Governments Committee Roles and Responsibilities

MAG INTELLIGENT TRANSPORTATION SYSTEM (ITS) COMMITTEE
ROLES and RESPONSIBILITIES

Vision and Leadership

The MAG ITS Committee will seek to provide vision and leadership for implementation of ITS projects in the MAG area.

Long Range Plan

MAG maintains a Long Range Transportation for the MAG area. The MAG ITS Committee will facilitate the development of the ITS section of this Plan and will help to ensure that ITS solutions are integrated among all modes of transportation.

Programming

The MAG ITS Committee will recommend and prioritize ITS projects for MAG federal funds (and other funding sources as appropriate) for potential inclusion in the transportation program.

Funding

The MAG ITS Committee will serve as a catalyst to support funding for ITS projects. Funding strategies will be developed and potential funding sources will be identified. Funding measures and applications will be encouraged and supported.

Coordination

The ITS Committee will help ensure coordination of ITS projects among modes and jurisdictions throughout the MAG area. This will include policy recommendations to the MAG Transportation Review Committee.

Education and Promotion

The ITS Committee will encourage ITS educational and promotional programs in the MAG area.

Data Collection and Reporting

The MAG ITS Committee will facilitate the collection and reporting of ITS information for the MAG area.

CATEGORY 600 - TRANSPORTATION
Subcategory 604 - Implementation Work Element 604.49

INTELLIGENT TRANSPORTATION SYSTEMS COORDINATION

OBJECTIVE
To ensure the advancement and efficient integration of Intelligent Transportation Systems (ITS) programs and projects in the region.

PRODUCT
1. Coordination of ITS efforts in the region.

PREVIOUS AND ON-GOING WORK
In December 1996, the Phoenix Metropolitan area was awarded approximately $7.5 million to complete a Model Deployment Initiative (MDI). The MDI is a seven-year project (two year implementation and five-year operation) that will develop an integrated intelligent transportation system for this area.

In 1996, MAG established an ITS Committee and adopted a strategic plan for ITS.

ANTICIPATED IMPACT
Ongoing ITS efforts can be a cost-effective way to improve mobility and reduce pollution in this region.

When implemented in 1998, the MDI will produce freeway and arterial street networks that are safer and more efficient for the traveling public, decreasing travel time and enhancing mobility. Up-to-the-minute statewide travel information will be made available to virtually any traveler using in a variety of methods. Equipment installed in buses will provide travelers with a real-time schedule status.

TASKS
1. Coordination with involved agencies on implementation and operation of the MDI and other ITS efforts. (90%)

2. Update the ITS element in the MAG Long Range Plan. (10%)

MAG FY 1998 WORK PROGRAM**

Source **Amount**	**Agency** **Cost**
CF FHWA CMAQ FUNDS $47,669	MAG Admin $47,669
$47,669	$47,669

**This is the total funding in the MAG FY 1998 Work Program. A portion of this funding may consist of funds from previous years.

CATEGORY 600 – TRANSPORTATION
Subcategory 606 – Special Studies

ISSUES, PROBLEMS AND OPPORTUNITIES

This subcategory encompasses Work Elements which are outside the scope and staffing of ongoing transportation planning activities. This may be due to the specialized expertise required, or because the work element provides one-time initiation of a system or program. Thus, any new development in transportation planning requirements or technology presents issues, problems and opportunities which pertain to this subcategory. In the FY 1998 Unified Planning Work Program, transportation special projects address issues such as improvements to the MAG travel demand models, review of pedestrian and bicycle needs, evaluation of specific corridor needs and assessment of fiscal, right-of-way, intermodal and demand management factors.

GOALS

1. To develop transportation plan elements and modeling refinements needed to respond to newly emerging planning requirements and regional policy issues.

2. To collect transportation data that is not collected on an annual basis and involves intensive short-term labor requirements that cannot be met by existing staff resources.

APPENDIX E
PLANS

Appendix E.1

TransGuide and the Model Deployment Initiative Public Information Plan

Texas Department of Transportation

TransGuide and the Model Deployment Initiative
Public Information Plan

MISSION: *To utilize all applicable mediums to inform the public and key decision makers about TransGuide, ITS systems in general and their benefits. This supports the San Antonio District (TxDOT) mission to be the State's model district for which all standards of quality and integrity evolve, where progressiveness and innovation are the norms.*

GOALS:
Maintain a proactive approach
Provide TransGuide information in an easily accessible manner,
Monitor feedback
Maintain status as international showcase
Maintain active partners program

CONSTITUENCIES

Primary	*Secondary*
Drivers	*Junior high school age youths*
(*teenage, adult, age 65 and above)*	*Elementary school age children*
Transportation community	
Medical community	
ITS community	
Tourists	
Legislators	

Texas Department of Transportation

FUTURE TRANSGUIDE PUBLIC INFORMATION PLAN EFFORTS

- Development of kiosk and in-vehicle navigation brochures
- New TransGuide and MDI videos and brochures
- Public Service Announcements for the kiosk and Real-Time Travel /information Tag programs
- Contract with public relations agency (should be finalized before the end of the year
- Quarterly TransGuide newsletter
- Surveys and focus groups
- Increased media exposure by participating in morning talk shows
- Increasing the number of local speeches and presentations
- Movie theater screen PSAs, sporting events opportunities, partnerships with local businesses for public education opportunities
- Updating TransGuide traffic map and information on Web page
- Meet and exceed goals of 500 tours and speeches; 30 special events; 40 broadcast interviews; and 50 articles
- Grand finale event

Media Distribution Plan

Live TransGuide video, maps, congestion and accident data are being sent to area television stations, radio stations and newspaper to be passed on to their respective viewers, listeners and readers.

The TransGuide system is the most elaborate Advanced Traffic Management System (ATMS) in the United States. The TransGuide system utilizes loop detectors embedded in the highway (each lane at 112 mile intervals) to detect abnormal traffic flow patterns. The loop detectors can determine the speed and occupancy of each lane. When the TransGuide Freeway Traffic Management Mainframe (FTMM) (a DEC VAX ft810 fault tolerant computer running Open VMS and the POSIX kernel) detects a traffic abnormality, an alarm is triggered and a "scenario" is implemented to alter the traffic routing conditions. These changes include textual descriptions to drivers through Changeable Message Signs (CMS) or lane control information through the use of colored arrows on Lane Control Signals (LCS). The TransGuide operator is aided in evaluating the traffic conditions through the use of Closed Circuit Video Television Cameras (CCTV) that have the ability to provide a field of view of 20 feet by 30 feet while zoomed up to 1/2 mile away.

Southwest Research Institute was funded in late 1994 to develop a concept in which TxDOT could disseminate the traffic information contained in the TransGuide facility to organizations who communicate this information to the traveling public. TxDOT felt that if the "near real-time" traffic conditions they were aware of in the TransGuide facility could be useful by radio and television stations in their traffic broadcasts, the overall flow of traffic could be improved in the San Antonio metropolitan area because the traveling public could use alternative routes to bypass known congestion.

During the concept development study, SwRI determined that the following four types of data contained in the TransGuide facility would be useful to the organizations who broadcast traffic information to the traveling public:

- Video: The video cameras provide high-resolution images which can be used to accurately describe traffic incidents.

- Map: The TransGuide system maps all traffic data to a color coded map which graphically depicts the traffic conditions on all instrumented segments of highways.

- Scenarios: When a traffic incident occurs, the TransGuide operators will implement a scenario. A scenario involves providing textual messages on CMSs, lane control through LCSs, and altering traffic signal timing on major freeway interchanges

- Lane Closures: When highway construction or maintenance is to be performed, TxDOT requires that any required lane closures be called into the TxDOT District office. This is currently a manual process and disseminating lane closures is not an automatic task. This project will provide a user interface for the entering of lane closure information into the TransGuide computing environment and then the data will be communicated for traffic information broadcasting purposes.

A variety of communication alternatives were investigated during the concept study. Through mutual consent of TxDOT and various radio/television station broadcast engineers, it was determined that Low-Power Television (LPTV) was the optimal communication media. LPTV provides the capability to cover the San Antonio metropolitan area using a single UHF transmitter. Additionally, TxDOT already has a 300 foot broadcast tower that can accommodate-the LPTV transmitting antenna. In an LPTV environment, the signal can be received using a very inexpensive antenna. The video to be distributed to the public can ride the main "television" signal while the map, lane closure and scenario data can be sent through a "vertical blanking interval" which can then be decoded at the receiving end.

The implementation project has been termed the "Media Distribution Plan." The effort has been broken into two projects with two alternative funding organizations:

- OCC Services: The part of the system that is to reside in the TransGuide Operational Control Center (OCC) to gather information and send it to the LPTV transmitter.

- Media Services: The part of the system that is to decode the information received from a LPTV receiver and present the information in a Microsoft Windows graphical user interface.

TRANSGUIDE OFFERS TECHNOLOGY TOUR

by **Betty Taylor**
TransGuide Public Information Officer
San Antonio District
Texas Department of Transportation

INTRODUCTION

Technology drives into action this summer when TxDOT's newest advanced traffic management system opens along San Antonio freeways. TransGuide, or Transportation Guidance System, will warn drivers ahead of time of incidents and accidents along the freeway and provide alternate routes. Through the use of computers, fiber optics, overhead variable message signs, lane control signals and cameras, the system detects changes in traffic patterns and makes changes to all affected signs and lane control signals in the area within a two-minute-and-15-second time frame. Main objectives of the system include reducing congestion and enhancing emergency response time to incidents along the highway. Participants in the TransGuide operations center include TxDOT, City of San Antonio Police and Fire dispatch and VIA Metropolitan Transit Authority bus dispatch.

TransGuide is part of ITS, or Intelligent Transportation Systems, a nationwide effort to better manage traffic along the nation's existing freeways. Currently, TransGuide is one of the fastest, most accurate, and technologically advanced systems in the nation. San Antonio District Director of Transportation Operations Patrick L. Irwin, PK., and Traffic Management Engineer Patrick F. McGowan, P.E., consulted over 150 engineers and scientists before designing this fully redundant, reliable and accurate system. TransGuide relies on non-vendor-specific equipment for easy expandability in the future. In addition, over 34,000 (eventually 128,000) traffic solution scenarios entered into the mainframe (DEC) VAX 810 FT computer account for the system's speed and accuracy. The communications system includes innovative designs that allow for cost savings, flexibility and efficiency.

The Operations Center

The TransGuide operations center, located in the IH 10/ IH 410 interchange in San Antonio, houses the San Antonio District Transportation Operations offices; offices of VIA Metropolitan Transit Authority, City of San Antonio traffic operations (police/fire/EMS/9-1-1 dispatch), and two research agencies on the third floor; and the computer and operations rooms. This includes a backup emergency management center, the alternate Public Safety Answering Point dispatch center.

The operations room houses 18 workstations and will initially operate from 5 A M. to 8 P M. weekdays and during special events on weekends. Other agencies will also operate workstations that will be utilized for research and development. An 8~cube video wall in the operations room provides operators with detailed highway, video, and weather maps.

Appendix E.2

AZTech Public Outreach Plan

AZTech Public Outreach Plan
EDUCATION

- **Bulletin/Fact Sheet**
- **Printed Materials**
- **Executive Slide Presentation**
- **Community Events**
- **Tours**
- **Web Page**

Some of the tools we developed to educate our target audience are:
Bulletin/Fact Sheet - Provides information on AZTech's progress for distribution to stakeholders and the media. We have completed 4 bulletins and have more scheduled.
Printed materials - Brochures, magazines, youth pages and press kits provide information about the AZTech project.
Executive slide presentation - A "traveling road show" with a slide presentation geared for government leaders, chambers of commerce, and top 25 companies are scheduled for earls next year.
Community events - Participation in local community events such as the State Fair allows AZTech to reach the general public.
Tours - Seeing is believing in order to provide a better understanding of ITS among our target audience, tours are encouraged and solicited. Congressional delegations, transportation officials and professional organizations have seen ITS at work in our traffic operations center in Phoenix.
Web page - Immediate access to AZTech's project information, status and accomplishments. With over 20,000 hits daily, our web page offers the ability to update and communicate new happenings in the project. The web address appears on all items that we print.

AZTech Public Outreach Plan
PUBLIC SERVICE CAMPAIGN

- **Retail**
- **Sporting Venues**
- **Billboards**
- **Public Facilities**
- **Radio and Television**

The Public Service Campaign will kickoff early next spring to help create awareness of the AZTech project and promote the project launch in April. We will be using several non traditional means to reach our target audience.
Retail - Ads on grocery store bags, tent cards on tables in restaurants
Sporting Venues - Program ads, scoreboard messages and game announcements at local sports events.
Billboards - Billboards along the roadway, at sporting events, and concert venues.
Public Facilities - advertisements at local libraries and inserts in bills sent by utility companies and local government agencies.
Radio Television - 15 and 30 second television and radio announcements.

PROMOTION
We are working to reach our stakeholders through:
Professional Organizations - presentations at Chambers of Commerce, professional business organizations, and transportation groups.
Employer Communications - providing information to large employers in the Phoenix area to include in their company newsletters and other employee communications.
Local and National Conferences - participation in local and national transportation-related conferences allows us to educate transportation's officials and decisions makers on the AZTech project.

AZTech Public Outreach Plan

COMMUNICATION

- **Media Relations**
- **Marketing**

Communication with the media and the development of marketing tools is another aspect of our public outreach plan.
Our media relations efforts have helped us locally and national get the word out on the AZTech
project.

AZTech Public Outreach Plan

MEDIA RELATIONS

- **Press Conferences**
- **Press Releases**
- **Media Contact**
- **Traffic Reporters**
- **Trade Press**

Press conferences - We have used press conferences to announce major milestones and introduce the new technologies coming to Phoenix. We have held two press conferences so far. The first to announce Phoenix as a site for the model deployment initiative and the second to announce the contract-with Etak and introduce the traveler information devices coming to Phoenix.
Press releases - We have used press releases to announce milestones and events during the project. The purpose is peak their interest to write a story a film segment for the evening news. AZTech has received over 25 articles and 15 television news stories
Media content - interaction with the media on a regular basis helps to keep them updated on the progress of the project and learn what stories that they will be interested in.
Traffic reporters - we distributed a list of "did you know" type facts to traffic reporters about travel the Phoenix area and the AZTech project. We have also distributed AZTech hats to the pilots that do traffic reports for TV stations.
Trade Press - we have received national and intentional through the transportation trade press on the AZTech project.

AZTech Public Outreach Plan
MARKETING

· **Logo and Image Development**
· **Specialty Items**
· **Signs and Banners**
· **Collateral Production**
· **Historical Archives**
· **Benchmark Survey**
· **Exhibit Booths**

Logo development - we are the keeper of the logo image to ensure that a universal symbol refers to the AZTech project.
Specialty items - Items such as pins, hats, shirts, ties, scarves, and coffee cups help establish an awareness of AZTech.
Signs and banners - graphics have been created to promote AZTech at conferences and community events.
Collateral production - we handle on design, production and printing for pieces for the AZTech project including brochures, letterhead, business cards and press kits.
Historical archives - a historical record of project milestones, printed pieces, community events and news stories is being compiled from the beginning to the completion of the project next spring.
Benchmark survey - over 1,000 people were surveyed last spring to get an initial awareness of ITS technologies in use.
Exhibit booths - a tabletop and 10' by 10' wall display have been created for AZTech to use at conferences, community events and presentations.

AZTech Public Outreach Plan
COOPERATIVE EFFORT

· **AZTech Executive Committee**
· **Public Outreach Committee**
· **Teamwork**

AZTech public outreach is a cooperative effort among the partners involved in the project. Representatives from the AZTech executive committee, FHWA, ADOT, McDOT, KC&A, and BRW guide public outreach activities.
The team of ADOT, Maricopa County and KC&A work together on the public outreach effort.

AZTech Public Outreach Plan
OUR VISION

**Create a Public Outreach Plan
to set a worldwide standard of excellence.**

- The AZTech project is a tremendous effort to improve transportation and the quality of life in the Phoenix metro area.
- ADOT, Maricopa County and Katherine Christensen & Associates formed a partnership to manage the public outreach activities for the AZTech project.
- Katherine Christensen & Associates is a public relations meeting planning and special events firm working on the AZTech project.
- Our efforts are working to develop local and national awareness of the AZTech project.

AZTech Public Outreach Plan

OBJECTIVES

- **Education**
- **Communication**

Working with an AZTech management committee, the public outreach plan was developed with careful thought of the purpose, plan of action and support activities needed to accomplish our goals.
The cornerstone of our plan is to educate and communicate with a targeted audience.

AZTech Public Outreach Plan

TARGET AUDIENCE

- **Stakeholders**
- **Media Representatives**
- **Traveling Public**

- Focusing our message to a target group helps us achieve continuity and give us the best "bang for our buck".
- Three audiences have been targeted:

Stakeholders - represent a group of federal, state and local government agencies, Congress, special interest groups, major local employers and professional/technical organizations. Tours, presentations and literature create awareness of AZTech locally.

Media representatives`- the media provide the broad avenue to reach the traveling public and stakeholders. Local reporters or editors from newspapers, magazines, radio and television needed to updated on the progress of the project and its impacts on travel in the Phoenix area.

Traveling public- Educating commuters about the AZTech project and its benefits will help ensure the success of an advanced traveler information system. Several means are being used to make drivers aware of steps being taken as part of the AZTech project.

Appendix E.3

Smart Trek Advertising and Promotion Plan

PROMOTIONS AND THE SUMMIT

1998

PRR
February 24, 1998

Smart Trek In the Media and on the Road: A Round-up for 1997.

You may have seen or heard reports and features about Smart Trek in the following in 1997:

Summer	Puget Sound, Both most congested area, to get ITS benefits *Washington Digital Media Alliance*
Summer	Intelligent Transportation Systems; Whats Down the Road in Traffic Management. (on Travel Aid) *Parsons Brinckerhoff Notes*
July	"ITS Washington: On a Mission to Increase ITS Awareness *ITS America News*
July 1	"Being smart about traffic." *Seattle Times*, Eastside Extra
July 24	"High tech fix for traffic?" *Seattle Daly Journal of Commerce*
July 28	"Get Smart about traffic snarls." *Eastside Journal*
July/August	"Seattle Takes to the Sidewalk." *ITS Intentional*
August	"Raising a Road's IQ." *Governing*
August 29	"Bus Arrival and Location Information Displays Underway in Seattle." The Urban *Transportation Monitor*
September/October	"Turning a Profit: What Will it Take to Create a Profitable Business in the Market for In-Vehicle ITS Systems and Services?" ITS *World*
October	"Intelligent Transportation Systems: Smart Trek Crafting National Model for Info Systems." *EX*Press* (WSDOT Newsletter)
October	"Traffic Systems Management Center, Watching over the Freeways - and Those Who Use Them". *Ex*Press*
November	"Web Watch: Seattle Trafficview". *PopularScience*
November/ December	"Winter Wonderland Ahead: Chain Up and Slow Down." (on Travel Aid). *ITS World*

November/ December	"Perspectives on ITS: Interview with Federal and State Legislators." (Interview with U.S. Sen. Patty Murray). *ITS World*
Dec. 19	"Intelligence." (on Travel Aid). *Urban* T*ransportation Monitor*

Radio and Television Smart Trek Coverage:

July 27	KOMO Radio
July 24	KING5 Television
July 24	KIRO Radio
July 25	KIRO Radio
July 25	KMPS Radio
Oct. 7	KPLU Radio.
Nov. 1	KOMO

The Smart Trek booth was displayed at three ITS or transportation-related annual meetings, three Model Deployment Initiative quarterly meetings, one education-related conference and one automotive convention. It traveled to New York, Washington DC, San Antonio and Salt Lake City in addition to venous sites around Puget Sound.

A total of 23 **Smart Trek briefings** were given, to business associations (including chambers of commerce), private industries, transportation groups, citizens' groups, professional organizations, elected officials (including law enforcement officers), and Washington State DOT divisions.

As you can see, 1997 was a busy year, and 1998 promises to be even busier as more Smart Trek projects become operational. Stay tuned!

For copies of articles cited, please contact Michael West at Pacific Rim Resources at (206) 623 0232 ext. 200 or mjwest@prr.seattle.com.

SMART TREK MEDIA PLAN, 1998

Objective

Maximize public understanding of the benefits and use of Smart Trek and Intelligent Transportation Systems in general through use of earned media, public outreach and paid marketing and promotions.

Activities

Earned Media

- Target media efforts to coincide with product launches and milestones.
- Highlight laypeople utilizing a Smart Trek product or service for use in media outreach.
- Link Smart Trek highlights to newsworthy ITS accomplishments or announcements around the country. (The idea is to localize a national story.)
- Develop themes tying in with national news and ongoing transportation issues.
- Target specific, technical announcements to specific media (business, technology, etc.)
- Increase efforts to promote the transportation and Smart Trek as a business story.

Public Outreach

- Briefings for policy makers and elected officials.
- Public Transportation forums and civic organizations.

Marketing and Promotions

- Radio promotional remote during ITS May Summit.
- Smart Trek Media Mousepad giveaway
- Maximize Smart Trek tie-ins to municipal services.

General Resources Needed

- Smart Trek mission statement (not just tag line)
- "Button" statements for individual Smart Trek products to aid media understanding.
- Cooperation from impacted public agency
- Broadcast fax list and e-mail tree (compiled from databases, rolodexes)

Specific Resources Needed

- Technical product information, particularly for technical media.
- Definitive product launch dates.
- Product spokespeople

• Laypeople who utilize Smart Trek product or service identified to match the demographics of the four promotions planned (see Smart Trek advertising & Promotional Plan 1st & 2nd Quarters, 1998).

Smart Trek Press:

Articles on Smart Trek have already appeared in:

[Seattle]Daily Journal of Commerce
Eastside Journal
Ex* Press
Governing
ITS America News
ITS International
ITS Washington News
ITS World
Parsons Brinckerhoff Notes
Popular Science
Puget Sound Journey (AAA Magazine)
Scientific American
Seattle Times & P-1
Traffic Technology International
Urban Transportation Monitor
Washington Digital Media Alliance

Possible sources for future publications:

Broad Public:

National:
- Time
- Newsweek
- USA Today
- New York Times

Regional:
- Personal Technology Section, Sunday Seattle Times-P1

Specialized journals & periodicals:

National:
- Government Technology
- IEEE Journal
- PSRC Regional View

Regional:
- Women's Transportation Seminar

Radio:
KULE, Ephrata
KUOW “Weekday”
Mark's contact with... ?

Calendar:

Jan
- Trek Talk no. 6

Feb

Mar
- Trek Talk no. 7 (insert in Ex*Press)

Apr
- High-frequency e-mail and fax campaigns announcing summit. targeting
  - Media
  - Public works
  - Electeds

May
- Trek Talk no. 8

June

July
- Trek Talk no. 9

Aug

Sep
- Trek Talk no. 10

Oct

Nov
- Trek Talk no. 11

Dec
- Wrap-up; compile activity summaries

Jan
- Trek Talk no. 12
- Complete activity summaries

Smart Trek Briefings Plan, 1998

During the second year of the Smart Trek project, public briefings will be tailored to a generally broader audience than during the first year. This strategy follows that of the Media Plan and Promotions Plan. Efforts will continue to brief the media and local elected officials, but the primary audience will be broader groups such as commuters who stand to benefit from Smart Trek.

Organization	Audience	Presenter
SeaTran/City Council	Electeds	Briglia
Bellevue Chamber of Commerce	Business	PRR (Richards, West)
Redmond Chamber of Commerce	Business	PRR (Richards, West)
Alt-Trans .	Cyclists, others	PRR (Richards, West)
Westlake Merchants	Commuters	PRR (Richards, West)
Swedish/Providence Hospitals	Commuters	PRR (Richards, West)

Smart Trek Booth Display Plan
(Draft)

Strategy: Maximize exposure of Smart Trek by setting up booth in places where the greatest numbers of people will see it.

This strategy encompasses two time periods, pre- and post-summit. Demonstration sites have been selected to reach a broad cross-section of the public and follows the general plan to make outreach to a broader public than during the first year of the project. Sites have been divided into six categories:

1. City and County Government
2. Commercial sites (shopping malls)
3. Education (Universities, High Schools)
4. Health Care Providers
5. Industry
6. Transportation (WSDOT, Metro, WSF)

See the attached table, “Smart Trek Booth Public Display Venues” for a complete list of planned sites. The end of this document lists a schedule of displays prior to the summit (see Calendar below).

Format
The booth will be set up either staffed or unstaffed. In cases where the booth is staffed, newletters, brochures and fact sheets will be available to the public, and a SmartTrek representative will be available to answer questions. It is anticipated that these staffed booth dates will not usually last more than one day. The PowerPoint display and SmartTrek.org website wi11 be featured on a laptop computer with a cellular modem connection.

In cases where the booth is not staffed, only the newsletters, brochures and fact sheets will be available to the public.

Calendar
In January and February 1998, the Smart Trek booth has been displayed at regional WSOOT offices and in Olympia at the Transportation Building and the Capitol Rotunda. Beginning in mid-February, the booth will be display set at various locations around the Puget Sound area according to the following schedule (dates are tentative):

Week of:	**Venue:**
Jan. 5	Olympic Region, Tumwater
Jan. 12	Transportation Building, Olympia
Jan. 19	Transportation Building, Olympia
Feb. 2	Capitol Rotunda, Olympia
Feb. 16	Seattle City Halt

Feb. 23	Boeing
Mar. 2	Microsoft
Mar. 9	Nathan Hale High School
Mar. 16	University of Washington (the Hub)
Mar. 23	Exchange Building, Seattle (Metro)
Mar. 30	Bellevue Transit Station
Apr. 6	Colman Dock (WSF)
Apr. 13	Westlake Mall
Apr. 20	Westlake Metro Station

Trek Talk Planning

	Trek Talk Production Schedule, 1998			
Issue	**Project Featured**	**Project launch date (from Dec. 97 Progress Report**	**Guest Columnist**	**Theme**
Jan/Feb 98	Etak Cable TV/Metro Networks	4/98	Rob McKenna	The Future
Mar/Apr 98	Video to/from Incident	2/98		
	AVL Enhancements	2/98		
	Enhanced Incident Information	3/98		
May/Jun 98	Exp. Links Emerg Mgmt Ctrs	?		
	Sea-Tac Monitor System	1/98-4/98		
	Bellevue ATMS	4/98		
Jul/Aug 98	Seattle Center Parking	3/98		
	WSF ATIS	7/98		
Sept/Oct 98	Public Outreach			
	Eastside, Southside ATMS			
Nov/Dec 98	ATIS Business Plan	Ongoing		
	FLOW Enhancements	11/98		
Jan/Feb 99	Dynamic RideMatch	12/98		
	Border Crossing Info	?		
	North Seattle ATMS	11 mos. From NTP		

Smart Trek
Advertising & Promotional Plan
2nd Quarter, 1998

Background
Over the course of 1998, Smart Trek will support, promote, and adverse the rollout of several Intelligent Transportation System (ITS) products. Not all products will be available simultaneously. Some are waiting on hardware or software development; others are dependent on systems and networks being completed. This promotions plan will be flexible to adapt to shifting product deployment schedules.

Goal
The goal of the marketing campaign will be to build "Smart Trek" as a quality brand that will add value and legitimacy to each product as it is introduced. Establishing the Smart Trek brand. will set the stage for individual product introduction into the market. Equally important will be distinct, targeted advertising and promotional flights for each product.

Tactics
While every product associated with the program comes under the Smart Trek umbrella, each is also targeted at a qualitatively distinct market. The advertising budget is not sufficient to support a full image campaign for the Smart Trek brand alone. It Is therefore suggested that individual products be target-marketed to the specific audience most likely to purchase and/or use those products. The branding. process will be accomplished as accumulative effort of the various product campaigns.

Media Selection
We propose a partnership with Entercom Radio to provide primary medium vehicle, selecting specific Entercom stations and audiences to support each Smart Trek product. Entercom can also assist us with promotional contest Internet activities, and introductions to possible retail partners.

Cable television is an Ideal secondary medium for Smart Trek Selected stations have a narrow enough audience focus to compliment the radio buy. As a visual medium, television can better demystify the complex ITS products. While television production is generally expensing, TCI Media Services can provide inexpensive production to keep Smart Trek marketing campaign within budget.

Print advertising is also proposed as secondary media, if targeted to the same audience as radio and cable.

Transit advertising, if negotiated rough Metro Transit and Washington Transit Advertising for production costs only, can provide broad, inexpensive support for transit-related Smart Trek products.

We also recommend Internet advertising on web sites associated with selected Entercorn stations. The Internet will furnish Smart Trek with a communications vehicle possessing substantial information capabilities targeted to a small, highly motivated audience. The Internet will also allow us promotional contest opportunities and the ability to gather audience qualitative data. This audience may be tapped through the Internet, to attend the Smart Trek Summit when it is hold this Spring.

Smart Trek Promotional Elements

Concept:	Familiarize tour distinct market segments with "Smart Trek" and Intelligent Transportation Systems (ITS) technology over the course of three months, pairing each market with the most Department technology as this technology is released to the public. Campaign will be extended to third-and fourth quarters as additional Smart Trek technology elements come on line.
Partners:	Entercom Radio Station Partners Retail Sponsorship Partners Smart Trek Technological Elements & Giveaways
Promotional Elements:	Radio Promotional Event Contests Radio On-Air Contest Giveaways Web Site Scavenger Hunt Contest
Advertising:	Radio (primary) Cable (secondary) Newspaper (secondary) Transit (secondary) Internet (support) Partner Advertising Mentions (support)
Advertising Creative:	Creative should be consistent throughout. AU advertising should include umbrella Smart Trek campaign themes (50%) and specific Smart Trek element and promotion (50%).
Summit:	Focal event in spring of 1998 (tentatively set for mid-May), consisting of a conference of 200 Smart Trek Partners, media and the public held at the Boeing Conference Center. Promotions should be compatible with summit presentation elements.

Promotion #1
"Get a Life" with "The End" 107.7 FM

Smart Trek Marketing Element:	Fastline Travel Software Real Time Bus Time Information Real Time Traffic Information
Timing:	April 13 - 26, 1998
Entercom Station:	KNDD "The End" 99.9 FM
Core Audience:	Adults 18-34 Well-Educated Higher than normal Income Active Employed in high tech industries
Smart Trek Partners:	Fastline (Travel Software) Metricom (Ricochet Modems) Metro Transit
Possible Retail Partners::	ComputerCity,CompUSA
Promotions:	On-line scavenger hunt contest "Get a Life" giveaway contest on KNDD
Display	Smart Trek Display at Board Stiff, KNDD annual snow festival March 21 at Snoqualmie Summit.
Prizes:	HPC/Fastline Computer, Ricochot Modem (8) • Given away on-line in Scavenger Hunt (1) • Drawing at KNDD Special Event (1) • On-air giveaway on KNPD (1) • For use by selected press reporters (5)
Radio Advertising:	KNDD "The End" 99.9 FM 2 weeks, April 13 - 26, 1998
Transit Advertising:	Bus Exteriors (Kings)
Cable Advertising:	MTV, Headline News, ESPN2
Print Advertising:	Seattle Times/P-1 Personal Technology Section
Internet:	KNDD

Flight Budgat

Radio …………….	$ 4.500
Cable ……………..	$ 3,500
Print ……………..	$ 2,000
Bus Exteriors & Interiors….	$ 2,500 (production only)
Internet ……………..	$ 1,000
Total	$13,500
Partner Contribution	- $ 5.000
Smart Trek Contribution	$ 8,500

Promotion #2
On the Road with Oldies 97.3 KBSG

Smart Trek Marketing Element:	ETAK Traffic Check
Timing:	May 11 – 26, 1998
Entercom Partner:	"Oldies 97.3" KBSG
Core Audience:	Adults 35-54 Average Income Broad range of professions Family-Oriented Low Tech
Smart Trek partners:	ETAK Metro Traffic Control TCI cable
Possible Retail partners:	Good Guys, Future Shop, Circuit City
Promotions:	On-line scavenger hunt contest 30 minute news interview Folklife Festival
Display:	Smart Trek display at Folklife Festival, May 23 – 26.
Prizes:	Big Screen Color Television and Web-TV Given away on-line in Scavenger Hunt (1) KBSG/Smart Trek Booth and remote broadcast at Folklife Festival (1)
Radio Advertising:	"Oldies 97.3" KBSG 2 weeks, May 11 – 26
Cable Advertising:	Lifetime, FX, TNT
Print Advertising:	Seattle Times/P-1 TV Times Seattle Times/P-1 Local News section
Internet:	KBSG

Flight Budget

Radio………………….	$ 5,000
Cable………………….	$ 3,500
Print……………………	$ 2,000
Internet………………...	$ 1,000
Total	$11,500
Partner Contribution	- $ 5,000
Smart Trek Contribution	$ 6,500

Promotion #3
"Get to Work on Time" with KISW "Twisted Radio"

Smart Trek Marketing Element:	Real Time Traffic Incidents SEIKO Watches	
Timing:	June 1 – June 14, 1998	
Entercom Station:	KISW "Seattle's Best Rock" 99.9 FM	
Core Audience:	Men 25-34 Interested in sports and high-tech toys Interested in music and entertainment Strong consumers, spend freely Employed in the trades	
Smart Trek Partners:	Primary: Seiko Secondary: ETAK, Metro Traffic Control	
Possible Retail Partners:	SEIKO retailers, Fred Meyer	
Promotions:	On-line scavenger hunt contest KISW Jocks, equipped with SEIKO watches, interface with traffic reporter	
Display:	Smart Trek display at SEIKO retailer	
Prizes:	SEIKO watches with Real Time Traffic Incident Reports & one-year air time (10) Given away to promotional contest winners (2) Given away on-line in Scavenger Hunt (2) On-air giveaway on KISW (4) For use by radio personalities (2)	
Radio Advertising:	KISW "Seattle's Best Rock" 103.7 FM 2 weeks, June 1 –14	
Cable Advertising:	ESPN, Fox Northwest Sports, TNT	
Print Advertising:	Seattle Times/P-1 Sports section	
Internet:	KISW	
Flight Budget:	Radio………………..	$ 5,000
	Metro Traffic Radio….	$ 0
	Cable…………………	$ 3,500
	Print………………….	$ 2,000
	Internet……………….	$ 1,000
	Total	$11,500
	Partner Contribution	- $ 5,000
	Smart Trek Contribution	$ 6,500

Promotion #4
Mountain Morning Show
"Make the Trek this Morning a Smart Trek"

Smart Trek Marketing Element:	BusView on the Internet
Timing:	June 22 – July 5, 1998
Entercom Station:	KMTT "The Mountain" 103.7 FM
Core Audience:	Adults 35-44 Environmentally aware audience Active Upscale, high income
Smart Trek Partners:	University of Washington King County Metro
Possible Retail Partners:	Bruegger's Bagels, Seattle's Best Coffee,
Promotions:	On-air giveaways of commuter mugs, coffee, and grand prizes of transit passes Internet Scavenger Hunt
Display:	Smart Trek Interactive Display at KMTT Earth Day Concert, April 19th (tentative date) and distribution of Smart Trek materials
Prices:	Transit Passes (8) Given away during promotions on KMTT (4) Given away on-line in Scavenger Hunt (4) Commuter Mugs & Coffee (1,024) On-air giveaway on KMTT (24) Given away on-line in Scavenger Hunt (1,000)
Radio Advertising:	KMTT "The Mountain" 103.7 FM 2 weeks, June 22 – July 5
Transit Advertising:	Bus Interiors
Cable Advertising:	Discovery Channel, A&E, TNT
Print Advertising:	Seattle Weekly
Internet:	KMTT

Flight Budget:		
	Radio………………..	$ 4,500
	Cable……………….	$ 3,500
	Print…………………	$ 1,000
	Interiors..…………….	$ 500
	Internet……………….	$ 1,000
	Total	$10,500

Smart Trek
Advertising & Promotions
Budget Summary – 1st & 2nd Quarter Campaign

Flights	#1	#2	#3	#4	Other	Totals
Radio	$ 4.500	$ 5.000	$ 5,000	$ 4,500		$19,000
Cable	$ 9,500	$ 3.500	$ 3,500	$ 3,500		$14,000
Print	$ 2.000	$ 2,000	$ 2,000	$ 1,000		$ 7,000
Transit	$ 2,500			$ 500		$ 3,000
Internet	$ 1,000	$ 1.000	$ 1,000	$ 1,000		$ 4,000
Radio Production					$ 1,000	$ 1,000
Cable Production					$ 2,500	$ 2,500
Subtotals	$13,500	$11.600	$11,500	$10,500	$ 3,500	$50,500
Partner Contributions	$ 5,000	$ 5.000	$ 5,000		$16.000	
Totals	$ 8,500	$ 5,500	$ 6.500	$10,500	$ 3,600	$35,500

This budget expends approximately 50% of the available funds. Additional funds will be budgeted to promote other Smart Trek products as they come on line in the third and fourth quarters of 1998.

Smart Trek Partners: Summit Requirements

Smart Trek; will boast a one-day VIP event in Seattle in May to discuss important emerging intelligent transportation systems in our region. The event will also demonstrate how Smart Trek projects are solving transportation problems today. The event will be held at the Museum of Flight at Boeing Field in Seattle. The one day summit is planned for Friday May 15, but we require your assistance on May 14 to set up equipment and possibly to respond to potential media inquiries.

The event is structured in two parts:

1. Briefings and discussion groups with transportation professionals from the Puget Sound region about technologies we are now deploying.
2. Demonstrations of Smart Trek projects in a simple hands-on- workshop setting. These demonstrations show how travelers will use the new technologies. We will display each technology as part of the planning en-route, and/or safety themes, similar to the format of the Road Trip section of the SmartTrek.org website.

We anticipate about 150 participants, including:

National, State, and local elected officials
Public works directors from 19 Puget Sound jurisdictions and *surrounding areas*
WSDOT staff
Select members of the general public
Local, regional, and national media

While we expect that elected officials and transportation officials will want to see how these technologies work, we also want to invite potential Smart Trek customers and members of the general public. This is an opportunity to heighten awareness of Smart Trek and to get reactions to the products and services from potential future users. We will promote awareness of the demonstrations using radio/cable TV/print/internet promotions that are scheduled for this time period. The media will be contacted beginning in February about the event. (Several key media groups have been alerted about our planning session on February 24, and may want to get a sneak preview of how the technologies may work – without demonstrations).

At the May Summit we want to have several users of ITS products and services available for media interviews We have several in mind and are working to identify others, but if you know of any good candidates, please let us know as soon as possible. These candidates will include Puget Sound residents who use and benefit from Smart Trek products or services, who are not afraid of the media or cameras, and who can speak clearly

We need your assistance in the following ways:

Smart Trek Partners
Requested Assistance

Task	**Timing/Deadlines**
1. Confirm description of what can be demonstrated in attached list	February 20
2. Seek assistance from your PR Department/firm in helping build awareness of the event (as applicable)	March 15 to Summit Date
3. ID what collateral, if any, you will bring to describe your product (hand outs)	February 20
4. Identify data and phone line requirements	February 20
5. Identify table and other display needs	February 20
6. Attend Smart Trek Partners Meeting	Fcbruary 24 ln Seattle
7. ID any VIPs from your company/agency that will attend, and any special accommodations they may require	March 15
8. Promote demonstration to potential customers	March l5 to Summit Date
9. Ship products to Summit Site	Day before Summit
10. Set up product at Summit/Field Media questions	Day before Summit
11. Staff product at Summit	Day of Summit: 8am-5 p.m.
12. ID times when you will need coverage to attend Summit sessions and proposed staffing in your absence.	April 30
13. TD who should represent your firm to the media that attend the event	April 30

Each product will be displayed on a table or equivalent set up. PRR will provide product name cards.

Several Smart Trek partners will be part of the Summit Sessions outlined in the attached agenda. Please be sure to indicate how your group can ensure coverage of the demonstrations during these times.

Thank you.

Smart Trek Products and Services to Demonstrate
Draft

Grouping	**Smart Trek Project**	**Demonstration**	**Equipment to Bring**	**Setting**	**Lead**
Planning Your Trip					
	Smart Trek Overview	Smart Trek Web-site	Internet Computer & Multi-media display	Table Display	PRR
	BusView	BusView on the Internet	Computer, Internet Access	Table Display	U of W
	UW Cable TV	Traffic Channel in operation	Cable TV or video	Table Display	U of W
	ETAK Cable TV	Traffic Channel in operation	Cable TV or video	Table Display	ETAK
??	WIN Kiosk	Kiosk in Operation	Kiosk?	Stand Alone Kiosk	WS Dept. Information
On the Go					
	Fastline	Real time traffic and bus Info in wireless package	Two devices, two Metricom modems	Table Display	Fastline
	TransitWatch and AVL	Verbal description along with prototype of display Messages	Mockup of Monitor	Table Display	KC Metro Transport.
	SEIKO	Message Watch	2-5 Operating Message watches	Table Display	SEIKO
	SEIKO	Data Cast Module	DCM, info	Table Display	SEIKO
	Traffic Reports	ETAK Workstation	Workstation?	Table Display	ETAK & Traffic Co
??	Border Crossing		Mockup of VMS Message?	Table Display	WSDOT
??	Seattle Center Parking		Mockup of VMS message?	Table Display	IBI Group
	SeaTac Traveler Information	Information displayed	Monitor with Internet connection?; Mockup Of VMS message	Table Display	PB/Farrad
Safety and Traffic Mngt					
	Travel Aid	Live Video of Pass Travel Speeds/ Snow Conditions	Computer with Pass video; Mockup of VMS speed message	Table display	PB/Farrad
	XYPoint MayDay Device	Watch XYpoint equipped vehicles travel around Puget Sound on computer screen	Device and computer to show tracking capability	Table display	XYPoint
	Bartizan	Device	Devices	Table display	Bartizan
	ATMS	How it works	Computer and Internet set up	Table display	PB/Farrad

Summit Agenda
Draft

Sessions	Audience	Speaker	Timing
Introductions	All	Secretary Morrison (WA)	8:45-9:00 a.m.
Keynote Address	All	To Be Determined	9:00-9:45 a.m.
Smart Trek Transit Projects	All	County Executive Ron Sims	9:45-10:00 a.m.
Demonstration	All	County Counsil Member Rob McKenna	10:00-11:00 a.m.
ITS is Here and Working: ITS & Smart Trek Success Stories	ISPs, Public Works	Intro by Briglia OPTION: Add Testimonials if available	11:00-11:30
How to make ITS an Integral part of Our Transportation System	All	Charlie Howard (WSDOT)	11:30-12:00
LUNCH			12:00-1:00 p.m.
ITS: Planning, Design And Funding	Public Works/ Planning folks Electeds	Panel: Ralph Cipriani (PSRC) Paula Hammond (WSDOT) FHWA and FTA	1:00-2:00 p.m.
Break out Sessions (DRAFT) 1. How to use Arterial Traffic Data to improve Traffic operations		Round table discussions facilitated by: Les Jacobson, WSDOT (confirm)	2:00-3:00 p.m. (Concurrent Sessions)
2. Improving Transit Customer Satisfaction and Ridership Through ITS		Nancy Neuerberg, King County Metro	
BREAK			
Break out Session 1. Congestion Incidents and Videotape: Improving Safety While Protecting Privacy	ISPs, public works	Dave Berg, WSDOT (confirm)	3:00-4:00 p.m. (Concurrent Sessions)
2. How to Measure ITS Success		YET	
Radio Remote/Public Reception			4:00-5:30 p.m.
ALL DAY			
Showcase (displays and demonstrations)	ALL	Providers	10:00-4:00 p.m.
Sign up for testing Smart Trek devices	ALL	Providers	8:00-4:00 p.m.

Appendix E.4

Puget Sound Regional Council Refinement of the Metropolitan Transportation Plan with the Regional ITS Component of the Metropolitan Transportation Plan

1998 Refinement of the Metropolitan Transportation Plan

Regional Intelligent Transportation Systems (ITS) Component

Note: This is a draft version. The final version will be completed by December, 1997. For additional information about the Metropolitan Transportation Plan (MTP) or about the ITS Component of the MTP, contact Ralph Cipriani at (206) 464-7122 or Kathleen Semple at (206) 587-5118.

DRAFT

August 1997
Puget Sound Regional Council

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I. OVERVIEW

In the past, we typically addressed our transportation problems through a combination of capacity improvements (additional roads, lanes, or transit service), and demand management strategies. Today, we have some additional methods to help improve our transportation system. These new methods involve the use of computer chips, fiber-optic cables, and software programs. Together, these technologies can help us to better manage traffic, inform travelers of transportation options, and respond quickly to accidents.[1]

The technological backbone to these systems is called the Intelligent Transportation Infrastructure (ITI), which is the overall system umbrella. The ITI represents the initial construction or acquisition of fully-integrated public sector ITS components.[2] ITS components are the particular applications of electronics, communications, or information processing used singly or in combination to improve the efficiency and safety of surface transportation systems within the ITI. For example, the I-5 freeway ramp metering system is an example of an Intelligent Transportation System operating through the central Puget Sound region s Intelligent Transportation Infrastructure. Appendix A is a glossary of all acronyms.

OBJECTIVE OF THE REFINEMENT EFFORT

The Metropolitan Transportation Plan, adopted in 1995, addressed Intelligent Transportation Systems (ITS) within the Transportation Systems Management (TSM) Component. The ITS section presented some of the ITS programs and projects currently underway, near-term enhancements to the program, and long term directions the Washington State Department of Transportation (WSDOT) is taking as documented in *Venture Washington*[3], the State's Strategic Plan for ITS. This refinement builds on the 1995 MTP by:

- Introducing Smart Trek, a major regional ITS project, which should advance our understanding of the effects of ITS in the region;
- Updating the list of ITS projects currently underway and planned;

Presenting our current understanding of how ITS affects our transportation system;

- Providing an overview of planning for ITS and how the Regional Council will begin developing a Regional ITS Strategic Plan;
- Presenting preliminary information regarding the funding and implementation of ITS;
- Identifying ITS areas where Smart Trek may help clarify our understanding of the possible effects on individual travel behavior and system performance; and
- Identifying significant remaining issues that will addressed in the 2001 MTP.

REFINEMENT PROCESS

The process undertaken to refine the ITS component of the MTP includes a review of literature describing ITS and its effects, and a survey of local jurisdictions and transit agencies. The survey of jurisdictions that was conducted helped to document the current use of ITS in the region and the current understanding of system effects. The transit agency survey helped to document attitudes toward the use of ITS by transit agencies in the region. In addition, for the 2001 MTP the Puget Sound Transportation Panel (PSTP) survey will be conducted in late 1997 and again in 1998. This survey will provide more useful information regarding the possible effects of ITS.

BACKGROUND OF ITS

ITS and the Federal Government

To achieve national deployment of ITS technologies, the U.S. DOT launched a multi-faceted ITS Program involving research and limited field trials of promising technologies and systems.[4] The following six categories have been developed to classify ITS technologies: Advanced Traffic Management Systems (ATMS), Advanced Traveler Information Systems (ATIS), Advanced Public Transportation Systems (APTS), Advanced Rural Transportation Systems (ARTS), Commercial Vehicle Operations (CVO), and Advanced Vehicle Control Systems (AVCS).

The ITS Program is guided by the National ITS Program Plan. This plan, which was adopted in 1995, is the result of a joint effort of the U.S. DOT and ITS America[5]. Work on the plan began in June of 1993 and a final draft was produced in November 1994. The purpose of the plan is to guide the national development and deployment of ITS. The plan is primarily based upon the work of ITS America which established goals and objectives for a national ITS program. The National Highway and Traffic Safety Administration also contributed to the plan by developing an ITS program to reduce traffic accidents, injuries, and fatalities.

The National ITS Program Plan sets the framework for:

- The promotion of shared ITS goals by integrating activities that are public, private, and cooperative in nature;
- Providing guidance for strategic decision-making for ITS investments;
- Encouraging coordination and integration of user service development activities;
- Ensuring that a focus on ITS implementation is maintained; and
- Ensuring ITS is intermodal by smoothing linkages between modes.

Over 200 individuals and organizations were involved in the preparation of the plan, which attempts to reflect the views of a broad range of players with a stake in ITS.

The U.S. DOT's short-range ITS program (4-5 years) is focused on facilitating the use of ITS solutions for systems that many jurisdictions are already beginning to deploy. ITS can improve safety, and increase the capacity and efficiency of highway, transit, and emergency response systems. The current national challenge is to ensure consistency in architecture and standards development, and to encourage integration of system components so that initial ITS applications form a foundation for the evolution of more sophisticated future systems. Near-term ITS efforts are in the areas of architecture, standards, operational tests, model deployment, technology transfer, and training efforts.

The U.S. Department of Transportation's ITS Program has received 1.3 billion to advance ITS over the last five years. The program envisioned widespread utilization of integrated multimodal ITS systems, but this vision has not yet been realized. The United States General Accounting Office (GAO) suggested several reasons for this:[6]

"First, the national ITS architecture was not completed until July 1996, and ITS technical standards will not be completed until 2001. The ITS architecture and technical standards, which define how ITS elements will work together, are prerequisite to a large scale, integrated deployment of ITS systems. In addition, the lack of knowledge of ITS technologies and systems integration among state and local officials, insufficient data documenting the cost effectiveness of ITS in solving transportation problems, and competing priorities for limited transportation dollars will further constrain widespread ITS deployment. Before DOT can aggressively pursue widespread deployment of integrated ITS, it must help state and local officials to overcome these obstacles."

Long-term efforts will focus on support for the research, development, and testing of more sophisticated technologies that show promise over the next 10 to 20 years. Long-term projects will focus on crash avoidance technology, the next generation of traffic management techniques, and automated highway research.

The State's ITS Plan

Venture Washington[7], the State's strategic ITS plan, represents the first step in the use of advanced transportation technology within the state.[8] The plan was completed in 1993 and addresses the next 20 years and beyond. While many of the actions proposed by the plan are continuations of work already underway, other applications proposed by the plan will not be operational for many years.

Venture Washington has two dimensions. First, the plan describes five program elements embraced as part of ITS implementation in Washington. The five program elements are Public Transit/Transportation Demand Management, Traveler Information, Traffic Management, Freight and Fleet Management, and Additional Services. Of the six national ITS areas, Washington's program elements embrace five: Advanced Traffic Management Systems, Advanced Traveler Information Systems, Advanced Rural Transportation Systems, Advanced Public Transportation Systems, and Commercial Vehicle Operations. The plan does not currently recommend that Advanced Vehicle Control Systems, or the highway investments needed to support these "smart" cars, be an active part of Washington's ITS program.

Second, the plan recognizes that the State of Washington encompasses a unique blend of geographical regions and that needs differ for each region. The plan establishes five geographic categories: central Puget Sound, Spokane, Vancouver, other urban areas, and intercity/rural. The plan concentrates the use of ITS in the most highly congested urbanized areas, where the largest return on investment will be available in the near term. The plan also recognizes that in the long term, all areas of the state can benefit from ITS, so applications are included as well.

ITS and Regional Multi-modal Deficiencies

The 1995 Metropolitan Transportation Plan (MTP) documented the enormous increase in the demand for vehicle travel in the central Puget Sound region over the past two decades.[9] Since 1980, the total number of vehicle miles traveled in the region has grown twice as fast as employment and four times faster than population growth. The MTP estimates that the costs associated with trying to meet the escalating demand for vehicle travel over the next 20 years would require financial resources far beyond what would be available based on existing funding sources. If the region continues on its present course, by the year 2020, peak afternoon delay on arterials and freeways is forecast to increase by approximately 300 percent. Also by the year 2020, peak afternoon vehicle speeds on arterials and freeways in the region are forecast to decrease by approximately 30 percent.

To help address these problems, the policies in the MTP propose that over the next 20 years, more emphasis should be placed on transportation strategies that: (1) optimize and manage the use of transportation facilities and services, (2) influence the demand for travel by promoting transit and ridesharing, (3) shift certain trips out of peak travel periods, and (4) reduce the total number of vehicle trips. The MTP identified a number of traditional transportation demand management (TDM) strategies, such as commute trip reduction programs, telecommunication technologies, and land use changes; and also identified some transportation systems management (TSM) strategies, such as freeway ramp metering or access control on arterials, to maximize the efficiency of the current transportation system without adding significant capacity.

ITS has the potential to increase the efficiency of our transportation system by increasing vehicle throughput on arterials and freeways. Some systems may also help encourage a shift to HOV or nonmotorized modes. Because ITS can help address some of the region's multi-modal transportation system deficiencies, the State of Washington and the central Puget Sound region have included some ITS-related policies in their long-range transportation plans.

ITS-Related Policies

As government agencies are becoming more aware of ITS, a number of state, regional and county policies have focused on ITS or related technologies:

State ITS Policies - In 1995, the Washington State Transportation Policy Plan (STPP) implemented several new policies regarding telecommunications and transportation. In the Telecommunications and Transportation Linkages element of the STPP, four policy areas are addressed:

1. Improved Access to Transportation Decision-Making
2. Telecommunication and Travel Substitution
3. Improved Efficiency of Traditional Transportation Services
4. Coordinated Development of Telecommunications and Transportation

To help improve efficiency of traditional transportation services (policy area three above). the state adopted the following new policy:

"Transportation agencies should implement advanced telecommunications technologies. such as intelligent vehicle highway and transit systems, to:

- Improve safety, traffic efficiency and fuel efficiency
- Provide real-time traveler information
- Improve public transit convenience
- Reduce the regulatory effect on motor carriers."

Regional ITS Policies - Regional, multicounty policies identified in the 1995 MTP that focus on transportation and technologies include the following:

RT-8.8 Support transportation system management activities, such as ramp metering, signalization improvement, and transit priority treatments, to achieve maximum efficiency of the current system without adding major new infrastructure.

RT-8.16 Support opportunities to use advanced transportation and information technologies which demonstrate support for regional growth and transportation strategies.

Counties ' ITS-Related Policies - The central Puget Sound region includes Snohomish, King, Pierce, and Kitsap Counties. Although most counties do give some consideration to ITS in their transportation planning, policies at the county level for the most part do not call a great deal of attention to the role of technology in transportation. Following are the ITS-related transportation policies adopted by each of the four counties.

Snohomish County's ITS-related Policies - Policy 4.B.3 in Snohomish County's 1995 Comprehensive Plan addresses some ITS-related elements of the transportation system:

> "State-of-the-art traffic control devices, signalization, and signing shall be used, consistent with professionally accepted geometric and structural standards, that reduce the risk of serious accidents."[10]

King County's ITS-related Policies - King County's 1994 Comprehensive Plan did not include any policies that specifically focused on the use of technologies in transportation. Policy T-525, however, does allude to the use of ITS, which can be an element in system management and congestion pricing:

> *"Transportation Demand Management (TDM) strategies should be used to promote travel efficiency and energy conservation and reduce the adverse environmental impacts of the transportation system. These strategies should include commute trip reduction, demand and system management. TDM measures may include telecommuting, congestion pricing, parking management, non-motorized travel, site design standards, public information, ridesharing, public transportation, joint use of parking facilities, and park and ride and other intermodal transfer facilities."*[11]

Pierce County's ITS-related Policies - Transportation Policy in Pierce County's 1994 Comprehensive Plan focuses on some ITS-related strategies:

> *"Utilize the following transportation systems management measures to make the most efficient use of the existing roadway system: structural improvements (e.g., super street arterials, signalization improvements, computerized signal systems, one-way streets, ramp metering, designation of HOV lanes, reversible traffic lanes), and non-structural improvements (e.g., incident detection and monitoring systems, network surveillance and control, motorist information systems, turn prohibitions, alternative work hours)."*[12]

Kitsap County's ITS-related Policies - TP-10 in Kitsap County's Comprehensive Plan focuses on some ITS-related strategies:

> *"Establish and monitor signal timing, phasing, and progression to give transit and HOV travel an advantage in designated locations."*[13]

These policies represent some of the first steps taken by the state, region, and counties to encourage local governments to consider implementing some ITS. One problem in carrying out these policies, however, is that there is still some uncertainty regarding the effects of a fully deployed ITI. One of the major objectives of the Smart Trek project is to more conclusively provide information to the region regarding the effects of a fully deployed ITI.

ITS and the Mobility of Freight and Goods

Major market changes in the rail, air and trucking industries (namely Federal deregulation of these businesses beginning in the late 1970s) have forced these industries to become increasingly efficient and competitive. To improve efficiency and increase competitiveness, these industries have become increasingly dependent upon good communications systems, including ITS. For example, shipments are increasingly being tracked using electronics rather than paper. Air package express providers now track individual packages using satellites, and allow customers to find out where their packages are through the use of a cellular phone. Electronic clearances are being installed at national borders to improve customs' operations. Although this paper primarily focuses on ITS applications to improve personal mobility, freight mobility has a major impact on the region. Freight mobility effects the regional economy, and in some cases also effects personal mobility. Therefore, regional planning with respect to ITS should also consider ITS strategies that may improve the mobility of freight and goods. See Appendix B for examples of several ITS strategies that may improve the mobility of freight and goods in the region.

II. REFINEMENT OF THE ITS COMPONENT FOR LONG TERM PLANNING

The refinement of the ITS component of the MTP consists of six sections: 1) an updated inventory of the system, 2) an overview of how ITS affects our transportation system. 3) how we can further advance ITS planning in the region, 4) an overview of funding issues related to ITS 5) an overview of ITS implementation issues, and 6) a brief description of how Smart Trek will help in these on-going efforts.

1. UPDATED ITS INVENTORY

The central Puget Sound region is one of the national leaders in the testing and use of ITS. The most recent ITS project in the region, the Smart Trek Model Deployment Initiative (MDI) is an instrumental project in the region since it should provide us with valuable information regarding the potential effectiveness of a fully deployed ITI. Below is a description of the Smart Trek Model Deployment Initiative (MDI), and lists of other projects in the region. This list was compiled by the Washington State Transportation Center (TRAC) in April 1997. Descriptions of each of these projects are provided in Appendix C of this report.

ITS Projects in the Region

Smart Trek Model Deployment Initiative (MDI) [14]**-** Within the Seattle region, traveler information is being delivered to the public by either public transportation providers or the private sector. Unfortunately, this information is not comprehensive: some roads are not covered at all; not all information collected is being disseminated; some information is not collected in a format that makes it useful to motorists; not everyone who might use the information has access to it; and most traffic information is delivered by radio, which means that travelers must have a radio and must be tuned to the proper station at the right time. Many other delivery methods are not yet being used effectively, such as the Internet, television, signing, and the telephone. The lack of integration and coordination in the region's current multi-modal traveler information systems is a shortcoming that is being addressed in the MDI project.

Smart Trek will provide the funding (about $13.7 million) and public and private sector participation needed to expand, integrate, and coordinate the region's traveler information system so that it is more widely-used and effective. Smart Trek will integrate many of the ITS elements now in place, adding new systems as necessary to provide real time information about the status of arterials and highways, transit vehicles, and ferry traffic. Traffic and transit information will be sent to pagers, laptops and desktop computers. The specific locations of buses will be shown on video monitors at bus stops, kiosks and hand-held personal digital assistants. Multi-modal traveler information system will be designed so visitors can determine how to link bus and ferry or other transit connections. Smart Trek will build on many of the ITS projects listed below.

Washington State Department of Transportation ITS Projects - The Washington State Department of Transportation has a key role in the following ITS projects in the region (see Appendix C for project descriptions):

- Smart Trek Model Deployment Initiative (MDI)
- IVHS Backbone Design and Demonstration
- Demonstration of ATIS/ATMS Data Fusion in a Regional IVHS
- Graphical Display of Real-Time Transit Coach Locations (BusView)
- Investigation of Video Image Tracking
- IVHS - Network and Data Fusion
- Ramp Control via Neural Network Control
- Fuzzy Logic Ramp Metering
- NEXRAD - The Next Generation Weather RADar
- Increasing Awareness of Transportation Options Through Riderlink
- Traffic Data Acquisition and Distribution (TDAD)
- North Seattle Advanced Traffic Management System (NSATMS)
- Puget Sound Help Me (PuSHMe) Operational Test
- SWIFT - Seattle Wide-area Information For Travelers
- SWIFT Smart Traveler
- SC&DI Expansion

Other Agencies' Projects- Other agencies within the central Puget Sound region are also involved in ITS projects. See Appendix C for descriptions of the following projects:

- Smart Bus
- AVI (Automated Vehicle Identification) Technology
- Regional Ridematch
- Regional Automated Trip Planning
- Riderlink
- Closed Circuit Television on Buses
- State Patrol CAD for Traffic Management
- Regional Fare Integration Project
- Community-Transit Arterial System Area-Wide Priority (CT ASAP)
- Kitsap Transit Signal Priority
- King County Metro Easy Rider Project
- Customer Security/Community Outreach Program
- Washington State Ferry Electronic Toll Collection
- Washington State Ferry Static/Variable Message Sign Project

Traffic Signal Control Systems Being Used Within Jurisdictions

Traffic signal control systems employ the use of communications technologies to detect traffic and adjust signal timing. Although traffic signal control systems are not always thought of as ITS, these systems are one area where ITS technologies are commonly employed. To better understand the current and planned traffic signal control systems in the region, the Regional Council conducted a small survey of jurisdictions in the central Puget Sound region. Surveys were received from 26 jurisdictions. About 2,3l9,642 people live within these 26 jurisdictions[15], representing about 76 percent of the region s total population. Table l below identifies characteristics of the traffic signal control systems in use or planned within the region.

As shown in Table l, most jurisdictions are currently using closed loop systems, but many jurisdictions are planning on using a centralized traffic signal control system in the future. To detect traffic, most jurisdictions rely on inductive loops, -but some are planning on using Video image detection in the future. Most jurisdictions in the region are currently able to adjust signal timing by time of day, for special events, in response to traffic conditions, and to enable preemption for emergency vehicles. Many jurisdictions are also planning on signal timing for transit priority within 5 years.

	Currently In Use	**Planned Within 5 Years**	**Not Planned**	**N/A**	**Did Not Respond**
I. System Architecture					
Centralized	5	7	8	3	3
Closed Loop (Distributed)	12	1	5	2	6
II. Means of Traffic Detection					
Inductive Loops	21	1	1	3	0
Radar	6	1	8	5	6
Video Image Detection	3	6	9	4	4
III. Signal Timing Plan Capabilities					
Time of Day	17	2	4	2	1
Special Events	13	1	5	3	4
Traffic Responsive	14	4	4	2	2
Signal Preemption for Emergency	22	1	1	3	0
Signal Priority for Transit	1	13	6	2	4

Advanced Public Transportation Systems (APTS) Being Used Within the Region

To better understand the current and planned Advanced Public Transportation Systems (APTS) in the region, the Regional Council surveyed transit agencies and the State Ferry system regarding their current use of ITS, planned use of ITS, and perceived benefits. Table 2 below shows which systems are currently in use within the region by transit agencies, and which systems are planned for use. As shown in Table 2. most transit agencies are either using or planning on using many APTS applications (although the majority of agencies are NOT planning on using automatic passenger counting systems). Most agencies are planning on using these systems within the next five years.

Table 2 - Advanced Public Transportation Systems (APTS) in Use or Planned Within The Region

System	Currently Using	Planning To Use Within 5 Years	Planning To Use Within 10 Years	Not Planning To Use
Real time Monitoring of Freeway Conditions (In-House Access to WSDOT's Freeway Cameras)	1	1	1	2
Real-time Congestion/Speed Info. on Freeways and Arterials (In-House Access)	1	2	1	1
Freeway Ramp Metering with HOV Bypass Lanes (Do Your Transit Routes Make Use of These?	2	1		2
Traveler Information Accessible to the General Public				
-Route and Schedule Information	2	2		
-Real-time Transit Vehicle Location		2	2	
-Multi-modal Traffic/Transit Information		3	1	
Automated Trip Planning				
-As a Tool For In-house Rider Information Staff		4	1	
-For the General Public's Access and Use		2	2	
Regional Automated Ridematching				
-In-House Central Processing	3	2		
-Public Access to Instant On-demand Ridematching	1	4		
Automated Passenger Counting				
-Sample of the Fleet		2		3
-Entire Fleet			1	4
Transit Signal Priority		4		1
Electronic Fare Payments (Smart Cards)		5		
Automatic Vehicle Location/CAD				
-For Fixed Routes	1	1	1	1
-For Paratransit		2		2

<<may also add inventory from related national ITS study>>

2. HOW ITS AFFECTS OUR TRANSPORTATION SYSTEM

To better assess what role ITS should play in the region's transportation system. we need to better understand the possible effects of ITS on system performance. Ultimately we will probably find that some ITS applications enhance the performance of our transportation system more than others.

One of the challenges in measuring effects is that u e do not yet have a fully deployed system-in place, and ITS developers stress that many systems are designed to be most effective when they are fully integrated in a region. Regardless, many studies have documented what we know so far about the effects of ITS. Some of the effects are measured directly from field tests, some are estimated through surveys of travelers, and still others are estimated through models. A full analysis of the effects of ITS goes far beyond the scope of this effort, but the sections that follow offer some examples of ITS effects: 1) that have been measured, 2) that are perceived to exist by local jurisdictions, and 3) that remain somewhat uncertain. It is important to keep in mind, however, that this overview of ITS impacts is by no means comprehensive. As the Smart Trek effort is completed and evaluated over the next two years, we should gain more insight into ITS impacts within this region.

Measured ITS Effects

ITS demonstrations and projects in the region and across the country have measured the effects of transportation technologies on the performance of transportation systems. Following are just a few of many examples available documenting how ITS can reduce travel time and delay. Several of these examples are from ITS efforts outside of the central Puget Sound region, so the effects would not necessarily be the same in this region. The first example is a freeway ramp metering system in the central Puget Sound region. The second is a computerized signal control system in Toronto. The third is an Advanced Traveler Information System (ATIS) in Orlando. Following these three examples is an overview of possible benefits of advanced public transportation systems (APTS).

Effect of a Freeway Ramp Metering System in the Central Puget Sound Region on Delay, Travel Time, and Accident Rates - As part of the FLOW project, 22 freeway ramps on I-5 were metered to enable more efficient use of the transportation corridor. An evaluation of the system in 1987 described effects to ramp operation, mainline operation, and accidents.[16] The evaluation found that delays on metered ramps averaged less than two minutes during peak periods, and that compliance to the ramp meters ranged from 83.2 to 99.2 percent for all ramps. For mainline operation, the evaluation found that ramp metering reduced travel times on a specific 6.9 mile course from south Snohomish County to Northgate: without ramp metering driving through this section took 22 minutes; after ramp metering (and despite increased volumes) it took only 11.5 minutes. The accident data analysis indicated that accident rates decreased by 39 percent after the ramp metering operation was implemented.

Effect of a Computerized Signal Control System in Toronto on Delay and Travel Time - Field operational tests in other areas have also measured the effects of ITS on travel time and delay. In Toronto for example, the SCOOT system (a computerized signal control system) was tested over a two-month period on an area that included 75 traffic signals. An evaluation compared travel times and delay using a "best effort" fixed signal timing plan versus the SCOOT system. The SCOOT system resulted in an 8 percent decrease in travel time and a 17 percent decrease in delay.[17]

Effect of an Advanced Traveler Information System in Orlando (TravTek) on Tourists' Travel Time and Trip Planning - For the TravTek project, about 100 vehicles (mostly rental cars) were installed with in-vehicle navigation systems, and about 4,000 drivers (mostly tourists) participated in the trial.[18] For drivers who were unfamiliar with the city, their probability of taking a wrong turn decreased by 33 percent, their travel time (relative to using a paper map) decreased by 20 percent, and their travel time planning decreased by 80 percent.[19]

For additional descriptions of other ITS benefits measured, see Dwight Shank's paper, "ITS Benefits: Success in the Field" in *ITS Quarterly*, 1997 Spring Issue. For the most part, ITS demonstrations have been conducted within small sections of a larger transportation network. An ITI deployed across an entire transportation network could realize greater effects.

Jurisdictions' Perceptions of ITS Effects

While many ITS researchers nationwide are working to better understand ITS effects, local jurisdictions, which have day-to-day transportation problems to deal with, also have some impressions of ITS effects. To better understand local jurisdictions perceptions regarding ITS, the Regional Council sent out a survey to local jurisdictions and asked jurisdictions to indicate how helpful or disruptive they believed different ITS applications would be to their transportation system. Surveys were received from 26 jurisdictions, which are home to about 2,319,642 people.[20] Jurisdictions that responded represent about 76 percent of the region's total population. Table 3 summarizes the survey responses.

Notice that for all systems listed, the majority of respondents (or at least 50 percent) indicated that the system would be-Somewhat or Very Helpful to their jurisdiction's transportation system. Systems that jurisdictions most often indicated Very Helpful include traffic signal coordination (67 percent), incident management systems (43 percent), centralized control with real-time adaptive signal timing (40 percent), real-time traveler information systems (36 percent), and variable message signs (35 percent). When responses of Very Helpful or Somewhat Helpful are grouped together, the systems that jurisdictions most often tended to find either Very or Somewhat Helpful include traffic signal coordination (91.7 percent), dynamic ridematching (77.3 percent), centralized control with real-time adaptive signal timing (75.0 percent), real-time traveler information systems (72.7 percent), automated ridematching systems (72.7 percent), incident management systems (71.4 percent), and HOV facility monitoring (70.0 percent).

The survey data was also analyzed for differences in perceptions regarding ITS according to jurisdiction size, type and whether or not systems were in use nearby. As described in Appendix D, for many freeway or transit-oriented systems, the larger jurisdictions were more positive about the possible effects on their jurisdictions. See Appendix D for other findings.

Table 3 - Jurisdictions Perceptions of Helpfulness of ITS Applications

(top number represents number of jurisdictions; bottom number represents percentage)

System	Very Helpful	Somewhat Helpful	No Impact	Somewhat Disruptive	Very Disruptive
Traffic Signal Coordination	16 66.7 %	6 25.0%	2 8.3%	0 0.0%	0 0.0%
Centralized Control With Real-time Adaptive Signal Timing	8 40.0%	7 35.0%	5 25.0%	0 0.0%	0 0.0%
Ramp Metering	5 22.7%	6 27.3%	7 31.8%	4 18.2%	0 0.0%
Variable Message Signs	8 34.8%	7 30.4%	8 34.8%	0 0.0%	0 0.0%
Incident Management System	9 42.9%	6 28.6%	6 28.6%	0 0.0%	0 0.0%
Highway Advisory Radio	5 23.8%	9 42.9%	7 33.3%	0 0.0%	0 0.0%
Fleet Management (AVI and/or AVL)	5 25.0%	7 .35.0%	8 40.0%	0 0.0%	0 0.0%
Transit Signal Priority	1 4.8%	11 52.4%	5 23.8%	4 19.0%	0 0.0%
Electronic Fare Payment	5 25.0%	6 30.0%	8 40.0%	0 0.0%	1 5.0%
Real-time Traveler Information System	8 36.4%	8 36.4%	6 27.3%	0 0.0%	0 0.0%
Automated Transit Information (Scheduled Arrivals)	5 23.8%	7 33.3%	9 42.9%	0 0.0%	0 0.0%
Real-time Transit Information (Actual Arrivals)	5 25.0%	8 40.0%	7 35.0%	0 0.0%	0 0.0%
Automated Ridematching System	5 22.7%	11 50.0%	6 27.3%	0 0.0%	0 0.0%
Dynamic Ridematching (On-line)	4 18.2%	13 59.1%	5 22.7%	0 0.0%	0 0.0%
HOV Facility Monitoring	5 25.0%	9 45.0%	6 30.0%	0 0.0%	0 0.0%

Transit Agencies' Perceptions of Benefits of ITS

As part of the survey of transit agencies, we asked transit agencies and the ferry system in the region to provide their impressions of the benefits of some ITS applications relative to their agencies' needs. Appendix E includes a full list of the benefits as described as transit agencies. Transit agencies were asked to describe the benefits of the following systems: real-time monitoring of area freeways and real-time congestion and speed information on arterials and freeways; freeway ramp metering systems with HOV bypass lanes; traveler information systems accessible to the general public, which may include route and schedule information, real-time transit vehicle location, and multi-modal traffic/transit information; automated trip planning, either as a tool for in-house rider information staff or for the general public's access and use; regional automated ridematching (both in-house central processing, and public access to instant on-demand ridematching); automated passenger counting; transit signal priority; electronic fare payment (smart cards); and automatic vehicle location/computer aided dispatch (CAD). The benefits of these systems as reported by transit agencies and the ferry system are summarized below:

Real-time Monitoring of Area Freeways and Real-Time Congestion and Speed Information on Arterials and Freeways - These systems could provide instantaneous knowledge that could help transit dispatchers and operators make decisions regarding possible detours to avoid congestion. Some of the feedback regarding freeway ramp metering systems with HOV bypass lanes were that they enable express buses to avoid congestion thereby enhancing service reliability and travel time since most of the delay experienced by express routes occurs at congested freeway interchanges.

Traveler Information Systems Accessible to the General Public, Which May Include Route and Schedule Information, Real-time Transit Vehicle Location, and Multi-modal Traffic/transit Information - These systems allow riders to perform more comprehensive trip planning, will increase ridership, and reduce uncertainty for transit customers related to wait times.

Automated Trip Planning, Either as a Tool for In-house Rider Information Staff for the General Public's Access and Use - Transit agencies reported that these systems can allow both rider information staff and the general public to access regional transit travel itineraries. These systems can also reduce training requirements for rider information staff, which is a high turnover position. These systems can also enable the provision of more consistent information to customers.

Regional Automated Ridematching (Both In-house Central Processing, and Public Access to Instant On-demand Ridematching) - Transit agencies indicated that these systems could increase the number of opportunities for people who want to share a ride to/from work by providing the best possible matches quickly and reducing the time required to process matches. Public access may appeal to some who won't wait for response through mail.

Automated Passenger Counting - This system can enable more accurate ridership counting without dedicating staff resources to manually perform counts. Ridership data would be current and updated regularly ensuring data integrity.

Transit Signal Priority - These systems can allow buses to travel along busy arterials more quickly resulting in the reallocation of service as well as increased service reliability. This is a unique approach to travel time savings and is one way to increase service without increasing operating and maintenance costs. Increased travel speed and improved service reliability will eventually increase ridership.

Electronic Fare Payment (Smart Cards) - These systems can promote seamless travel between transit systems. This integrated fare media will reduce confusion and expense to the rider and virtually eliminate counterfeiting of transit passes. It can also reduce fare media handling costs.

Automatic Vehicle Location/Computer-aided Dispatch (CAD) for Fixed Routes/Paratransit - These systems can increase the dispatching efficiency for our paratransit service. Fixed route AVL could result in more real-time tracking and communication with operators and real-time schedule information for transit riders. This improved communication can result in improved ability to respond to in service operating problems, and improved safety and security for passengers with better response to emergencies.

National Assessment of Benefits of Advanced Public Transportation Systems (APTS)

The Volpe Center, working for the Federal Transit Administration (FTA), evaluated APTS to provide an "order of magnitude" estimate of the expected benefits to the transit industry of APTS technologies.[21] The study identified a total of 265 APTS systems in the U.S. that are currently operational, under implementation, or planned for implementation over the next 10 years. They divided the systems into four groups: transit management, traveler information, electronic fare payment, and demand-responsive computer-aided dispatching. The expected benefits of the four groups of systems are listed in Table 4.

Table 4 - Benefits to the Transit Industry of Advanced Public Transportation Systems[22]

Group of APTS	Total # Systems	Primary Benefits (Per Transit Agencies)	Assumptions Regarding Effects	Total Benefit – Low & High Estimates
Transit Management	73	Increased transit safety, and improved operating efficiency, improved transit service, and improved transit information.	1 to 2 % reduction in fleet requirements. 5 to 8 % reduction in non-revenue vehicle miles.	$244,725,000 to $456,206,000
Transit Information	72	Increased transit ridership and revenues, improved transit service and visibility within the region, increased customer convenience, and enhanced compliance with ADA requirements.	1 to 3 % increase in ridership	$113,335,000 to $226,669,000
Fare Payment	43	Improved security of transit revenues, customer convenience, expanded base for transit revenue, reduced fare collection/processing costs, and more equitable and flexible fare structures.	2 to 4 % savings in passenger fares	$182,220,000 to $364,439,000
Demand Responsive CAD	77	Increased efficiency in transit operations, improved transit service and customer convenience, and increased compliance with transit ADA requirements.	3 to 5 % reduction in total demand responsive transit fleet vehicle miles	$6,361,000 to $10,602,000

The first group, transit management systems, refers to a broad range of technologies that improve the planning, scheduling, and operation of transit vehicle fleets. Systems involved include communication systems, automatic vehicle location and monitoring systems, automated passenger counters, and automated software systems for transit route planning, scheduling and operations. The second group, Advanced Traveler Information Systems (ATIS), provides timely and accurate information to help travelers make decisions on modes to travel, routes, and travel times. The third group, electronic fare payment systems, include a wide-range of automated fare collection system technologies that make fare payment more convenient for the transit user. These systems also help transit agencies by improving the security and the efficiency of managing the fare revenue. The fourth and final group, demand-responsive computer-aided dispatching systems, improve the dispatching of demand-responsive transit vehicles.

Uncertainties Regarding ITS Effects

Regional policies emphasize strategies that increase the efficiency of the current system, reduce the number of vehicle trips made, encourage mode shift to high occupancy or nonmotorized modes of travel, or shift some travel out of the peak periods. Although some ITS applications have been shown to increase the efficiency of particular corridors or subregions, the effect of ITS in reducing the number of vehicle trips made and encouraging a mode shift to high occupancy or nonmotorized modes of travel, has not been clearly demonstrated.

For example, we need to better understand to what degree improved traveler information can encourage mode shift to non-SOV modes of travel and/or improve the overall performance of our transportation system. Studies describing the effects of traveler information systems have been mixed. Most studies have shown some willingness by travelers to change their time of departure and/or route, but little willingness to change their mode of travel. While some studies did point out that improved traveler information can effect a person's willingness to use transit, the results probably more strongly suggest that the greatest effect will be realized when improved transit information, is combined with improved transit service. At a recent symposium on Advanced Traveler Information Systems (ATIS) a participants seemed to agree that "traveler information systems do not seem to produce changes in overall traffic flow, traffic patterns, and congestion levels."[23] Instead, they felt that the key measure of success of traveler information systems would be the benefits of traveler information to individual travelers rather than improved facility performance.

Following are summaries of just a few of the studies investigating the response of travelers to traveler information. The first two studies occurred in the Puget Sound area, the third in Sacramento and San Jose, and the fourth in the San Francisco Bay Area.

Bellevue Smart Traveler: A Traveler Information Center for Dynamic Ridesharing - *Bellevue Smart Traveler* designed and tested a traveler information system that would help decrease single-occupancy vehicle (SOY) travel to a downtown employment center by making alternative commuting options more attractive and accessible.[24] This project included a prototype traveler information center (TIC) in downtown Bellevue to help commuters form carpools on an on-demand basis (dynamic ridesharing). The TIC also provided traffic congestion and transit information. At the program's peak, 53 participants were registered. The study found that participants liked the idea of dynamic ridesharing, the presentation of the information, and the technology. They were willing to offer rides, and they used the TIC for other forms of information. However, for various reasons, usage statistics and follow-up surveys indicated that they were either unable or unwilling to form ride matches. During the six months that the TIC was evaluated, only six ride matches were logged.[25] The study concluded that factors affecting the success of the TIC in facilitating on-demand ridematches include the limited size of the rideshare groups, which may have resulted in insufficient rideshare choices; and the fact that participants may have been uncomfortable getting into another's car.[26]

The symposium was sponsored by the Institute of Transportation Engineers, ITS America, and the Association for Commuter Transportation. Source: K. Kenneth Orski, "Consensus on ATIS," *Traffic Technology International*, April/May 1997, p. 79.

***Survey of the Responses of Puget Sound Motorists to Traffic Information* -** Nearly 10,000 motorists in the Puget Sound region were surveyed in the late 1 980s to determine how tines would change their behavior based on traffic information. Overall, this survey showed that commuters in the Puget Sound region were fairly flexible to changing their route or departure time, but that most were inflexible to changing their mode of transportation.

The study found that most commuters (73 percent) received traffic information of some kind at least three times during the period prior to their departure, and that most often (98 percent) this information was received from commercial radio. The study identified four groups of commuters[27]: (1) route changers (20.6 percent), who are commuters who would be willing to change routes before or during their commute but were unwilling to change their departure time or transportation mode; (2) non-changers (23.4 percent) who indicate that they are unwilling or able to change their route, transportation mode, or departure time; (3) route and time changers (40.1 percent) who would be willing to change their route and departure time, but not their mode of transportation; and (4) pre-trip changers (15.9 percent) who would be unwilling to change their route while driving, but would be willing to change their route, departure time, or mode before leaving their residence.

***Survey of the Effect of Traveler Information on Commuters' Tendency to Use Transit in Sacramento and San Jose* -** Another survey investigating the effect of traveler information on commuters' tendency to use transit found that about 38 percent of respondents who currently do not use transit might consider transit if the appropriate information is available. These results are a compelling argument for improved transit information, but they may be somewhat misleading. First, respondents were asked how likely they would be to use transit *one day a week or more,* so any mode shift may not span across an entire week. Second, the scenario respondents were given may not have been a realistic representation of current transit service levels.

The scenario respondents were given is as follows:

"Suppose that transit information was available to you at home by TV, radio or computer network, and you knew how many transit routes would take from your home to your usual workplace' Now suppose that the total travel time to work via transit was 'X'. How likely would you be to use transit as a commute mode at least one day per week?"

The transit travel time 'X' that respondents were given was customized based on their current travel time. A hypothetical transit travel time was generated by randomly multiplying their current commute travel time by either .75, 1.00, 1.25, or 1.50. This means that for half the respondents, their hypothetical transit travel time was the same as or less than their current travel time. For the rest of respondents, their transit travel time was either 1.25 or 1.50 times their current travel time.

Unfortunately, because most transit trips currently take longer than private vehicle trips (and some take much longer). it is probably not a very realistic scenario. While this study did point out that improved transit information can effect a person's willingness to use transit, the results also probably suggest that the greatest effect will be realized when improved transit *information* is combined with improved transit *service.*

Survey on Traveler Response to Traffic Information in the San Francisco Bay Area - In another survey on traveler response to traffic information, 48.3 percent of commuters indicated that they change their travel behavior based on traffic information. Most of the travelers who indicated that they change their behavior take an alternate route, some of these also changed their time of departure. Interestingly, about 10.5 percent indicated that they canceled the trip altogether (note that the sample included both those who commute to work and those who don't, so those who canceled the trip were probably not commuting to work). However, only 15 respondents (1.7 percent) indicated that, based on pre-trip traffic information, they changed their mode of travel. What is somewhat alarming is that of these 15 respondents who changed mode, 9 of these were transit riders who changed to personal vehicle and drove alone.[31]

3. DEVELOPING A REGIONAL ITS STRATEGIC PLAN FOR THE 2001 MTP

The use of new technologies in transportation is bringing about rapid change in how some jurisdictions manage their transportation systems. Currently, local governments do not typically include ITS planning in their long-range strategic plans, and may not necessarily know where to begin. Although developing an ITS Strategic Plan is not a requirement of the planning process, there are a number of good reasons to develop one. Strategic ITS planning can help governments to take advantage of the changes brought about through the application of technologies in transportation.[32] According to the Federal Highway Administration (FHWA), developing an ITS Strategic Plan can help to:

- Maximize the use of existing transportation facilities and assets;
- Determine the feasibility of an Intelligent Transportation Infrastructure (ITI);
- See how the ITI, which cuts across modes of transportation, geographic areas, and institutions, can help you unite these elements for the benefit of all;
- Prioritize the most important elements of your ITI, matching these to the needs of your region. Without such a plan, ITI activities will be uncoordinated and unstructured; paying little attention to overall planning goals and using funds ineffectively.
- Communicate more effectively. The strategic plan is an on-going communication tool, as well as a reference point that coordinates implementation of the ITI, and keeps it on track.[33]

To help and encourage local governments to develop ITS strategic plans, the U.S. Department of Transportation (USDOT) published *Integrating ITS within the Transportation Planning Process: An Interim Handbook*, and Public Technology, Inc., received funding from the USDOT to publish *Smart Moves - A Decision-Maker's Guide to the Intelligent Transportation*

Infrastructure. The Regional Council will be developing a regional ITS Strategic Plan. and will take many of their guidelines into consideration.

The region's long-range transportation plan, the Metropolitan Transportation Plan (MTP). is not prepared at a level of detail needed to appropriately analyze operations and maintenance requirements of ITS, and institutional responsibilities for ITS. Because a more focused effort is needed to work out the details of an ITS strategy, the development of a Regional ITS Strategic Plan can more appropriately address regional ITS issues. The Strategic Plan will form the basis for the ITS component of the 2001 MTP. If warranted, the study could also influence the Transportation Improvement Program (TIP) process.

Developing a Regional ITS Strategic Plan can benefit the region by bringing together stakeholders to focus on ITS; enabling the region to define which ITS applications are most appropriate to address particular problems; helping maximize the use of existing transportation facilities and assets; helping unite systems so that all receive the maximum benefits; enabling us to prioritize the most important elements of the regions ITI; and providing an on-going communication tool that coordinates implementation of the ITI and ITS and keeps it on track. [34]

The Regional ITS Strategic Plan will benefit from the findings from the Smart Trek project, including results from the Puget Sound Transportation Panel (PSTP) survey, which in 1997 and 1998 will focus on ITS. The Strategic Plan may also include some or all of the following:

- An overview of effects of ITS (including Smart Trek findings);
- An assessment of whether there are some systems that the public sector in the region should focus on more aggressively, and other systems best left to private sector development;
- An overview of institutional/policy issues emerging from Smart Trek;
- An overview of environmental review issues;
- An action strategy for funding, phasing, managing, and operating the systems that may be implemented;
- The identification of specific priority systems, corridors, subareas, transit routes, etc., for implementation;
- Overview of the possible costs of maintaining and operating various ITS elements;
- Overview and update of the regional ITS architecture developed as part of Smart Trek that will help to coordinate long-term implementation of ITS;
- Overview of how ITS costs and benefits are considered in the Transportation Improvement Program (TIP) process;
- Overview of how ITS may be included in Major Investment Studies (MISs) in the screening of alternatives and in selection of preferred investment strategies.

Two of the areas that will be expanded in the Regional ITS Strategic Plan include an analysis of funding and implementation issues. Some initial considerations regarding ITS funding and implementation are presented in the two sections that follow.

4. FUNDING ITS AND THE ITI

Overview of ITS/ITI Funding Outlook

As part of the Smart Trek proposal to the Federal Highway Administration and Federal Transit Administration, the Smart Trek team identified anticipated non-federal ITS funding to maintain and operate the Smart Trek system in the region over the next five years.[35] The anticipated total private sector funding from federal fiscal years 1998 through 2002 is about $9,200,000. The anticipated total public sector funding (WSDOT, transit agencies, and cities) over the same period is approximately $50,000,000. The source of these public sector funds would most likely be the revenues that transit agencies, cities, and the WSDOT currently receive (from a variety of sources, including transit and ferry fares; sales, fuel, and property taxes; and the Motor Vehicle Excise Tax). Over the longer-term, additional funding will be required. For example, the region will require additional funding to continue operating and maintaining the systems in place. Another funding need relates to personnel training required to use and maintain systems. Many of the ITS applications in place or planned for the region rely on relatively new technologies, which require new skills and personnel to operate and manage them.

In addition, funding for ITS is available from the federal government. The National Economic Crossroads Transportation Efficiency Act of 1997 (NEXTEA) is currently being submitted for authorization, and, like its predecessor ISTEA, would allow local governments to use federal funding to pay for most core components of the ITI. The NEXTEA bill proposes making technology investments eligible under all major investment categories, and also proposes a new $ 100 million (annual for six years) ITI Deployment Incentives Program to assure that all technology systems can be integrated. In addition, as part of the bill's ITS Program and Research Activities, the bill proposes the appropriation of $96 million annually (for fiscal years 1 998 through 2000) and $130 million annually (for fiscal years 2001 through 2003) for multi-year research and technology development initiatives.[36] Multi-year federal transportation legislation will hopefully be authorized before ISTEA expires in September 1997. Local governments may be able to apply for many of these federal funds.[b]

The bill also proposes extending the State Infrastructure Banks (SIBs) to all states.[37] Using SIBs, local governments may-be able to "borrow" money to help pay for construction of the ITI and other projects. Region's can use up to 10 percent of their highway funds and 10 percent of their transit funds to create an SIB that provides loans for projects.[38]

Another possibility that local jurisdictions may consider is the use of some valuable rights-of-way that local telecommunications companies may be interested in. Some jurisdictions are

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[b]For specific details on the different types of federal funds available, which federal funds local governments may be able *to* apply for, and guidance regarding the application process, contact your MPO or your regional FHWA or FTA office. The Puget Sound Regional Council is the MPO for Snohomish, King, Pierce, and Kitsap counties, and PSRCs phone number is (206) 464-7090. The phone number for the Regional FHWA in Olympia is (360) 753-9480, and the phone number for the regional FTA office in Seattle is (206) 220-7954.

negotiating with telecommunications companies to exchange access to publicly owned rights-of-way for the communications capacity needed for their ITI. A second approach that other jurisdictions have taken is to raise revenue for projects by leasing rights-of-way to private-sector vendors. These are examples of approaches that can help supply the resources needed to implement an ITI.[39]

Finally, in the long term, public agencies may need to consider new options for managing and financing their transportation systems to better manage the demand for use of the system with the supply. For example, road users may be charged for using some facilities during the most congested periods of the day. The ITI can help facilitate changes such as this since the ITI may enable an electronic toll collection system to charge vehicles without requiring them to stop or slow down. With the 2001 MTP, we will have a better understanding of funding options and obstacles.

Transit Agencies' Perspectives of Funding Issues and Constraints

As part of the survey administered to transit agencies, they were asked to describe ITS funding constraints. Comments relating to ITS funding include the following:

> *"Because ITS generally requires a multi jurisdictional or regional approach, financing can suffer from limited coordination. Further, ISTEA flex funds and state resources are being called upon to respond to so many other urgent needs that ITS projects must compete within a relatively small arena A dedicated source of ITS funding is needed."*
>
> *"Competition for scarce resources, and an inability to meet other more critical needs for service and equipment. "*
>
> *"Given state legislature commitment to ITS is very constrained. "*
>
> *"The biggest issues remaining regarding ITS are the costs and benefits received for the investment. In some cases, implementing A VL and Smart Card are not an inexpensive endeavor. What are we gaining by this investment? "*
>
> *"Priority for public transportation systems is preservation of capital. Though capital costs are involved, all ITS related needs are operational. There is little federal operational support. "*

5. IMPLEMENTING THE ITI

Two of the important aspects of implementing ITS are selecting and purchasing equipment, and developing partnerships with the private sector to help ensure that the ITI will continue to be built and maintained after federal funding subsides.

Equipment

Many local governments already have some ITS components in place so they will not have to build their ITI from scratch. For example, some local governments are already using traffic signal control systems or transit management systems. Nearly all local governments have phone lines, computers, fiber-optic lines, or computer networks that can be used in the ITI. Bs using some of the existing technologies, the overall cost of building an ITI may be reduced.

A System Architecture to Guide Development of the System - In the context of ITS, an “architecture” describes what a system does and how it does it, providing the general framework within which the various system components are deployed.[40] The national ITS architecture was completed in July 1996.[41] Over the last several years, and as part of the Smart Trek project. ITS developers in the central Puget Sound region have been working to develop an ITS architecture to guide the development of the system.[42] The goal is to define an architecture which meets the functional requirements of the proposed system and can provide for inevitable change, evolution and growth. The Regional ITS Strategic Plan will include an overview and update of the region's ITS architecture.

Selecting Equipment **-** The ITI is rooted in information technology, and it is designed to be most effective when all the systems in the ITI can share information. This requires that computer and telecommunications technologies be based on industry standards. Certain technology standards have gained industrywide acceptance, allowing the creation of open systems. Open systems are ones in which all of the connections among the different software programs, networks, and computers in a system are standardized so that they can all share information.[43] Client/server systems are open systems that enable data to be shared among different systems and allow the more efficient use of each computer. The Internet is another example of an open system, and many jurisdictions are reworking GISs to run on the Internet. It is also important that multi-jurisdiction regions coordinate the standards used so that systems across jurisdictions will be able to share information. At the national level, the U.S. DOT is in the process developing ITS technical standards. These, however, will not be completed until 2001.[44] The ITS architecture and technical standards, which define how ITS elements will work together, are prerequisite to a large scale, integrated deployment of ITS.

Purchasing Equipment **-** Purchasing computer systems is usually more complicated than purchasing equipment to maintain a road. The cost and performance of computer systems are changing rapidly and government procurement processes are often less flexible than private sector procurement processes. In addition, some government procurement processes focus on the lowest bid, which may end up costing more in the long run since the system with the lowest bid might require frequent repairs or maintenance. Local governments might consider instead turning to "best-value" bids, where values are weighed according to a product life cycle, vendor reliability, and how a proposed system satisfies the agency's mission.[45]

Partnerships

Although the federal government is currently funding much of the development of the ITI, the Federal Highway Administration estimates that over the long run, as much as 80 percent of investments in the ITI are expected to come from non-federal sources. It is anticipated that in the future the private sector will supply many of the products and services needed to build and maintain the ITI. Therefore, local governments will need to develop more partnerships with the private sector.

Why would the private sector want to invest in the ITI? Commercial trucking or shipping companies may be interested in ITI partnerships since they can increase their productivity, as using systems in the ITI to monitor and track their fleets. In some states, commercial trucking companies have already formed partnerships with state and local governments to implement ITS. Some other private firms are interested in partnerships with the public sector to develop the ITI because they hope to be able to resell the results of their partnership to other public and private sector customers. Some businesses, for example, are developing partnerships with the public sector so that they can collect and distribute information to the traveling public regarding current traffic conditions, alternate routes, or the location of shops, restaurants, or major attractions.

Transit Agencies' Perspectives of Implementation Constraints to ITS Deployment

As part of the survey administered to transit agencies, they were asked to describe ITS implementation constraints. Comments regarding issues effecting ITS implementation include:

> *"Too many promises, too few deliveries. "*
>
> *"It is critical that individual agencies understand their ITS needs and objectives prior to selecting technologies or applications as solutions. Many solutions are in developmental stages and not widely used. Transit agencies have limited resources to experiment with leading edge or unproven technologies. If transit agencies are going to use ITS applications to increase ridership or improve efficiency, the system must be proven reliable and cost beneficial. Interagency or regional coordination of ITS applications will certainly be an additional constraint during implementation. "*
>
> *"Interjurisdictional cooperation, lack of standards. "*
>
> *"Funding and infrastructure. "*
>
> *" Wish list too big, promises too bold, customer perception and acceptance has not been developed. "*

6. SMART TREK WILL HELP US BETTER UNDERSTAND EFFECTS

While some ITS demonstrations have quantified the effects of ITS on travel time and delay. the findings from traveler information studies have generally indicated some willingness on the part of travelers to change their route or time of departure, but relatively little willingness to change their mode of transportation. Smart Trek should help us better understand the effects of ITS, such as whether travelers are willing to change their mode of transportation if they are provided with easy, convenient access to a fully integrated traveler information system that includes real-time transit and traffic information. In addition, the three other major MDI projects occurring outside of this region (in San Antonio, Phoenix, and the New York/New Jersey metropolitan areas) will also help us better understand the possible effects of ITS on individual travel behavior and overall system performance. However, because the region can't wait until we have all the answers to begin strategic planning for ITS, the Regional Council is beginning to expand on its ITS planning for the region.

III. SIGNIFICANT ISSUES REMAINING

The role and effects of ITS are still in some respects unknown. Within the next few years, we should better understand the effects of ITS as the major ITS project in this region (Smart Trek) is completed. There are a number of significant issues that need to be addressed in the near-term and incorporated into the 2001 MTP. The Regional ITS Strategic Plan can provide the background for the ITS component. The Regional ITS Strategic Plan can include the identification of specific priority corridors, subareas, and transit routes most suitable for implementation; and an analysis of ITS funding and implementation issues. Ultimately, we may conclude that some ITS programs more directly address regional policy goals, and those systems may be prioritized in the Strategic Plan. Other ITS applications may be found to be less effective in addressing the region's goals, so they may be better-suited to private sector investment.

IV. SUMMARY

This report has described some of the issues surrounding ITS and the ITI in the central Puget Sound region that have come about in the three years since the MTP was adopted in 1995. This refinement adds to the 1995 MTP by updating the list of ITS projects underway in the region; providing a broad overview of the effects of ITS; overviewing key planning, funding, and implementation issues for ITS; and identifying the significant issues that have yet to be addressed. The Smart Trek project should further our understanding of ITS for the 2001 MTP. A Regional ITS Strategic Plan will be developed, which will serve as a background report. This document will include a more comprehensive analysis of ITS planning, funding, and implementation issues for the region over the next 20 years.

APPENDIX A - GLOSSARY

ADA - Americans with Disabilities Act.

FHWA (Federal Highway Administration) - The organization in the United States Department of Transportation that has primary responsibility for the USDOT's ITS program.

ITI (Intelligent Transportation Infrastructure) - The technological infrastructure (including computer chips, fiber-optic cables, and software programs) that is the overall system umbrella. The ITI represents the initial construction or acquisition of fully integrated public sector ITS components.

ITS (Intelligent Transportation Systems) - The particular applications of electronics, communications, or information processing used singly or in combination to improve the efficiency and safety of surface transportation systems within the ITI. ITS examples include systems used to meter freeway ramps, disseminate real-time information about traffic conditions, or provide priority to transit vehicles at traffic signals.

IVHS (Intelligent Vehicle Highway Systems) - The previous term for ITS.

MDI (Model Deployment Initiative) - A program being run by the FHWA, which has awarded projects to four regions across the country to demonstrate the effectiveness of an integrated ITI. The four regions selected are Seattle (the Smart Trek project), Phoenix, San Antonio, and the New York/New Jersey metropolitan area.

MPO (Metropolitan Planning Organization) - A regional association of local governments and state agencies that serves as a forum for developing policies and making decisions about regional growth and transportation issues.

MTP (Metropolitan Transportation Plan) - The long-range transportation plan for the central Puget Sound region prepared by the Puget Sound Regional Council, the MPO for the region.

PSRC (Puget Sound Regional Council) - The Metropolitan Planning Organization for the central Puget Sound region.

Regional Council - Another term used for the Puget Sound Regional Council.

SIB (State Infrastructure Bank) - A system that allows local governments to "borrow" money to help pay for construction of the ITI and other projects. Multijurisdictions can use up to 10 percent of their highway funds and 10 percent of their transit funds to create a SIB that provides loans for projects

Smart Trek - The name of the Seattle-area ITS deployment project, one of four projects selected nationwide for participation in the FHWA's Model Deployment Initiative (MDI).

STPP (Surface Transportation Policy Plan) - The State of Washington's transportation policy

TDM (Transportation Demand Management) - Strategies that help to shift travel demand to non-SOV modes of travel or to off-peak periods of travel.

TIC (Traveler Information Center) - A system that enables travelers to receive traveler information (may include traffic, transit, and ridematching information).

TSM (Transportation Systems Management) - Strategies to maximize the efficiency of the current transportation system without adding significant capacity (e.g., freeway ramp metering, access control on arterials, etc.).

APPENDIX B - EXAMPLES OF ITS FOR FREIGHT MOBILITY

Following are some examples of the types of ITS strategies that could be included in the development of a Regional ITS Strategy for the 2001 MTP Update. which could improve freight mobility within the region:

- Additional installation of real-time variable message signs (VMS) to help trucks select among routes during periods of congestion.

- Improved coordination (among Federal and State agencies) regarding cargo tracking requirements. Automatic Equipment Identification (AEI) applications may be able to handle many of these cargo tracking requirements.

- Investigate technologies that may allow safer and closer spacing of trains. such as positive train separation (PTS) technologies.

- Installation of additional Weigh-in-Motion (WIM) stations.

APPENDIX C - DESCRIPTIONS OF CURRENT ITS PROJECTS IN THE REGION

The following is a list of ITS projects that are currently in place in the Puget Sound Region. The projects are listed under two groups: 1) Washington State Department of Transportation projects and 2) Other Agency Projects. This list and the project descriptions were compiled by the Washington State Transportation Center (TRAC) in April, 1997.

Washington State Department of Transportation ITS Projects

Smart Trek Model Deployment Initiative (MDI). Within the Seattle region traveler information is being delivered to the public by either public transportation providers or the private sector. Unfortunately, this information is not comprehensive: some roads are not covered at all: not all information collected is being disseminated; some information is not collected in a format that makes it useful to motorists; not everyone who might use the information has access to it; and most traffic information is delivered by radio, which means that travelers must have a radio and must be tuned to the proper station at the right time. Many other delivery methods are not yet being used effectively, such as the Internet, television, signing, and the telephone. The lack of integration and coordination in the region's current multi-modal traveler information systems are shortcomings that are being addressed in the MDI project.

Smart Trek will provide the funding (about $13.7 million) and public and private sector participation needed to expand, integrate, and coordinate the region's traveler information system so that it is a more widely-used and effective system. Smart Trek will integrate many of the ITS elements now in place, adding new systems as necessary to provide real time information about the status of arterials and highways, transit vehicles, and ferry traffic. Traffic and transit information will be sent to pagers, laptops and desktop computers. The specific locations of buses will be shown on video monitors at bus stops, kiosks and hand-held personal digital assistants. Multi-modal traveler information system will be designed so visitors can make intelligent choices about how to link bus and ferry or other transit connections with ease and confidence. Smart Trek will build on many of the ITS projects listed below.

IVHS Backbone Design and Demonstration. This project will (1) design a demonstration architecture for a regional IVHS backbone for the Puget Sound area and (2) construct this backbone in order to demonstrate how different types of data gathered from distinct agencies can be integrated in a single application. The backbone will be designed to (a) improve interagency and multijurisdictional sharing of data without disrupting existing operations, (b) support existing investment in IVHS technology and system development, (c) encourage expansion and innovation, and (d) be compatible with federal efforts to develop a national IVHS architecture. The backbone will support traffic data from a multitude of sources while making data accessible in a clearly defined manner on a geographically distributed network. This all will be done in an open systems model that supports a distributed computing environment, is extensible to larger areas, and easily allows new agencies to participate.

Demonstration of ATIS/ATMS Data Fusion in a Regional IVHS. This project proposes to design construct, and demonstrate a data fusion system for use in a regional IVHS system. The fusion system will combine data for multi-agency and multi-jurisdictional sources to provide a more accurate, real-time picture of the transportation system. This fusion system will operate in a distributed computing environment that encourages interagency cooperation.

Graphical Display of Real-Time Transit Coach Locations (BusView) The project will design and demonstrate a system that graphically displays real-time transit coach locations to the University of Washington campus community. The system will use Seattle Metro's existing automatic vehicle location system as its information source.

Investigation of Video Image Tracking. First generation video imaging systems provide “trip-wire” type detection, that is they mimic the performance of inductance loops. The newer video imaging tracking system not only gathers loop type data but "fingerprints" vehicles to provide tracking capabilities. Vehicle tracking provides travel time and origin destination information which has been historically difficult to obtain. The proposed video imaging system for this project is the MOBILIZER, which is provided by Condition Monitoring Systems (CMS) and is in the prototype stages of development. This project will test collected data for reliability and range of usefulness, compare cost effectiveness and total life-cycle cost of the CMS system to that of traditional loop detector systems, and if cost effective, incorporate the system in the WSDOT Traffic Systems Management Center.

IVHS - Network and Data Fusion. This Federally funded project will progress from specific regional issues investigated in other related projects and generalize by creating key network and fusion components that are transferable to other regions and countries. The project will (1) investigate, design, and document an encoding scheme, including ways to include temporal information with spatial information, for standardization of traffic and traveler information, (2) use this encoding scheme to demonstrate a layer between application and transport layers, and (3) work with another related IVHS research center to use the encoding scheme in a demonstration of its use in inter-regional IVHS communication.

Ramp Control via Neural Network Control. This project will develop and test a new ramp metering algorithm by using an artificial neural network congestion predictor and a multi-variable control system.

Fuzzy Logic Ramp Metering. This project will move toward developing the neural network forecasting and fuzzy logic control system including in depth testing using models and on - . existing SC&DI system. The developed systems will be placed in the TSMC control system and real world tested.

NEXRAD - The NEXt Generation Weather RADar. This project is investigating potential applications for the new Doppler weather radar in transportation. The potential uses of accurate short term weather predictions include better maintenance scheduling and transit operation improvements from early snow warnings, wind warnings for ferries, and for research into the traffic effects of inclement weather.

Increasing Awareness of Transportation Options Through Riderlink. This FHWA/FTA Operation Action Program project intends to develop a Metro database infrastructure that can be used to make transit information (and other information) available at selected work sites. Originally the intent was to team up with US. West Community Link's planned videotext service (The original project was titled: Increasing Public Awareness of Transportation Options Through Videotext). Since the videotext service has been delayed or abandoned, the use of videotext w as replaced by planning on using existing computer networks of some of the employers in the Overlake area between Redmond and Bellevue.

Traffic Data Acquisition and Distribution (TDAD). The TDAD project will provide a prototype system that will access available traffic databases and store information in a separate database for historical, research, and planning purposes. Agencies will then be able to request from the system specific records, and obtain these in formats meaningful and useful to them. The initial system will be demonstrated in the Puget Sound area, together with linkages to state level databases and applications. This project is coordinated with the North Seattle ATMS. This project supports regional Congestion Management Plans.

North Seattle Advanced Traffic Management System (NSATMS). The primary objective of this project is to design and build an ATMS that enables the exchange transportation information among the different transportation agencies in the I-5 corridor from Seattle to Marysville. This coverage includes nine cities, two counties, three transit agencies, and WSDOT. This project will be expandable to the east and south to include the entire Seattle Metropolitan area. The NSATMS will exchange information among traffic signals, CCTV, VMS, Detector Stations, and ramp meters. The data will be collected by a separate micro-computer through communications links with the central traffic control systems belonging to each jurisdictions. The micro-computer will compile volume, occupancy, and other operations data and transmit it back out to participating agencies. The agencies can then make changes to their control routines based on this new information.

Puget Sound Help Me (PuSHMe) Operational Test. This project is testing two different mayday systems in the Puget Sound Area. These systems allow travelers in need of assistance or emergency service to send a signal that includes their location and type of service needed directly to a response center who will then make the appropriate dispatch (i.e. tow truck, assistance van, WSP, etc.)

SWIFT- Seattle Wide-area Information For Travelers. This IVHS Operational test of an FM sideband data system which will be used to deliver traffic and transit information. Data will be extracted from WSDOT's freeway ramp control computer, Metro Transit's vehicle location system, and augmented with information from Metro Traffic Control. The information will be formatted and sent to Seiko Telecommunication System for transmission to devices. The devices include a watch (or pager) based on Seiko's Message Watch, Delco Electronics' Telepath car radio that includes a GPS to give distance and bearing to a destination, and a palm top computer that will be supplied by IBM which will provide bus locations and graphic displays of traffic conditions. Etak will supply geo-coding, mapping, and data and interfaces. An evaluation plan from SAIC was approved by FHWA.

SWIFT Smart Traveler. This project is a companion to the SWIFT project and will allow ad hoc ridesharing amongst UW employees. The large employer base combined with the availability of desktop computers and the campus network should allow for greater number of ride matches than found in previous projects.

SC&DI Expansion. Washington State Department of Transportation's Northwest Region is in the process of expanding into new areas -- including proposed projects in Bellingham and Mount Vernon. Statewide Incident Management Operational Guidelines. This project, which is currently underway, is addressing the need for consistency in some of the operational aspects of the state's incident management programs. Currently, four of the state's six regions have incident response teams: Northwest, Olympic, Southwest, and Eastern Regions. The project will make specific recommendations for the statewide standardization of program procedures, services, duties and operational guidelines.

Other Agencies' Projects

Smart Bus. King County Metro is beginning the implementation of a smart bus strategy that will integrate electronic information systems on-board buses. The current order for 360 buses includes J-1708 wiring which will provide the backbone of the "vehicle area network." J-1708 is an SAE standard developed and adopted by ITS America. A contractor has been hired to integrate the automatic passenger counting systems and automatic vehicle location systems on board the 10 percent of the current fleet that have APC systems installed.

AVI (Automated Vehicle Identification) Technology. King County Metro Transit and Snohomish County Community Transit are implementing AVI technology. This technology will support transit signal priority operation at 27 busy intersections and will collect arterial speed data as the buses serve the region.

Regional Ridematch. King County Metro is participating with Snohomish County Community Transit and Pierce Transit in the development of regional ridematching software. The system will allow ridematch staff at any of the three agencies to enter ridematch requests into a regional database. This system will replace an existing regional ridematch system that limits the ability of agencies to offer GIS based matches, match maps for customers, and on-line ridematching. This project will also provide a toll-free telephone number for anyone in King, Snohomish, and Pierce counties to use for ridematch assistance.

Regional Automated Trip Planning. King County Metro is participating with Community Transit and Pierce Transit in the development of a regional transit trip planning system. The system will allow any information operator at any of the three agencies to enter origins and destinations within the region. The system will automatically produce a trip itinerary including travel times, fares, and transfers Current effort is focused on developing geographic information system (GIS) hardware and software capability in Pierce and Snohomish counties. King County is nearly done with its GIS component.

Riderlink. Vital transportation information at a customer's fingertips - that's what Riderlink; provides. This on-line information resource is available on the Internet via the World Wide Web. Using personal computers, Puget Sound residents can view Metro bus route, time tables. and maps, as well as information about vanpool and ridematch services, ferry schedules. road construction and freeway congestion. Riderlink was developed by King County Metro with active participation of a nonprofit association of eight area companies, including Microsoft, Nintendo, Applied Microsystems, Safeco Insurance, Eddie Bauer, and others, all dedicated to reducing traffic congestion.

Closed Circuit Television on Buses. King County Metro is evaluating the effectiveness of CCTV on increasing security and reducing crime on Metro buses. CCTV would be installed on three types of Metro coaches. They want to evaluate this technology because CCTV's may prove helpful in reducing crime by providing an evidence record in the event of criminal activity and assisting in the prosecution of crime perpetrators.

State Patrol CAD for Traffic Management. Washington State Department of Transportation's Northwest Region is working with the Washington State Patrol to more fully utilize their CAD system for traffic management.

Regional Fare Integration Project. King County Metro is participating with Community Transit, Pierce Transit, Everett Transit, Kitsap Transit, Washington State Ferries, the RTA, PSRC, and the Cascadia Project to provide seamless regional fare media that makes it easier to make inter-county trips within the Puget Sound region. The project team is currently evaluating several technologies including smart cards and magnetically encoded cards. A demonstration of the selected technology will be performed after the conclusion of the analysis phase.

Kitsap Transit, Signal Priority. Kitsap transit has installed Opticom based signal priority systems at 42 intersections. They are working to develop additional intelligence and GPS receivers on the coaches to improve system performance.

Community Transit Arterial System Area-Wide Priority (CTASAP). This is the IVHS operational test project that was earmarked by congress for Snohomish County (Community Transit). This project plans to implement the most cost effective portion of the Community Transit Arterial HOV study, which was previously completed. That means installing a bus priority system at about 100 traffic signals in Snohomish County. The North Seattle ATMS project will utilize the data and METRO will install the same signal priority system on SR 99. This will be the first large scale area-wide test of a signal priority system. Pierce Transit has jumped into the forefront of testing signal priority, and may have a different signal priority system operational in Tacoma.

APPENDIX D - JURISDICTIONS PERCEPTIONS OF ITS

Differences in Responses by Population of jurisdiction **-** To determine if there were significant differences in perceptions regarding ITS according to jurisdiction size, the responses were analyzed with jurisdictions grouped by population. Table 5 shows how jurisdictions were grouped. The populations of these jurisdictions ranged from 1,680 in Eatonville to about 2,420,700 for the Washington State Department of Transportation Northwest Region.

Table 5 - Jurisdictions Grouped According to population

Jurisdictions Grouped By Population							
<10,000		20,000 – 50,000		100,000 – 300,000		>300,000	
Eatonville	1680	Mercer Island	21,490	Bellevue	103,700	King Co.*	431,910
Orting	2960	SeaTac	23,110	Kitsap Co.*	155,120	Seattle	534,700
Medina	3085	Bothell	25,990	Tacoma	185,000	WSDOT NW Reg.	2,420,700
Fife	4475	Puyallup	28,660	Snohomish Co.*	270,769		
Arlington	5670	Lynnwood	32,420	Pierce Co.*	295,533		
Poulsbo	6070	Edmonds	35,480				
Steilacoom	6135	Redmond	40,805				
Port Orchard	6610	Kirkland	43,160				
Woodinville	9940	Renton	45,170				

*Unincorporated Areas

When jurisdictions were grouped by population, there were statistically significant differences in perceptions regarding the helpfulness of the ITS applications listed below:

- Real-time Transit Information (Actual Arrivals)
- Incident Management System
- Electronic Fare Payment
- Highway Advisory Radio
- Real-time Traveler Information System
- Variable Message Signs
- Fleet Management (AVI and/or AVL)
- Automated Transit Information (Scheduled Arrivals)
- HOV Facility Monitoring
- Traffic Signal Coordination

In general, for the systems listed the larger jurisdictions were more positive about the possible effects on their jurisdictions. Larger jurisdictions were more likely to report that these systems would be *Very Helpful* or *Somewhat Helpful* to their systems while the smaller jurisdictions were more likely to report that these systems would be *Somewhat Helpful* or have *No Impact* on their systems. Note that most of these systems are either freeway or transit-oriented, which may effect larger jurisdictions more than other systems.

Differences in Responses by Type of Jurisdiction **-** The survey respondents included cities and towns, counties, and state government. To determine if there were statistically significant differences in perceptions of ITS by jurisdiction type, the responses were analyzed by type of

Kitsap Transit Opticom Priority, Phase 2. This project will install GPS on all the ferries that operate to Kitsap County ferry terminals, and make the ferry location information available to bus riders. Initially a kiosk will be installed in the Bremerton ferry terminal passenger waiting area.

King County Metro Easy Rider Project. This project will install kiosks in two of the ferries that normally travel to the downtown Seattle ferry terminal from the Bainbridge ferry terminal. The kiosks will indicate real-time bus location information to aid people who transfer to buses in downtown Seattle. Kiosks will also be installed in the Seattle and Bainbridge ferry terminals.

Customer Security/Community Outreach Program. King County Metro is evaluating ways to increase customer security at transit facilities. This project evaluates the best locations for closed circuit television and surveillance sites and explore the location and cost of panic buttons at transit shelters.

Washington State Ferry Electronic Toll Collection. Work is underway to design and implement a new electronic toll collection system capable of accommodating the current tariff structure, as well as discounts and incentive pricing to encourage use of HOVs and alternative modes. The system will be based on Smartcard technology, integrated with an in-vehicle toll transponder to enable remote reading/writing from roadside readers. The system will also be integrated with the electronic passenger fare collection system currently under design.

Washington State Ferry Static/Variable Message Sign Project. The ITS component of this project will look at where the installation of VMS should be made. This covers the roadways approaching or departing the ferry terminals (including roads that are approaching major decision points on whether a driver should divert to another ferry terminal), within the ferry terminals, and on the ferry boats. The project will also coordinate and integrate with King County Metro's Easy Rider project. The consultant will prepare a technical memorandum that will address the following topics: Integrate WSF traveler information into the WSDOT Northwest Region Advance Traffic Management System; Interface with transit agency automatic vehicle identification and location information systems; Identify techniques for distribution of traveler information to WSF customers; Integrate Metro's Easy Rider Project-Phase 1; Integrate with WSF Automated Fare Collection project (which will include Smart Card Technology); Develop a plan to detect and identify vehicle queues at three ferry terminals; Hold two ITS workshops with representative members of various state agencies.

jurisdiction (City/Town. County, or State). When survey data was analyzed by type o jurisdiction, statistically significant differences in responses were found for only one system: the electronic fare collection system.

The two Counties that responded and the State indicated that the system was Very *Helpful*. Most towns and cities indicated that this system would have *No Impact* or would be *Somewhat Helpful*. It may be surprising that there weren't more differences in responses according to jurisdiction type, but statistical significance may not have been found because the test was not very powerful. The ability to find statistically significant differences was low since sample sizes were very small: County had 4 responses at most, and State had 1 response at most.

Differences in Responses According to Use of System Nearby **-** For each system that respondents were asked to rate, they were also asked to indicate whether, to their knowledge, a system like this was in place nearby. Table 6 summarizes jurisdictions' responses regarding whether systems were in use nearby.

Table 6 - Systems in Use Nearby

System	Nearby	Not Nearby	Don't Know
Traffic Signal Coordination	73%	5%	23%
Centralized Control	38%	29%	33%
Ramp Metering	50%	27%	23%
Variable Message Signs	55%	27%	18%
Incident Management Systems	52%	17%	30%
Highway Advisory Radio	55%	15%	30%
Fleet Management (AVUAVL)	30%	26%	43%
Transit Signal Priority	30%	35%	35%
Electronic Fare Payment	17%	30%	52%
Real-time Traveler Info. System	26%	30%	43%
Automated Transit Info. (Scheduled Arrivals)	10%	33%	57%
Real-time Transit Info. (Actual Arrivals)	4%	35%	61%
Automated Ridematching System	14%	5%	82%
Dynamic Ridematching (On-line)	9%	9%	82%
HOV Facility Monitoring	20%	20%	60%

To determine if there were statistically significant differences in responses based on respondents indication of whether the system was in use nearby, data was analyzed according to whether systems were in use. This analysis found statistically significant differences in responses for only one system: the electronic fare collection system. Jurisdictions that indicated that they "did not know" if a system like this was in use nearby usually indicated that the system would have *No Impact* on their transportation system, while those who indicated that a system was in use nearby usually indicated that the system was *Very Helpful*.

APPENDIX E - BENEFITS OF ADVANCED PUBLIC TRANSPORTATION SYSTEMS (APTS)*

Real-time Monitoring of Freeway Conditions (in-house Access to WSDOT's Freeway Cameras) - Instantaneous knowledge of a change in freeway conditions allows quicker response and use of by-pass or detour routes. These systems also enable the potential to view an incident involving a bus. The system, however, does not extend to all jurisdictions currently.

Real-time Congestion/Speed Info. on Freeways and Arterials (in-house Access) - Communications between the transit dispatcher and operators regarding delays and detours are currently effective. Real-time monitoring will improve this communication link as providing transit dispatch immediate feedback, similar to the camera system. Rerouting to avoid congestion. Better understanding of the status of the freeway network. Arterial speed information may be used to adjust departure times and traffic signal timing.

Freeway Ramp Metering will HOV Bypass Lanes (Do Your Transit Routes Make Use of These.) - The bypasses enable express buses to avoid congestion thereby enhancing service reliability and travel time. In some cases the combination of ramp-metering and HOV by-pass could have significant travel time benefits for express services since most of the delay experienced by express routes occurs at congested freeway interchanges. Competitive advantage over SOV in terms of travel time. Major reconstruction of Everett's interchanges would be needed to properly design metering and bypass systems.

Traveler Information' Accessible to the General Public
- ***Route and Schedule Information***
- ***Real-time Transit Vehicle Location***
- ***Multi-modal traffic/Transit Information***

By allowing riders to perform more comprehensive trip planning, riding the bus has become a more attractive travel option. Increased ridership as a result of increased ability to access information about transit services and reduced anxiety on the part of bus riders. Reduced uncertainty related to wait times.

Automated Trip Planning
- ***As a Tool For In-house Rider Information Staff***
- ***For the General Public's Access and Use***

Will allow both rider information staff and the general public to access regional transit travel itineraries. By customizing each trip, riders will view transit as fitting more easily into their busy schedules. Reduce training requirements in high turnover position, provide more consistent information to customers, help callers more quickly. Will improve efficiency of fleet vehicles utilization. Will empower public to coordinate several modes of transportation when planning a trip.

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* As Reported by Transit Agencies and the WSDOT Ferry System in the central Puget Sound region.

Regional Automated Ridematching

- ***In-house Central Processing***
- ***Public Access to Instant On-demand Ridematching***

Will increase the number of opportunities for people who want to share a ride to/from work. The regional software will identify new concentrations of riders. System provides best possible matches quickly and reduces time required to process matches. Public access may appeal to some who won't wait for response through mail. Will improve ridership both in-house and with the public resulting in reduced congestion in the ferry lines.

Automated Passenger Counting

- ***Sample of the Fleet***
- ***Entire Fleet***

The obvious benefit of this system is more accurate ridership counting without dedicating staff resources to manually perform counts. Ridership data would be current and updated regularly ensuring data integrity. Eliminate labor costs associated with manual counting for FTA reporting purposes.

Transit Signal Priority - We see it as an important way to enhance service reliability. Will allow bus to travel along busy arterials more quickly resulting in the reallocation of service as well as increased service reliability. This is a unique approach to travel time savings and is one way to increase service without increasing operating and maintenance costs. Increased travel speed and improved service reliability to attract more riders. Reduced travel times, eventually increased ridership.

Electronic Fare Payment (Smart Cards) - This system will promote seamless travel between transit systems. This integrated fare media will reduce confusion and expense to the rider and virtually eliminate counterfeiting of transit passes. Increase ridership by simplifying complex regional fares collection. Reduce fare media handling costs. Customer use, allows seamless travel and minimizes cash handling. Reduce administrative costs; extra convenience.

Automatic Vehicle Location/CAD

- ***For Fixed Routes***
- ***For Paratransit***

This system will increase the dispatching efficiency for our paratransit service. Fixed route AVL could result in more real-time tracking and communication with operators and real-time schedule information for transit riders. Improved ability to respond to in service operating problems. Improved safety and security for passengers with better response to emergencies. More efficient use of paratransit fleet.

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Appendix E.5

Puget Sound Regional Council
1998 Progress Report

1998 PROGRESS REPORT

1995
METROPOLITAN TRANSPORTATION PLAN

MTP

Supplemental Report

<u>Regional Intelligent Transportation Systems Strategy</u>

JUNE 1998

Puget Sound Regional Council
Nick Roach, Program Manager

Table of Contents

I. OVERVIEW

In the past, transportation problems were typically addressed through a combination of capacity improvements (additional roads, lanes, or transit service), and demand management strategies. Today, additional methods exist to help improve the transportation system. These new methods involve the use of computer chips, fiber-optic cables, and software programs. Together, these technologies can help to better manage traffic, inform travelers of transportation options, and respond quickly to accidents.'

The technological backbone to these systems is called the Intelligent Transportation Infrastructure (ITI), which is the overall system umbrella. The ITI represents the initial construction or acquisition of fully-integrated public sector ITS (Intelligent Transportation Systems) components.[2] ITS components are the particular applications of electronics, communications, or information processing used singly or in combination to improve the efficiency and safety of surface transportation systems within the ITI. For example, the I-5 freeway ramp metering system is an example of an ITS operating through the central Puget Sound region's ITI. Appendix A is a glossary of all acronyms.

Objective of the Refinement Effort

The Metropolitan Transportation Plan (MTP), adopted in 1995, addressed ITS within the Transportation Systems Management (TSM) Component. The ITS section presented some of the ITS programs and projects currently underway, near-term enhancements to the programs, and long-term directions that the Washington State Department of Transportation (WSDOT) is taking as documented in *Venture Washington*[3], the State's Strategic Plan for ITS. This refinement builds on the 1995 MTP by:

- Introducing Smart Trek, a major regional ITS project, which should advance an understanding of the ITS effects in the region;
- Updating the list of ITS projects currently underway and planned;
- Presenting the current understanding of how ITS affects the region's transportation system;
- Providing an overview of planning for ITS and how the Regional Council will begin developing a Regional ITS Strategic Plan;
- Presenting preliminary information regarding the funding and implementation of ITS;
- Identifying areas where Smart Trek may help clarify the region's understanding of the possible effects of ITS on individual travel behavior and system performance; and
- Identifying significant remaining issues that will be addressed in the 2001 MTP.

Refinement Process

The process undertaken to refine the ITS component of the MTP includes a review of literature describing ITS and its effects, and a survey of local jurisdictions and transit agencies. The survey of jurisdictions that was conducted helped to document the current use of ITS in the region and the current understanding of system effects. The transit agency survey helped to document attitudes toward the use of ITS by transit agencies in the region. In addition, for the 2001 MTP, the Puget Sound Transportation Panel (PSTP) survey will be conducted in late 1997 and again in 1998. This survey will provide more useful information regarding the possible effects of ITS.

Background of ITS

ITS and the Federal Government - To achieve national deployment of ITS technologies, the U.S. DOT launched a multi-faceted ITS Program involving research and limited field trials of promising technologies and systems.[4] The following six categories have been developed to classify ITS technologies: Advanced Traffic Management Systems (ATMS), Advanced Traveler Information Systems (ATIS), Advanced Public Transportation Systems (APTS), Advanced Rural Transportation Systems (ARTS), Commercial Vehicle Operations (CVO), and Advanced Vehicle Control Systems (AVCS).

The ITS Program is guided by the National ITS Program Plan. This plan, which was adopted in 1995, is the result of a joint effort of the U.S. DOT and ITS America.[5] Work on the plan began in June of 1993 and a final draft was produced in November 1994. The purpose of the plan is to guide the national development and deployment of ITS. The plan is primarily based upon the work of ITS America, which established goals and objectives for a national ITS program. The National Highway and Traffic Safety Administration also contributed to the plan by developing an ITS program to reduce traffic accidents, injuries, and fatalities.

The National ITS Program Plan sets the framework for:

- The promotion of shared ITS goals by integrating activities that are public, private, and cooperative in nature;
- Providing guidance for strategic decision-making for ITS investments;
- Encouraging coordination and integration of user service development activities;
- Ensuring that a focus on ITS implementation is maintained; and
- Ensuring ITS is intermodal by smoothing linkages between modes.

Over 200 individuals and organizations were involved in the preparation of the plan, which attempts to reflect the views of a broad range of players with a stake in ITS.

The U.S. DOT's short-range ITS program (4-5 years) is focused on facilitating the use of ITS solutions for systems that many jurisdictions are already beginning to deploy. ITS can improve safety, and increase the capacity and efficiency of highway, transit, and emergency response systems. The current national challenge is to ensure consistency in architecture and standards development, and to encourage integration of system components so that initial ITS applications form a foundation for the evolution of more sophisticated future systems. Near-term ITS efforts are in the areas of architecture, standards, operational tests, model deployment, technology transfer, and training efforts.

The U.S. Department of Transportation's ITS Program has received $1.3 billion to advance ITS over the last five years. The program envisioned widespread utilization of integrated multimodal ITS systems, but this vision has not yet been realized. The United States General Accounting Office (GAO) suggested several reasons for this:[6]

> "First, the national ITS architecture was not completed until July 1996, and ITS technical standards will not be completed until 2001. The ITS architecture and technical standards, which define how ITS elements will work together, are prerequisite to a large scale, integrated deployment of ITS systems. In addition, the lack of knowledge of ITS technologies and systems integration among state and local officials, insufficient data documenting the cost effectiveness of ITS in solving transportation problems, and competing priorities for limited transportation dollars will further constrain widespread ITS deployment. Before DOT can aggressively pursue widespread deployment of integrated ITS, it must help state and local officials to overcome these obstacles."

Long-term efforts will focus on support for the research, development, and testing of more sophisticated technologies that show promise over the next 10 to 20 years. Long-term projects will focus on crash avoidance technology, the next generation of traffic management techniques, and automated highway research.

The State's ITS Plan - *Venture Washington,*[7] the State's strategic ITS plan, represents the first step in the use of advanced transportation technology within the state.[8] The plan was completed in 1993 and addresses the next 20 years and beyond. While many of the actions proposed by the plan are the continuation of work already underway, other applications proposed by the plan will not be operational for many years.

Venture Washington has two dimensions. First, the plan describes five program elements embraced as part of ITS implementation in Washington. The five program elements are Public Transit/Transportation Demand Management, Traveler Information, Traffic Management, Freight and Fleet Management, and Additional Services. Of the six national ITS areas, Washington's program elements embrace five: Advanced Traffic Management Systems, Advanced Traveler Information Systems, Advanced Rural Transportation Systems, Advanced Public Transportation Systems, and Commercial Vehicle Operations. The plan does not currently recommend that Advanced Vehicle Control Systems, or the highway investments needed to support these "smart" cars, be an active part of Washington's ITS program.

Second, the plan recognizes that the State of Washington encompasses a unique blend of geographical regions and that needs differ for each region. The plan establishes five geographic categories: central Puget Sound, Spokane, Vancouver, other urban areas, and intercity/rural. The plan concentrates the use of ITS in the most highly congested urbanized areas, where the largest return on investment will be available in the near term. The plan also recognizes that in the long term, all areas of the state can benefit from ITS, so applications for small urban and rural areas are included as well.

ITS and Regional Multi-modal Deficiencies

The 1995 MTP documented the enormous increase in the demand for vehicle travel in the central Puget Sound region over the past two decades.[9] Since 1980, the total number of vehicle miles traveled in the region has grown twice as fast as employment and four times faster than population growth. The MTP estimates that the costs associated with trying to meet the escalating demand for vehicle travel over the next 20 years would require financial resources far beyond what would be available based on existing funding sources. If the region continues on its present course, by the year 2020, peak afternoon delay on arterials and freeways is forecast to increase by approximately 300 percent. Also by the year 2020, peak afternoon vehicle speeds on arterials and freeways in the region are forecast to decrease by approximately 30 percent.

To help address these problems, the policies in the MTP propose that over the next 20 years, more emphasis should be placed on transportation strategies that: (1) optimize and manage the use of transportation facilities and services, (2) influence the demand for travel by promoting transit and ridesharing, (3) shift certain trips out of peak travel periods, and (4) reduce the total number of vehicle trips. The MTP identified a number of traditional transportation demand management (TDM) strategies, such as commute trip reduction programs, telecommunication technologies, and land use changes; and also identified some transportation systems management (TSM) strategies, such as freeway ramp metering or access control on arterials, to maximize the efficiency of the current transportation system without adding significant capacity.

ITS has the potential to increase the efficiency of the transportation system by increasing vehicle throughput on arterials and freeways. Some systems may also help encourage a shift to HOV or nonmotorized modes, eliminate the need for some trips, or reduce trip length. Because ITS can help address some of the region's multi-modal transportation system deficiencies, the State of Washington and the central Puget Sound region have included some ITS-related policies in their long-range transportation plans.

ITS-Related Policies

As government agencies are becoming more aware of ITS, a number of state, regional and county policies have focused on ITS or related technologies:

State ITS Policies - In 1995, the Washington State Transportation Policy Plan (STPP) implemented several new policies regarding telecommunications and transportation. In the Telecommunications and Transportation Linkages element of the STPP, four policy areas are addressed:

1. Improved Access to Transportation Decision-Making
2. Telecommunication and Travel Substitution
3. Improved Efficiency of Traditional Transportation Services
4. Coordinated Development of Telecommunications and Transportation

To help improve efficiency of traditional transportation services (policy area three above), the state adopted the following new policy:

"Transportation agencies should implement advanced telecommunications technologies, such as intelligent vehicle highway and transit systems, to:

- Improve safety, traffic efficiency and fuel efficiency
- Provide real-time traveler information
- Improve public transit convenience
- Reduce the regulatory effect on motor carriers."

Regional ITS Policies - Regional, multicounty policies identified in the 1995 MTP that focus on transportation and technologies include the following:

> RT-8.8 Support transportation system management activities, such as ramp metering, signalization improvement, and transit priority treatments, to achieve maximum efficiency of the current system without adding major new infrastructure.
>
> RT-8.16 Support opportunities to use advanced transportation and information technologies which demonstrate support for regional growth and transportation strategies.

Counties' ITS-Related Policies - The central Puget Sound region includes Snohomish, King, Pierce, and Kitsap Counties. Although most counties do give some consideration to ITS in their transportation planning, policies at the county level for the most part do not call a great deal of attention to the role of technology in transportation. Following are the ITS-related transportation policies adopted by each of the four counties.

Snohomish County's ITS-related Policies - Policy 4.B.3 in **Snohomish County's 1995** Comprehensive Plan addresses some ITS-related elements of the transportation system:

> "State-of-the-art traffic control devices, signalization, and signing shall be used, consistent with professionally accepted geometric and structural standards, that reduce the risk of serious accidents."[10]

King County's ITS-related Policies - King County's 1994 Comprehensive Plan did not include any policies that specifically focused on the use of technologies in transportation. Policy T-525, however, does allude to the use of ITS, which can be an element in system management and congestion pricing:

> "Transportation Demand Management (TDM) strategies should be used to promote travel efficiency and energy conservation and reduce the adverse environmental impacts of the transportation system. These strategies should include commute trip reduction, demand and system management. TDM measures may include telecommuting, congestion pricing, parking management, non-motorized

travel, site design standards, public information, ridesharing, public transportation, joint use of parking facilities, and park and ride and other intermodal transfer facilities."[11]

Pierce County's ITS-related Policies - Transportation Policy 14 in Pierce County's 1994 Comprehensive Plan focuses on some ITS-related strategies:

> "Utilize the following transportation systems management measures to make the most efficient use of the existing roadway system: structural improvements (e.g., super street arterials, signalization improvements, computerized signal systems, one-way streets, ramp metering, designation of HOV lanes, reversible traffic lanes), and non-structural improvements (e.g., incident detection and monitoring systems, network surveillance and control, motorist information systems, turn prohibitions, alternative work hours)."[12]

Kitsap County's lTS-related Policies - TP-10 in Kitsap County's Comprehensive Plan focuses on some ITS-related strategies:

> "Establish and monitor signal timing, phasing, and progression to give transit and HOV travel an advantage in designated locations."[13]

These policies represent some of the first steps taken by the state, region, and counties to encourage local governments to consider implementing some ITS. One problem in carrying out these policies, however, is that there is still some uncertainty regarding the effects of a fully deployed ITI. One of the major objectives of the Smart Trek project is to more conclusively provide information to the region regarding the effects of a fully deployed ITI.

ITS and the Mobility of Freight and Goods

Major market changes in the rail, air, and trucking industries (namely, Federal deregulation of these businesses beginning in the late 1 970s) have forced these industries to become increasingly efficient and competitive. To improve efficiency and increase competitiveness, these industries have become increasingly dependent upon good communications systems, including ITS. For example, shipments are increasingly being tracked using electronics rather than paper. Air package express providers now track individual packages using satellites, and allow customers to find out where their packages are through the use of a cellular phone. Electronic clearances are being installed at national borders to improve customs' operations. Although this paper primarily focuses on ITS applications to improve personal mobility, freight mobility has a major impact on the region. Freight mobility effects the regional economy, and in some cases also effects personal mobility. Therefore, regional planning with respect to ITS should also consider

ITS strategies that may improve the mobility of freight and goods. Following are some examples of the types of ITS strategies that *could* be included in the development of a Regional ITS Strategy for the 2001 MTP Update, which could improve freight mobility within the region:

- Additional installation of real-time variable message signs (VMS) to help trucks select among routes during periods of congestion.
- Improved coordination (among Federal and State agencies) regarding cargo tracking requirements. Automatic Equipment Identification (AEI) applications may be able to handle many of these cargo tracking requirements.
- Investigate technologies that may allow safer and closer spacing of trains, such as positive train separation (PTS) technologies.
- Installation of additional Weigh-in-Motion (WIM) stations.

II. REFINEMENT OF THE ITS COMPONENT FOR LONG TERM PLANNING

The refinement of the ITS component of the MTP consists of six sections: 1) an updated inventory of the system, 2) an overview of how ITS affects the transportation system, 3) how the region can further advance ITS planning in the region, 4) an overview of funding issues related to ITS, 5) an overview of ITS implementation issues, and 6) a brief description of how Smart Trek will help in these on-going efforts.

Updated ITS Inventory

The central Puget Sound region is one of the national leaders in the testing and use of ITS. The most recent ITS project in the region, the Smart Trek Model Deployment Initiative (MDI), is an instrumental project in the region since it should provide valuable information regarding the potential effectiveness of a fully deployed ITI. Below is a description of the Smart Trek Model Deployment Initiative (MDI), and lists of other projects in the region. This list was compiled by the Washington State Transportation Center (TRAC) in April 1997. Descriptions of each of these projects are provided in Appendix B of this report.

ITS Projects in the Region

Smart Trek Model Deployment Initiative (MDI)[14] **-** Within the Seattle region, traveler information is being delivered to the public by either public transportation providers or the private sector. Unfortunately, this information is not comprehensive: some roads are not covered at all; not all information collected is being disseminated; some information is not collected in a format that makes it useful to motorists; not everyone who might use the information has access to it; and most traffic information is delivered by radio, which means that travelers must have a radio and must be tuned to the proper station at the right time. Many other delivery methods are not yet being used effectively, such as the Internet, television, signing, and the telephone. The lack of integration and coordination in the region's current multi-modal traveler information systems is a shortcoming that is being addressed in the MDI project.

Smart Trek will provide the funding (about $13.7 million) and public and private sector participation needed to expand, integrate, and coordinate the region's traveler information system so that it is more widely-used and effective. Smart Trek will integrate many of the ITS elements now in place, adding new systems as necessary to provide real time information about the status of arterials and highways, transit vehicles, and ferry traffic. Traffic and transit information will be sent to pagers, laptops and desktop computers. The current status of buses will be shown on video monitors at bus stops, kiosks and hand-held personal digital assistants. Multi-modal traveler information system will be designed so residents and visitors can determine how to link bus and ferry or other transit connections. Smart Trek will build on many of the ITS projects listed below.

Washington State Department of Transportation ITS Projects - The Washington State Department of Transportation has a key role in the following ITS projects in the region (see Appendix B for project descriptions):

- Smart Trek Model Deployment Initiative (MDI)
- IVHS Backbone Design and Demonstration
- Demonstration of ATIS/ATMS Data Fusion in a Regional IVHS
- Graphical Display of Real-Time Transit Coach Locations (BusView)
- Investigation of Video Image Tracking
- IVHS - Network and Data Fusion
- Ramp Control via Neural Network Control
- Fuzzy Logic Ramp Metering
- NEXRAD - The Next Generation Weather RADar
- Traffic Data Acquisition and Distribution (TDAD)
- North Seattle Advanced Traffic Management System (NSATMS)
- Puget Sound Help Me (PuSHMe) Operational Test
- SWIFT - Seattle Wide-area Information For Travelers
- SWIFT Smart Traveler
- SC&DI Expansion
- Washington State Ferry Electronic Toll Collection
- Washington State Ferry Static/Variable Message Sign Project

Other Agencies' Projects- Other agencies within the central Puget Sound region are also involved in ITS projects. See Appendix B for descriptions of the following projects:

- Smart Bus
- AVI (Automated Vehicle Identification) Technology
- Regional Ridematch
- Regional Automated Trip Planning
- Increasing Awareness of Transportation Options Through Riderlink
- Closed Circuit Television on Buses
- State Patrol CAD for Traffic Management
- Regional Fare Integration Project
- Community Transit Arterial System Area-Wide Priority (CT ASAP)
- Kitsap Transit Signal Priority
- City of Renton Transit Signal Priority
- EZRider Project
- Regional Vanpool Information System (King County)
- Customer Security/Community Outreach Program

Traffic Signal Control Systems Being Used Within Jurisdictions

Traffic signal control systems employ the use of communications technologies to detect traffic and adjust signal timing. Although traffic signal control systems are not always thought of as ITS, these systems are one area where ITS technologies are commonly employed. To better understand the current and planned traffic signal control systems in the region, the Regional

Council conducted a small survey of jurisdictions in the central Puget Sound region. Surveys were received from 26 jurisdictions. About 2,319,642 people live within these 26 jurisdictions[15], representing about 76 percent of the region's total population. Table 1 below identifies characteristics of the traffic signal control systems in use or planned within the region. As shown in Table 1, most jurisdictions are currently using closed loop systems, but many jurisdictions are planning on using a centralized traffic signal control system in the future. To detect traffic, most jurisdictions rely on inductive loops, but some are planning on using video image detection in the future. Most jurisdictions in the region are currently able to adjust signal timing by time of day, for special events, in response to traffic conditions, and to enable preemption for emergency vehicles. Many jurisdictions are also planning on signal timing for transit priority within 5 years.

Table 1 - Characteristics of Traffic Signal Control Systems Within the Region

	Currently In use	Planned Within 5 Years	Not Planned	N/A	Did Not Respond
1. System Architecture					
Centralized	5	7	8	3	3
Closed Loop (Distributed)	12	1	5	2	6
II. Means of Traffic Detection					
Inductive Loops	21	1	1	3	0
Radar	6	1	8	5	6
Video Image Detection	3	6	9	4	4
III. Signal Timing Plan Capabilities					
Time of Day	17	2	4	1	1

Special Events	13	1	5	3	4
Traffic Responsive	14	4	4	2	2
Signal Preemption for Emergency	22	1	1	3	0
Signal Priority for Transit	1	13	6	2	4

Advanced Public Transportation Systems (APTS) Being Used Within the Region

To better understand the current and planned Advanced Public Transportation Systems (APTS) in the region, the Regional Council surveyed transit agencies and the State Ferry system regarding their current use of ITS, planned use of ITS, and perceived benefits. Table 2 shows which systems are currently in use within the region by transit agencies, and which systems are planned for use. As shown in Table 2, most transit agencies are either using or planning on using many APTS applications (although the majority of agencies are NOT planning on using automatic passenger counting systems). Most agencies are planning on using these systems within the next five years.

Table 2 - Advanced Public Transportation Systems (APTS) in Use or Planned Within the Region

SYSTEM	Currently Using	Use Within 5 Years	Use Within 10 Years	Not Planning to Use
Real Time Monitoring of Freeway Conditions (In- House Access to WSDOT's Freeway Cameras)	1	1	1	2
Real-time Congestion/Speed Info. on Freeways and Arterials (In-House Access)	1	2	1	1
Freeway Ramp Metering with HOV Bypass Lanes (Do Your Transit Routes Make Use of These?)	2	1		2
Traveler Information Accessible to the General Public				
- Route and Schedule Information	2	2		
- Real-time Transit Vehicle Location		2	2	
- Multi-modal Traffic/Transit Information		3	1	
Automated Trip Planning				
- As a Tool For In-house Rider Information Staff		4	1	
- For the General Public's Access and Use		2	2	
Regional Automated Ridematching				
- In-House Central Processing	3	2		
- Public Access to Instant On-demand Ridematching	1	4		
Automated Passenger Counting				
- Sample of the Fleet	1	1		3
- Entire Fleet			1	4
Transit Signal Priority	1	4		1
Electronic Fare Payment (Smart Cards)		5		
Automatic Vehicle Location/CAD				
- For Fixed Routes	1	1	1	1
- For Paratransit		2		2

How ITS Affects the Region's Transportation System

To better assess what role ITS should play in the region's transportation system, a better understanding is needed of the possible effects of ITS on system performance. Ultimately the region will probably find that some ITS applications enhance the performance of the transportation system more than others.

One of the challenges in measuring effects is that the region does not yet have a fully deployed system in place, and ITS developers stress that many systems are designed to be most effective when they are fully integrated in a region. Regardless, many studies have documented what is known so far about the effects of ITS. Some of the effects are measured directly from field tests, some are estimated through surveys of travelers, and still others are estimated through models. A full analysis of the effects of ITS goes far beyond the scope of this effort, but the sections that follow offer some examples of ITS effects: 1) that have been measured, 2) that are perceived to exist by local jurisdictions, and 3) that remain somewhat uncertain. It is important to keep in mind, however, that this overview of ITS impacts is by no means comprehensive. As the Smart Trek effort is completed and evaluated over the next two years, the region should gain more insight into ITS impacts.

Measured ITS Effects

ITS demonstrations and projects in the region and across the country have measured the effects of transportation technologies on the performance of transportation systems. Following are just a few of many examples available documenting how ITS can reduce travel time and delay. Several of these examples are from ITS efforts outside of the central Puget Sound region, so the effects would not necessarily be the same in this region. The first example is a freeway ramp metering system in the central Puget Sound region. The second is a computerized signal control system in Toronto. The third is an Advanced Traveler Information System (ATIS) in Orlando. Following these three examples is an overview of possible benefits of advanced public transportation systems (APTS).

***Effect of a Freeway Ramp Metering System in the Central Puget Sound Region on Delay, Travel Time, and Accident Rates* -** As part of the FLOW project, 22 freeway ramps on I-5 were metered to enable more efficient use of the transportation corridor. An evaluation of the system in 1987 described effects to ramp operation, mainline operation, and accidents.[16] The evaluation found that delays on metered ramps averaged less than two minutes during peak periods, and that compliance to the ramp meters ranged from 83.2 to 99.2 percent for all ramps. For mainline operation, the evaluation found that ramp metering reduced travel times on a specific 6.9 mile course from south Snohomish County to Northgate: without ramp metering driving through this section took 22 minutes; after ramp metering (and despite increased volumes) it took only 11.5 minutes. The accident data analysis indicated that accident rates decreased by 39 percent after the ramp metering operation was implemented.

***Effect of a Computerized Signal Control System in Toronto on Delay and Travel Time* -** Field operational tests in other areas have also measured the effects of ITS on travel time and delay. In Toronto, for example, the SCOOT system (a computerized signal control system) was tested over a two-month period on an area that included 75 traffic signals. An evaluation compared travel times and delay using a "best effort" fixed signal timing plan versus the SCOOT system. The SCOOT system resulted in an 8 percent decrease in travel time and a 17 percent decrease in delay.[17]

***Effect of an Advanced Traveler Information System in Orlando (TravTek) on Tourists' Travel Time and Trip Planning* -** For the TravTek project, about 100 vehicles (mostly rental cars) were installed with in-vehicle navigation systems, and about 4,000 drivers (mostly tourists) participated in the trial.[18] For drivers who were unfamiliar with the city, their probability of taking a wrong turn decreased by 33 percent, their travel time (relative to using a paper map) decreased by 20 percent, and their travel time planning decreased by 80 percent.[19]

For additional descriptions of other ITS benefits measured, see Dwight Shank's paper, "ITS Benefits: Success in the Field" in ITS *Quarterly,* 1997 Spring Issue. For the most part, ITS demonstrations have been conducted within small sections of a larger transportation network. An ITI deployed across an entire transportation network could realize greater effects.

Jurisdictions' Perceptions of ITS Effects

While many ITS researchers nationwide are working to better understand ITS effects, local jurisdictions, which have day-to-day transportation problems to deal with, also have some impressions of ITS effects. To better understand local jurisdictions' perceptions regarding ITS, the Regional Council sent out a survey to local jurisdictions and asked jurisdictions to indicate how helpful or disruptive they believed different ITS applications would be to their transportation system. Surveys were received from 26 jurisdictions, which are home to about 2,319,642 people.[20] Jurisdictions that responded represent about 76 percent of the region's total population. Table 3 summarizes the survey responses.

Notice that for all systems listed, the majority of respondents (or at least 50 percent) indicated that the system would be *Somewhat* or *Very Helpful* to their jurisdiction's transportation system. Systems that jurisdictions most often indicated *Very Helpful* include traffic signal coordination (67 percent), incident management systems (43 percent), centralized control with real-time adaptive signal timing (40 percent), real-time traveler information systems (36 percent), and variable message signs (35 percent). When responses of *Very Helpful* or *Somewhat Helpful* are grouped together, the systems that jurisdictions most often tended to find either *Very* or *Somewhat Helpful* include traffic signal coordination (91.7 percent), dynamic ridematching (77.3 percent), centralized control with real-time adaptive signal timing (75.0 percent), real-time traveler information systems (72.7 percent), automated ridematching systems (72.7 percent), incident management systems (71.4 percent), and HOV facility monitoring (70.0 percent).

The survey data was also analyzed for differences in perceptions regarding ITS according to jurisdiction size, type, and whether or not systems were in use nearby. As described in Appendix C, for many freeway or transit-oriented systems, the larger jurisdictions were more positive about the possible effects on their jurisdictions. See Appendix C for other findings.

Table 3 - Jurisdictions Perceptions of Helpfulness of ITS Applications

(top number represents number of jurisdictions; bottom number represents percentage)

System	Very Helpful	Somewhat Helpful	No Impact	Somewhat Disruptive	Very Disruptive
Traffic Signal Coordination	16	6	2	0	0
	66.7%	25.0%	8.3%	0.0%	0.0%
Centralized Control With Real-time Adaptive Signal Timing	8	7	5	0	0
	40.0%	35.0%	25.0%	0.0%	0.0%
Ramp Metering	5	6	7	4	0
	22.7%	27.3%	31.8%	18.2%	0.0%
Variable Message Signs	8	7	8	0	0
	34.8%	30.4%	34.8%	0.0%	0.0%
Incident Management System	9	6	6	0	0
	42.9%	28.6%	28.6%	0.0%	0.0%
Highway Advisory Radio	5	9	7	0	0
	23.8%	42.9%	33.3%	0.0%	0.0%
Fleet Management (AVI and/or AVL)	5	7	8	0	0
	25.0%	35.0%	40.0%	0.0%	0.0%
Transit Signal Priority	1	11	5	4	0
	4.8%	52.4% 2	3.8%	19.0%	0.0%
Electronic Fare Payment	5	6	8	0	1
	25.0%	30.0%	40.0%	0.0%	5.0%
Real-time Traveler Information System	8	8	6	0	0
	36.4%	36.4%	27.3%	0.0%	0.0%
Automated Transit Information (Scheduled Arrivals)	5	7	9	0	0
	23.8%	33.3%	42.9%	0.0%	0.0%
Real-time Transit Information (Actual Arrivals)	5	8	7	0	0
	25.0%	40.0%	35.0%	0.0%	0.0%
Automated Ridematching System	5	11	6	0	0
	22.7%	50.0%	27.3%	0.0%	0.0%
Dynamic Ridematching (On-line)	4	13	5	0	0
	18.2%	59.1%	22.7%	0.0%	0.0%
HOV Facility Monitoring	5	9	6	0	0
	25.0%	45.0%	30.0%	0.0%	0.0%

Transit Agencies' Perceptions of Benefits of ITS

As part of the survey, transit agencies along with the ferry system were asked to provide their impressions of the benefits of some ITS applications relative to their agencies' needs. Appendix D includes a full list of the benefits as described by transit agencies. Transit agencies were asked to describe the benefits of the following systems: real-time monitoring of area freeways and real-time congestion and speed information on arterials and freeways; freeway ramp metering systems with HOV bypass lanes; traveler information systems accessible to the general public, which may include route and schedule information, real-time transit vehicle location, and multi-modal traffic/transit information; automated trip planning, either as a tool for in-house rider information staff or for the general public's access and use; regional automated ridematching (both in-house central processing, and public access to instant on-demand ridematching); automated passenger counting; transit signal priority; electronic fare payment (smart cards); and automatic vehicle location/computer aided dispatch (CAD). The benefits of these systems as reported by transit agencies and the ferry system are summarized below:

Real-time Monitoring of Area Freeways and Real-time Congestion and Speed Information on Arterials and Freeways - These systems could provide instantaneous knowledge that could help transit dispatchers and operators make decisions regarding possible detours to avoid congestion. Some of the feedback regarding freeway ramp metering systems with HOV bypass lanes were that they enable express buses to avoid congestion thereby enhancing service reliability and travel time since most of the delay experienced by express routes occurs at congested freeway interchanges.

Traveler Information Systems Accessible to t/'e General Public, Which May Include Route and Schedule Information, Real-time Transit Vehicle Location, and Multi-modal Traffic/transit Information - These systems allow riders to perform more comprehensive trip planning, will increase ridership, and reduce uncertainty for transit customers related to wait times.

Automated Trip Planning, Either as a Tool for In-House Rider Information Staff or for the General Public's Access and Use - Transit agencies reported that these systems can allow both rider information staff and the general public to access regional transit travel itineraries. These systems can also reduce training requirements for rider information staff, which is a high turnover position. These systems can also enable the provision of more consistent information to customers. King County notes that in the next five years, King County Metro will broaden trip planning efforts to multimodal regional trip planning that should include ferries, bus service, and commuter rail.

Regional Automated Ridematching (Both In-House Central Processing, and Public Access to Instant On-demand Ridematching) - Transit agencies indicated that these systems could increase the number of opportunities for people who want to share a ride to/from work by providing the best possible matches quickly and reducing the time required to process matches. Public access may appeal to some who would not wait for response through mail.

Automated Passenger Counting **-** This system can enable more accurate ridership counting without dedicating staff resources to manually perform counts. Ridership data would be current and updated regularly ensuring data integrity.

Transit Signal Priority **-** These systems can allow buses to travel along busy arterials more quickly resulting in the reallocation of service as well as increased service reliability. This is a unique approach to travel time savings and is one way to increase service without increasing operating and maintenance costs. Increased travel speed and improved service reliability will eventually increase ridership.

Electronic Fare Payment (Smart Cards) **-** These systems can promote seamless travel between transit systems. This integrated fare media will reduce confusion and expense to the rider and virtually eliminate counterfeiting of transit passes. It can also reduce fare media handling costs.

Automatic Vehicle Location/Computer-aided Dispatch (CAD) for Fixed Routes/Paratransit **-** These systems can increase the dispatching efficiency for paratransit service. Fixed route AVL could result in more real-time tracking and communication with operators and real-time schedule information for transit riders. This improved communication can result in improved ability to respond to in service operating problems, and improved safety and security for passengers with better response to emergencies.

National Assessment of Benefits of Advanced Public Transportation Systems (APTS)

The Volpe Center, working for the Federal Transit Administration (FTA), evaluated APTS to provide an "order of magnitude" estimate of the expected benefits to the transit industry of APTS technologies.[21] The study identified a total of 265 APTS systems in the U.S. that are currently operational, under implementation, or planned for implementation over the next 10 years. They divided the systems into four groups: transit management, traveler information, electronic fare payment, and demand-responsive computer-aided dispatching. The expected benefits of the four groups of systems are listed in Table 4.

Table 4 - Benefits to the Transit Industry of Advanced Public Transportation systems [22]

Group of APTS	Total # Systems	Primary Benefits (Per Transit Agencies)	Assumptions Regarding Effects	Total Benefit – Low & High Estimates
Transit Management	73	Increased transit safety and security, improved operating efficiency, improved transit service, and improved transit information	1 to 2 % reduction in fleet requirements, 5 to 8 % reduction in non-revenue vehicle miles	$244,725,000 to $456,206,000
Transit Information	72	Increased transit ridership and revenues, improved transit service and visibility within the region, increased customer convenience, and enhanced compliance with ADA requirements.	1 to 3 % increase in ridership	$113,335,000 to $226,669,000
Fare Payment	43	Improved security of transit revenues, customer convenience, expanded base for transit revenue, reduced fare collection/processing costs, and more equitable and flexible fare structures.	2 to 4 % savings in passenger fares	$182,220,000 to $364,439,000
Demand Responsive CAD	77	Increased efficiency in transit operations, improved transit service and customer convenience, and increased compliance with transit ADA requirements.	3 to 5 % reduction in total demand responsive transit fleet vehicle miles	$6,361,000 to $10,602,000

The first group, transit management systems, refers to a broad range of technologies that improve the planning, scheduling, and operation of transit vehicle fleets. Systems involved include communication systems, automatic vehicle location and monitoring systems, automated passenger counters, and automated software systems for transit route planning, scheduling and operations. The second group, Advanced Traveler Information Systems (ATIS), provides timely and accurate information to help travelers make decisions on modes to travel, routes, and travel times. The third group, electronic fare payment systems, include a wide-range of automated fare collection system technologies that make fare payment more convenient for the transit user. These systems also help transit agencies by improving the security and the efficiency of managing the fare revenue. The fourth and final group, demand-responsive computer-aided dispatching systems, improve the dispatching of demand-responsive transit vehicles.

Uncertainties Regarding ITS Effects

Regional policies emphasize strategies that increase the efficiency of the current system, reduce the number of vehicle trips made, encourage mode shift to high occupancy or nonmotorized modes of travel, or shift some travel out of the peak periods. Although some ITS applications have been shown to increase the efficiency of particular corridors or subregions, the effect of ITS in reducing the number of vehicle trips made and encouraging a mode shift to high occupancy or nonmotorized modes of travel, has not been clearly demonstrated.

For example, a better understanding is needed to what degree improved traveler information can encourage mode shift to non-SOV modes of travel, and/or improve the overall performance of the transportation system. Studies describing the effects of traveler information systems have been mixed. Most studies have shown some willingness by travelers to change their time of departure and/or route, but little willingness to change their mode of travel. While some studies point out that improved traveler information can effect a person's willingness to use transit, the results strongly suggest that the greatest effect will be realized when improved transit *information is* combined with improved transit *service.* At a recent symposium on Advanced Traveler Information Systems (ATIS)* participants seemed to agree that "traveler information systems do not seem to produce changes in overall traffic flow, traffic patterns, and congestion levels."[23] Instead, they felt that the key measure of success of traveler information systems would be the benefits of traveler information to individual travelers rather than improved facility performance.

Following are summaries of just a few of the studies investigating the response of travelers to traveler information. The first two studies occurred in the Puget Sound area, the third in Sacramento and San Jose, and the fourth in the San Francisco Bay Area.

***Bellevue Smart Traveler: A Traveler Information Center for Dynamic Ridesharing* -** *Bellevue Smart Traveler* designed and tested a traveler information system that would help decrease single-occupancy vehicle (SOY) travel to a downtown employment center by making alternative commuting options more attractive and accessible.[24] This project included a prototype traveler information center (TIC) in downtown Bellevue to help commuters form carpools on an on-demand basis (dynamic ridesharing). The TIC also provided traffic congestion and transit information. At the program's peak, 53 participants were registered. The study found that participants liked the idea of dynamic ridesharing, the presentation of the information, and the technology. They were willing to offer rides, and they used the TIC for other forms of information. However, for various reasons, usage statistics and follow up surveys indicated that they were either unable or unwilling to form ride matches. During the six months that the TIC was evaluated, only six ride matches were logged.[25] The study concluded that factors affecting the success of the TIC in facilitating on-demand ridematches include the limited size of the rideshare groups, which may have resulted in insufficient rideshare choices; and the fact that participants may have been uncomfortable getting into another's car.[26]

***Survey of the Responses of Puget Sound Motorists to Traffic Information* -** Nearly 10,000 motorists in the Puget Sound region were surveyed in the late 1980s to determine how they would change their behavior based on traffic information. Overall, this survey showed that commuters in the Puget Sound region were fairly flexible to changing their route or departure time, but that most were inflexible to changing their mode of transportation.

The study found that most commuters (73 percent) received traffic information of some kind at

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*The symposium was sponsored by the Institute of Transportation Engineers, ITS America, and the Association for Commuter Transportation. Source: K. Kenneth Orski, "Consensus on ATIS," *Traffic Technology International*, April/May 1997, p. 79.

least three times during the period prior to their departure, and that most often (98 percent) this information was received from commercial radio. The study identified four groups of commuters27: (1) route changers (20.6 percent), who are commuters who would be willing to change routes before or during their commute but were unwilling to change their departure time or transportation mode; (2) non-changers (23.4 percent) who indicate that they are unwilling or able to change their route, transportation mode, or departure time; (3) route and time changers (40.1 percent) who would be willing to change their route and departure time, but not their mode of transportation; and (4) pre-trip changers (15.9 percent) who would be unwilling to change their route while driving, but would be willing to change their route, departure time, or mode before leaving their residence.

Survey of the Effect of Traveler Information on Commuters' Tendency to Use Transit in Sacramento and San Jose - Another survey investigating the effect of traveler information on commuters' tendency to use transit found that about 38 percent of respondents who currently do not use transit might consider transit if the appropriate information is available.[28] These results are a compelling argument for improved transit information, but they may be somewhat misleading. First, respondents were asked how likely they would be to use transit *one day a week or more, so* any mode shift may not span across an entire week. Second, the scenario respondents were given may not have been a realistic representation of current transit service levels.

The scenario respondents were given is as follows:

> “Suppose that transit information was available to you at home by TV, radio or computer network, and you knew how many transit routes would take from your home to your usual workplace. Now suppose that the total travel time to work via transit was 'X'. How likely would you be to use transit as a commute mode at least one day per week?”

The transit travel time 'X' that respondents were given was customized based on their current travel time. A hypothetical transit travel time was generated by randomly multiplying their current commute travel time by either 0.75, 1.00, 1.25, or 1.50. This means that for half the respondents, their hypothetical transit travel time was the same as or less than their current travel time. For the rest of respondents, their transit travel time was either 1.25 or 1.50 times their current travel time.

Unfortunately, because most transit trips currently take longer than private vehicle trips (and some take much longer), it is probably not a very realistic scenario. While this study did point out that improved transit information can effect a person's willingness to use transit, the results also probably suggest that the greatest effect will be realized when improved transit *information* is combined with improved transit *service.*

Survey on Traveler Response to Traffic Information in the San Francisco Bay Area - In another survey on traveler response to traffic information, 48.3 percent of commuters indicated that they change their travel behavior based on traffic information.[29]Most of the travelers who indicated that they change their behavior take an alternate route; some of these also changed their time of departure. Interestingly, about 10.5 percent indicated that they canceled the trip altogether (note that the sample included both those who commute to work and those who don't - so those who canceled the trip were probably not commuting to work). However, only 15 respondents (1.7 percent) indicated that, based on pre-trip traffic information, they changed their mode of travel.[30] What is somewhat alarming is that of these 15 respondents who changed mode, 9 of these were transit riders who changed to personal vehicle and drove alone.[31]

Developing a Regional ITS Strategic Plan For the 2001 MTP

The use of new technologies in transportation is bringing about rapid change in how some jurisdictions manage their transportation systems. Currently, local governments do not typically include ITS planning in their long-range strategic plans, and may not necessarily know where to begin. Although developing an ITS Strategic Plan is not a requirement of the planning process, there are a number of good reasons to develop one. Strategic ITS planning can help governments to take advantage of the changes brought about through the application of technologies in transportation.[32] According to the Federal Highway Administration (FHWA), developing an ITS Strategic Plan can help to:

- Maximize the use of existing transportation facilities and assets;
- Determine the feasibility of an Intelligent Transportation Infrastructure (ITI);
- See how the ITI, which cuts across modes of transportation, geographic areas, and institutions, can help unite these elements for the benefit of all;
- Prioritize the most important elements of an ITI, matching these to the needs of a region. Without such a plan, ITI activities will be uncoordinated and unstructured; paying little attention to overall planning goals and using funds ineffectively.
- Communicate more effectively. The strategic plan is an on-going communication tool, as well as a reference point that coordinates implementation of the ITI, and keeps it on track.[33]

To help and encourage local governments to develop ITS strategic plans, the U.S. Department of Transportation (USDOT) published *Integrating ITS within the Transportation Planning Process: An Interim Handbook*, and Public Technology, Inc., received funding from the USDOT to publish *Smart Moves - A Decision-Maker's Guide to the Intelligent Transportation Infrastructure.* The Regional Council will be developing a regional ITS Strategic Plan, and will take many of their guidelines into consideration.

The region's long-range transportation plan, the Metropolitan Transportation Plan (MTP), is not prepared at a level of detail needed to appropriately analyze operations and maintenance requirements of ITS, and institutional responsibilities for ITS. Because a more focused effort is needed to work out the details of an ITS strategy, the development of a Regional ITS Strategic Plan can more appropriately address regional ITS issues. The Strategic Plan will form the basis for the ITS component of the 2001 MTP. If warranted, the study could also influence the Transportation Improvement Program (TIP) process.

Developing a Regional ITS Strategic Plan can benefit the region by bringing together stakeholders to focus on ITS; enabling the region to define which ITS applications are most appropriate to address particular problems; helping maximize the use of existing transportation facilities and assets; helping unite systems so that all receive the maximum benefits; enabling the region to prioritize the most important elements of the ITI; and providing an on-going communication tool that coordinates implementation of the ITI and ITS and keeps it on track.[34]

The Regional ITS Strategic Plan will benefit from the findings from the Smart Trek project, including results from the Puget Sound Transportation Panel (PSTP) survey, which in 1997 and 1998 will focus on ITS. The Strategic Plan may also include some or all of the following:

- An overview of regional effects of ITS on system performance and on system users (including Smart Trek findings);
- An assessment of the role of the public sector and private sector in the development and operation of systems beyond Smart Trek;
- An overview of institutional/policy issues emerging from Smart Trek;
- An overview of environmental review issues;
- An action strategy for funding, phasing, managing, and operating the systems that may be implemented beyond Smart Trek;
- The identification of specific priority systems, corridors, subareas, transit routes, etc., for implementation;
- Overview of the possible costs of maintaining and operating various ITS elements;
- Overview and update of the regional ITS architecture and regional ITS standards developed and tested as part of Smart Trek;
- Overview of how ITS costs and benefits are considered in the Transportation Improvement Program (TIP) process;
- Overview of how ITS may be included in Major Investment Studies (MISs) in the screening of alternatives and in selection of preferred investment strategies.

Two of the areas that will be expanded in the Regional ITS Strategic Plan include an analysis of funding and implementation issues. Some initial considerations regarding ITS funding and implementation are presented in the two sections that follow.

Funding ITS And The ITI

Overview of ITS/ITI Funding Outlook - As part of the Smart Trek proposal to the Federal Highway Administration and Federal Transit Administration, the Smart Trek team identified anticipated non-federal ITS funding to maintain and operate the Smart Trek system in the region over the next five years.[35] The anticipated total private sector funding from federal fiscal years 1998 through 2002 is about $9,200,000. The anticipated total public sector funding (WSDOT, transit agencies, and cities) over the same period is approximately $50,000,000. The source of these public sector funds would most likely be the revenues that transit agencies, cities, and the WSDOT currently receive (from a variety of sources, including transit and ferry fares; sales, fuel, and property taxes; and the Motor Vehicle Excise Tax). Over the longer-term, additional funding will be required. For example, the region will require additional funding to continue operating and maintaining the systems in place.

Another funding need relates to personnel training required to use and maintain systems. Many of the ITS applications in place or planned for the region rely on relatively new technologies, which require new skills and personnel to operate and manage them.

In addition, funding for ITS is available from the federal government through the reauthorization of the Intermodal Surface Transportation Efficiency Act (ISTEA). The new bill, called the Transportation Equity Act for the 21st Century (TEA21), provides a total amount of $1.28 billion for the ITS program from 1998-2003. The funding is divided into two categories: 1) ITS standards, research, and operational tests funded at $95 million to $110 million annually; and 2) ITS deployment funded at $101 million to $ 122 million a year. The deployment funding is further categorized by money for metropolitan or rural deployment as well as funding for CVO deployment. Local governments may be able to apply for many of these federal funds. TEA21 requires that ITS projects that utilize federal funds* conform to the National ITS Architecture and standards for ITS or provisional standards. Exceptions to this requirement may include some conditions for research programs and ITS legacy systems to be determined by the U.S. Department of Transportation.[36] The bill also establishes a pilot program for State Infrastructure Banks (SIB).[37] At the present time, Washington State is not part of this pilot program, but it is possible SIBs may be extended to all states. Using SIBs, local governments can "borrow" money to help pay for construction of the ITI and other projects.

Another possibility that local jurisdictions may consider is the use of some valuable rights-of-way that local telecommunications companies may have an interest. Some jurisdictions are negotiating with telecommunications companies to exchange access to publicly owned rights-of-way for the communications capacity needed for their ITI. A second approach that other jurisdictions have taken is to raise revenue for projects by leasing rights-of-way to private-sector vendors. These are examples of approaches that can help supply the resources needed to implement an ITI.[38]

Finally, in the long term, public agencies may need to consider new options for managing and financing their transportation systems to better manage demand for use of the system with supply. For example, road users may be charged for using some facilities during the most congested periods of the day. The ITI can help facilitate this since the ITI may enable an electronic toll collection system to charge vehicles without requiring them to stop or slow down. With the 2001 MTP, the region will have a better understanding of funding options and obstacles.

* For specific details on the different types of federal funds available, which federal funds local governments may be able to apply for, and guidance regarding the application process, contact your MPO or your regional FHWA or FTA office. The Puget Sound Regional Council is the MPO for Snohomish, King, Pierce, and Kitsap counties, and PSRC's phone number is (206) 464-7090. The phone number for the Regional FHWA in Olympia is (360) 753-9480, and the phone number for the regional FTA office in Seattle is (206) 220-7954.

Transit Agencies' Perspectives of Funding Issues and Constraints

As part of the survey administered to transit agencies, they were asked to describe ITS funding constraints. Comments relating to ITS funding include the following:

> *"Because ITS generally requires a multi jurisdictional or regional approach, Financing can suffer from limited coordination. Further, ISTEA flex funds and state resources are being called upon to respond to so many other urgent needs that ITS projects must compete within a relatively small arena. A dedicated source of ITS funding is needed. "*
>
> *"Competition for scarce resources, and an inability to meet other more critical needs for service and equipment. "*
>
> *"Given state legislature commitment to ITS is very constrained. "*
>
> *"The biggest issues remaining regarding ITS are the costs and benefits received for the investment. In some cases, implementing A VL and Smart Card are not an inexpensive endeavor. What are we gaining by this investment? "*
>
> *"Priority for public transportation systems is preservation of capital. Though capital costs are involved, all ITS related needs are operational. There is little federal operational support. "*

Implementing the ITI

Two of the important aspects of implementing ITS are selecting and purchasing equipment, and developing partnerships with the private sector to help ensure that the ITI will continue to be built and maintained after federal funding subsides.

Equipment

Many local governments already have some ITS components in place, so they will not have to build their ITI from scratch. For example, some local governments are already using traffic signal control systems or transit management systems. Nearly all local governments have phone lines, computers, fiber-optic lines, or computer networks that can be used in the ITI. By using some of the existing technologies, the overall cost of building an ITI may be reduced.

A System Architecture to Guide Development of the System - In the context of ITS, an "architecture" describes what a system does and how it does it, providing the general framework within which the various system components are deployed.[39] The national ITS architecture was completed in July 1996.[40] Over the last several years, and as part of the Smart Trek project, ITS developers in the central Puget Sound region have been working to develop an ITS architecture to guide the development of the system.[41] Smart Trek team members are also developing technical standards that they will be able to test during Smart Trek deployment. The goal is to define an architecture which meets the functional requirements of the proposed system and can provide for inevitable change, evolution and growth. The Regional ITS Strategic Plan will include an overview and update of the region's ITS architecture and technical standards that have been developed.

***Selecting Equipment* -** The ITI is rooted in information technology, and it is designed to be most effective when all the systems in the ITI can share information. This requires that computer and telecommunications technologies be based on industry standards. Certain technology standards have gained industrywide acceptance, allowing the creation of open systems. Open systems are ones in which all of the connections among the different software programs, networks, and computers in a system are standardized so that they can all share information.[42] Client/server systems are open systems that enable data to be shared among different systems and allow the more efficient use of each computer. The Internet is another example of an open system, and many jurisdictions are reworking GISs to run on the Internet. It is also important that multi-jurisdiction regions coordinate the standards used so that systems across jurisdictions will be able to share information. At the national level, the U.S. DOT is in the process developing ITS technical standards. Although some standards are already in place, the national development of technical standards will not be completed until 2001.[43] The ITS architecture and technical standards, which define how ITS elements will work together, are prerequisite to a large scale, integrated deployment of ITS.

***Purchasing Equipment* -** Purchasing computer systems is usually more complicated than purchasing equipment to maintain a road. The cost and performance of computer systems are changing rapidly and government procurement processes are often less flexible than private sector procurement processes. In addition, some government procurement processes focus on the lowest bid, which may end up costing more in the long run since the system with the lowest bid might require frequent repairs or maintenance. Local governments might consider instead turning to "best-value" bids, where values are weighed according to a product life cycle, vendor reliability, and how a proposed system satisfies the agency's mission.[44]

Partnerships

Although the federal government is currently funding much of the development of the ITI, the Federal Highway Administration estimates that over the long run, as much as 80 percent of ITI investments are expected to come from non-federal sources. It is anticipated that in the future the private sector will supply many of the products and services needed to build and maintain the ITI. Therefore, local governments will need to develop more partnerships with the private sector.

Why would the private sector want to invest in the ITI? Commercial trucking or shipping companies may be interested in ITI partnerships since they can increase their productivity by using systems in the ITI to monitor and track their fleets. In some states, commercial trucking companies have already formed partnerships with state and local governments to implement ITS. Some other private firms are interested in partnerships with the public sector to develop the ITI because they hope to be able to resell the results of their partnership to other public and private sector customers. Some businesses, for example, are developing partnerships with the public sector so that they can collect and distribute information to the traveling public regarding current traffic conditions, alternate routes, or the location of shops, restaurants, or major attractions.

Transit Agencies' Perspectives of Implementation Constraints to ITS Deployment

As part of the survey administered to transit agencies, they were asked to describe ITS implementation constraints. Comments regarding issues effecting ITS implementation include:

> *"Too many promises, too few deliveries."*
>
> *"It is critical that individual agencies understand their ITS needs and objectives prior to selecting technologies or applications as solutions. Many solutions are in developmental stages and not widely used. Transit agencies have limited resources to experiment with leading edge or unproven technologies. If transit agencies are going to use ITS applications to increase ridership or improve efficiency, the system must be proven reliable and cost beneficial. Interagency or regional coordination of ITS applications will certainly be an additional constraint during implementation. "*
>
> *"Interjurisdictional cooperation, lack of standards."*
>
> *"Funding and infrastructure. "*
>
> *"Wish list too big, promises too bold, customer perception and acceptance has not been developed."*

Smart Trek Will Help the Region Better Understand Effects

While some ITS demonstrations have quantified the effects of ITS on travel time and delay, the findings from traveler information studies have generally indicated some willingness on the part of travelers to change their route or time of departure, or to cancel their trip altogether, but relatively little willingness to change their mode of transportation. Smart Trek should help the region better understand the effects of ITS, such as whether travelers are willing to change their mode of transportation if they are provided with easy, convenient access to a fully integrated traveler information system that includes real-time transit and traffic information. In addition, the three other major MDI projects occurring outside of this region (in San Antonio, Phoenix, and the New York/New Jersey metropolitan areas) will also help the region understand the possible effects of ITS on individual travel behavior and overall system performance. However, because the region can not wait for all the answers to begin strategic planning for ITS, the Regional Council is beginning to expand on its ITS planning for the region.

III. SIGNIFICANT ISSUES REMAINING

This report has described some of the issues surrounding ITS and the ITI in the central Puget Sound region that have come about in the three years since the MTP was adopted in 1995. This refinement adds to the 1995 MTP by updating the list of ITS projects underway in the region; providing a broad overview of the effects of ITS; and overviewing key planning, funding, and implementation issues for ITS. The Smart Trek project should further the region's understanding of the effects of ITS, and the institutional and technical hurdles yet to be overcome.

There are a number of significant issues that need to be addressed in the near-term and incorporated into the Region's Metropolitan Transportation Plan (MTP) in the year 2001. As part of efforts to develop the 2001 MTP, a Regional ITS Strategic Plan will be developed. This plan will include a more comprehensive analysis of ITS planning, funding, and implementation issues for the region over the next 20 years. As part of the development of a Regional ITS Strategy, stakeholders in the region will be brought together to answer the following questions:

- From a regional perspective, what are the effects of ITS on the performance of the transportation system and on its users? How can the region use this understanding of effects to prioritize ITS investments beyond Smart Trek as part of a Regional ITS Strategy?
- VISION 2020 and the Region's long-range transportation plan (the MTP) provide a long-range "vision" for the region. How can ITS help the region realize this vision?
- What are the appropriate roles of the public sector and private sector in the development and operation of systems?
- How can a Regional ITS Strategy help ensure that, where warranted, systems and technologies conform to the National ITS Architecture and ITS Technical Standards, and to Regional ITS Technical Standard developed and tested as part of Smart Trek?
- In addition to the standards being developed and tested as part of Smart Trek, are there other systems that warrant regional technology standards or agreements?
- What are the institutional barriers (e.g., specific Interjurisdictional coordination issues, specific policy issues, etc.) to ITS implementation, and how can a Regional ITS Strategy help to overcome them?
- Beyond Smart Trek, how can the region finance the implementation, operation, and maintenance of systems?

As stakeholders work together to answer these questions, and in doing so begin developing a Regional ITS Strategy, the region can more comprehensively analyze ITS planning, funding, and implementation issues for the region over the next 20 years. The Regional ITS Strategy will provide the background for the ITS component of the 2001 MTP.

The Regional ITS Strategy may provide an overview of regional effects of ITS on system performance and on system users; an assessment of the roles of the public and private sectors with respect to ITS deployment and operations; an overview of remaining institutional/policy issues effecting implementation and operations; an action strategy for funding, phasing, managing, and operating the systems that may be implemented beyond Smart Trek; the identification of specific priority systems, corridors, subareas, or transit routes beyond Smart

Trek; an overview and update of the regional ITS arc7hitecture and regional ITS standards developed and tested as part of Smart Trek; and an overview of how ITS costs and benefits are considered in transportation funding processes.

APPENDIX A - Glossary

ADA - Americans with Disabilities Act.

FHWA (Federal Highway Administration) - The organization in the United States Department of Transportation that has primary responsibility for the USDOT's ITS program.

ITI (Intelligent Transportation Infrastructure) - The technological infrastructure (including computer chips, fiber-optic cables, and software programs) that is the overall system umbrella. The ITI represents the initial construction or acquisition of fully integrated public sector ITS components.

ITS (Intelligent Transportation Systems) - The particular applications of electronics, communications, or information processing used singly or in combination to improve the efficiency and safety of surface transportation systems within the ITI. ITS examples include systems used to meter freeway ramps, disseminate real-time information about traffic conditions, or provide priority to transit vehicles at traffic signals.

IVHS (Intelligent Vehicle Highway Systems) - The previous term for ITS.

MDI (Model Deployment Initiative) - A program being run by the FHWA, which has awarded projects to four regions across the country to demonstrate the effectiveness of an integrated ITI. The four regions selected are Seattle (the Smart Trek project), Phoenix, San Antonio, and the New York/New Jersey metropolitan area.

MPO (Metropolitan Planning Organization) - A regional association of local governments and state agencies that serves as a forum for developing policies and making decisions about regional growth and transportation issues.

MTP (Metropolitan Transportation Plan) - The long-range transportation plan for the central Puget Sound region prepared by the Puget Sound Regional Council, the MPO for the region.

National ITS Architecture - A master blueprint for building an integrated, multimodal, intelligent transportation system. The Architecture developed by the U.S. Department of Transportation, provides a framework that defines the key elements required for ITS functions and the data that must be exchanged between subsystems.

PSRC (Puget Sound Regional Council) - The Metropolitan Planning Organization for the central Puget Sound region.

Regional Council - Another term used for the Puget Sound Regional Council.

SIB (State Infrastructure Bank) - A system that allows local governments to "borrow" money to help pay for construction of the ITI and other projects. Multi-jurisdictions can use up to 10 percent of their highway funds and 10 percent of their transit funds to create a SIB that provides loans for projects.

Smart Trek - The name of the Seattle-area ITS deployment project, one of four projects selected nationwide for participation in the FHWA's Model Deployment Initiative (MDI).

STPP (Surface Transportation Policy Plan) - The State of Washington's transportation policy plan.

TDM (Transportation Demand Management) - Strategies that help to shift travel demand to non-SOV modes of travel or to off-peak periods of travel.

TIC (Traveler Information Center) - A system that enables travelers to receive traveler information (may include traffic, transit, and ridematching information).

TSM (Transportation Systems Management) - Strategies to maximize the efficiency of the current transportation system without adding significant capacity (e.g., freeway ramp metering, access control on arterials, etc.).

APPENDIX B - Descriptions of Current ITS Projects in the Region

The following is a list of ITS projects that are currently in place in the Puget Sound Region. The projects are listed under two groups: 1) Washington State Department of Transportation projects and 2) Other Agency Projects. This list and the project descriptions were compiled by the Washington State Transportation Center (TRAC) in April, 1997.

Washington State Department of Transportation ITS Projects

Smart Trek Model Deployment Initiative (MDI). Within the Seattle region traveler information is being delivered to the public by either public transportation providers or the private sector. Unfortunately, this information is not comprehensive: some roads are not covered at all; not all information collected is being disseminated; some information is not collected in a format that makes it useful to motorists; not everyone who might use the information has access to it; and most traffic information is delivered by radio, which means that travelers must have a radio and must be tuned to the proper station at the right time. Many other delivery methods are not yet being used effectively, such as the Internet, television, signing, and the telephone. The lack of integration and coordination in the region's current multi-modal traveler information systems are shortcomings being addressed in the MDI project.

Smart Trek will provide the funding (about $13.7 million) and public and private sector participation needed to expand, integrate, and coordinate the region's traveler information system so that it is a more widely-used and effective system. Smart Trek will integrate many of the ITS elements now in place, adding new systems as necessary to provide real time information about the status of arterials and highways, transit vehicles, and ferry traffic. Traffic and transit information will be sent to pagers, laptops and desktop computers. The specific locations of buses will be shown on video monitors at bus stops, kiosks and hand-held personal digital assistants. Multi-modal traveler information system will be designed so visitors can make intelligent choices about how to link bus and ferry or other transit connections with ease and confidence. Smart Trek will build on many of the ITS projects listed below.

IVHS Backbone Design and Demonstration. This project will (1) design a demonstration architecture for a regional IVHS backbone for the Puget Sound area and (2) construct this backbone in order to demonstrate how different types of data gathered from distinct agencies can be integrated in a single application. The backbone will be designed to (a) improve interagency and multijurisdictional sharing of data without disrupting existing operations, (b) support existing investment in IVHS technology and system development, (c) encourage expansion and innovation, and (d) be compatible with federal efforts to develop a national IVHS architecture. The backbone will support traffic data from a multitude of sources while making data accessible in a clearly defined manner on a geographically distributed network. This all will be done in an open systems model that supports a distributed computing environment, is extensible to larger areas, and easily allows new agencies to participate.

Demonstration of ATIS/ATMS Data Fusion in a Regional IVHS. This project proposes to design, construct, and demonstrate a data fusion system for use in a regional IVHS system. The fusion system will combine data for multi-agency and multijurisdictional sources to provide a more accurate, real-time picture of the transportation system. This fusion system will operate in a distributed computing environment that encourages interagency cooperation.

Graphical Display of Real-Time Transit Coach Locations (BusView). The project involved designing and demonstrating a system that graphically displays real-time transit coach locations to the University of Washington campus community. The system will use Seattle Metro's existing automatic vehicle location system as its information source. Lessons learned in this project are being applied to the BusView component of SmartTrek.

Investigation of Video Image Tracking. First generation video imaging systems provide "trip-wire" type detection, that is they mimic the performance of inductance loops. The newer video imaging tracking system not only gathers loop type data but "fingerprints" vehicles to provide tracking capabilities. Vehicle tracking provides travel time and origin destination information which has been historically difficult to obtain. The proposed video imaging system for this project is the MOBILIZER, which is provided by Condition Monitoring Systems (CMS) and is in the prototype stages of development. This project will test collected data for reliability and range of usefulness, compare cost effectiveness and total life-cycle cost of the CMS system to that of traditional loop detector systems, and if cost effective, incorporate the system in the WSDOT Traffic Systems Management Center.

IVHS - Network and Data Fusion. This Federally funded project will progress from specific regional issues investigated in other related projects and generalize by creating key network and fusion components that are transferable to other regions and countries. The project will (1) investigate, design, and document an encoding scheme, including ways to include temporal information with spatial information, for standardization of traffic and traveler information, (2) use this encoding scheme to demonstrate a layer between application and transport layers, and (3) work with another related IVHS research center to use the encoding scheme in a demonstration of its use in inter-regional IVHS communication.

Ramp Control via Neural Network Control. This project will develop and test a new ramp metering algorithm by using an artificial neural network congestion predictor and a multi-variable control system.

Fuzzy Logic Ramp Metering. This project will move toward developing the neural network forecasting and fuzzy logic control system including in depth testing using models and on the existing SC&DI system. The developed systems will be placed in the TSMC control system and real world tested.

NEXRAD - The NEXt Generation Weather RADar. This project is investigating potential applications for the new Doppler weather radar in transportation. The potential uses of accurate short term weather predictions include better maintenance scheduling and transit operation improvements from early snow warnings, wind warnings for ferries, and for research into the traffic effects of inclement weather.

Traffic Data Acquisition and Distribution (TDAD). The TDAD project will provide a prototype system that will access available traffic databases and store information in a separate database for historical, research, and planning purposes. Agencies will then be able to request from the system specific records, and obtain these in formats meaningful and useful to them. The initial system will be demonstrated in the Puget Sound area, together with linkages to state level databases and applications. This project is coordinated with the North Seattle ATMS. This project supports regional Congestion Management Plans.

North Seattle Advanced Traffic Management System (NSA TMS). The primary objective of this project is to design and build an ATMS that enables the exchange of transportation information among the different transportation agencies in the I-5 corridor from Seattle to Marysville. This coverage includes nine cities, two counties, three transit agencies, and WSDOT. This project will be expandable to the east and south to include the entire Seattle Metropolitan area. The NSATMS will exchange information among traffic signals, CCTV, VMS, Detector Stations, and ramp meters. The data will be collected by a separate micro-computer through communications links with the central traffic control systems belonging to each jurisdictions. The micro-computer will compile volume, occupancy, and other operations data and transmit it back out to participating agencies. The agencies can then make changes to their control routines based on this new information.

Puget Sound Help Me (PuSHMe) Operational Test. This project is testing two different mayday systems in the Puget Sound Area. These systems allow travelers in need of assistance or emergency service to send a signal that includes their location and type of service needed directly to a response center who will then make the appropriate dispatch (i.e. tow truck, assistance van, WSP, etc.)

SWIFT- Seattle Wide-area Information For Travelers. This is an IVHS Operational test of an FM sideband data system which is being used to deliver traffic and transit information. Data is being extracted from WSDOT's freeway ramp control computer, Metro Transit's vehicle location system, and augmented with information from Metro Traffic Control. The information is being formatted and sent to Seiko Telecommunication System for transmission to devices. The devices include a watch (or pager) based on Seiko's Message Watch, Delco Electronics' Telepath car radio that includes a GPS to give distance and bearing to a destination, and a palm top computer supplied by IBM which is providing bus locations and graphic displays of traffic conditions. Etak is supplying geo-coding, mapping, and data entry interfaces. An evaluation is on-going. The operational test was scheduled to end September 20, 1997.

SWIFT Smart Traveler. This project is a companion to the SWIFT project and will allow ad hoc ridesharing amongst UW employees. The large employer base combined with the availability of desktop computers and the campus network should allow for greater number of ride matches than found in previous projects.

SC&DI Expansion. Washington State Department of Transportation's Northwest Region is in the process of expanding into new areas -- including proposed projects in Bellingham and Mount Vernon. Statewide Incident Management Operational Guidelines, which is currently underway, is addressing the need for consistency in some of the operational aspects of the state's incident management programs. Currently, four of the state's six regions have incident response teams: Northwest, Olympic, Southwest, and Eastern Regions. The project will make specific recommendations for the statewide standardization of program procedures, services, duties and operational guidelines.

Other Agencies' Projects

Smart Bus. King County Metro is beginning the implementation of a smart bus strategy that will integrate electronic information systems on-board buses. The current order for 360 buses includes J-1708 wiring which will provide the backbone of the "vehicle area network". J-1708 is an SAE standard developed and adopted by ITS America. A contractor has been hired to integrate the automatic passenger counting systems and automatic vehicle location systems on board the 10 percent of the current fleet that have APC systems installed.

AVI (Automated Vehicle Identification) Technology. King County Metro Transit is implementing AVI technology. This technology will support transit signal priority operation at 27 busy intersections and will collect arterial speed data as the buses serve the region.

Regional Ridematch. King County Metro is participating with Snohomish County Community Transit and Pierce Transit in the development of regional ridematching software. The system will allow ridematch staff at any of the three agencies to enter ridematch requests into a regional database. This system will replace an existing regional ridematch system that limits the ability of agencies to offer GIS based matches, match maps for customers, and on-line ridematching. This project will also provide a toll-free telephone number for anyone in King, Snohomish, and Pierce counties to use for ridematch assistance.

Regional Automated Trip Planning. King County Metro is participating with Community Transit and Pierce Transit in the development of a regional transit trip planning system. The system will allow any information operator at any of the three agencies to enter origins and destinations within the region. The system will automatically produce a trip itinerary including travel times, fares, and transfers. Current effort is focused on developing geographic information system (GIS) hardware and software capability in Pierce and Snohomish counties. King County has completed its GIS work for regional trip planning. Regional Ridematch has implemented the toll-free telephone number and further development of the database will include additional Counties, such as Kitsap, Island, Mason, Skagit, Thurston, and Whatcom.

Riderlink. This on-line information resource is available on the Internet via the World Wide Web. Using personal computers, Puget Sound residents can view Metro bus route, time tables, and maps, as well as information about vanpool and ridematch services, ferry schedules, road construction and freeway congestion. Riderlink was developed by King County Metro with active participation of a nonprofit association of eight area companies, including Microsoft, Nintendo, Applied Microsystems, Safeco Insurance, Eddie Bauer, and others, all dedicated to reducing traffic congestion.

Closed Circuit Television on Buses. King County Metro is evaluating the effectiveness of CCTV on increasing security and reducing crime on Metro buses. CCTV would be installed on three types of Metro coaches. They want to evaluate this technology because CCTV's may prove helpful in reducing crime by providing an evidence record in the event of criminal activity and assisting in the prosecution of crime perpetrators.

State Patrol CAD for Traffic Management. Washington State Department of Transportation's Northwest Region is working with the Washington State Patrol to more fully utilize their CAD system for traffic management.

Regional Fare Integration Project. King County Metro is participating with Community Transit, Pierce Transit, Everett Transit, Kitsap Transit, Washington State Ferries, the RTA, PSRC, and the Cascadia Project to provide seamless regional fare media that makes it easier to make inter-county trips within the Puget Sound region. The project team is currently evaluating several technologies including smart cards and magnetically encoded cards. A demonstration of the selected technology will be performed after the conclusion of the analysis phase.

Kitsap Transit, Signal Priority. Kitsap transit has installed Opticom based signal priority systems at 42 intersections. They are working to develop additional intelligence and GPS receivers on the coaches to improve system performance.

City of Renton Transit Signal Priority. This project will design, purchase, and install Intelligent Transportation Management System (ITMS) hardware and software, including a central ITMS, signal controller upgrades, AVI, and enhanced communications and signal coordination programming systems.

Community Transit Arterial System Area-Wide Priority (CT ASAP). This is the IVHS operational test project that was earmarked by congress for Snohomish County (Community Transit). This project plans to implement the most cost effective portion of the Community Transit Arterial HOV study, which was previously completed. That means installing a bus priority system at about 100 traffic signals in Snohomish County. The North Seattle ATMS project will utilize the data and METRO will install the same signal priority system on SR 99. This will be the first large scale area-wide test of a signal priority system. Pierce Transit has jumped into the forefront of testing signal priority, and may have a different signal priority system operational in Tacoma.

Kitsap Transit Opticom Priority, Phase 2. This project will install GPS on all the ferries that operate to Kitsap County ferry terminals, and make the ferry location information available to bus riders. Initially a kiosk will be installed in the Bremerton ferry terminal passenger waiting area.

EZRider. This project will install kiosks in two of the ferries that normally travel to the downtown Seattle ferry terminal from the Bainbridge ferry terminal. Kiosks will also be installed in the Seattle and Bainbridge ferry terminals, and five kiosks will be installed at Boeing's Everett Plant. The kiosks will indicate real-time bus location information to aid people who transfer to buses in downtown Seattle. Expansion of Riderlink will include information about Kitsap Transit, Pierce Transit, and Community Transit buses.

Customer Security/Community Outreach Program. King County Metro is evaluating ways to increase customer security at transit facilities. This project evaluates the best locations for closed circuit television and surveillance sites and explore the location and cost of panic buttons at transit shelters.

Washington State Ferry Electronic Toll Collection. Work is underway to design and implement a new electronic toll collection system capable of accommodating the current tariff structure, as well as discounts and incentive pricing to encourage use of HOVs and alternative modes. The system will be based on Smartcard technology, integrated with an in-vehicle toll transponder to enable remote reading/writing from roadside readers. The system will also be integrated with the electronic passenger fare collection system currently under design.

Washington State Ferry Static/Variable Message Sign Project. The ITS component of this project will look at where the installation of VMS should be made. This covers the roadways approaching or departing the ferry terminals (including roads that are approaching major decision points on whether a driver should divert to another ferry terminal), within the ferry terminals, and on the ferry boats. The project will also coordinate and integrate with King County Metro's Easy Rider project. The consultant will prepare a technical memorandum that will address the following topics: Integrate WSF traveler information into the WSDOT Northwest Region Advance Traffic Management System; Interface with transit agency automatic vehicle identification and location information systems; Identify techniques for distribution of traveler information to WSF customers; Integrate Metro's Easy Rider Project-Phase 1; Integrate with WSF Automated Fare Collection project (which will include Smart Card Technology); Develop a plan to detect and identify vehicle queues at three ferry terminals; Hold two ITS workshops with representative members of various state agencies.

APPENDIX C - Jurisdictions Perceptions of ITS

Differences in Responses by Population of Jurisdiction **-** To determine if there were significant differences in perceptions regarding ITS according to jurisdiction size, the responses were analyzed with jurisdictions grouped by population. Table 5 shows how jurisdictions were grouped. The populations of these jurisdictions ranged from 1,680 in Eatonville to about 2,420,700 for the Washington State Department of Transportation Northwest Region.

Table 5 - Jurisdictions Grouped According to population

Jurisdictions Grouped By Population							
<10,000		20,000 – 50,000		100,000 – 300,000		>300,000	
Eatonville	1680	Mercer Island	21,490	Bellevue	103,700	King Co.*	431,910
Orting	2960	SeaTac	23,110	Kitsap Co.*	155,120	Seattle	534,700
Medina	3085	Bothell	25,990	Tacoma	185,000	WSDOT NW Reg.	2,420,700
Fife	4475	Puyallup	28,660	Snohomish Co.*	270,769		
Arlington	5670	Lynnwood	32,420	Pierce Co.*	295,533		
Poulsbo	6070	Edmonds	35,480				
Steilacoom	6135	Redmond	40,805				
Port Orchard	6610	Kirkland	43,160				
Woodinville	9940	Renton	45,170				

*Unincorporated Areas

When jurisdictions were grouped by population, there were statistically significant differences in perceptions regarding the helpfulness of the ITS applications listed below:

- Real-time Transit Information (Actual Arrivals)
- Incident Management System
- Electronic Fare Payment
- Highway Advisory Radio
- Real-time Traveler Information System
- Variable Message Signs
- Fleet Management (AVI and/or AVL)
- Automated Transit Information (Scheduled Arrivals)
- HOV Facility Monitoring
- Traffic Signal Coordination

In general, for the systems listed the larger jurisdictions were more positive about the possible effects on their jurisdictions. Larger jurisdictions were more likely to report that these systems would be *Very Helpful* or *Somewhat Helpful* to their systems while the smaller jurisdictions were more likely to report that these systems would be *Somewhat Helpful* or have *No Impact* on their systems. Note that most of these systems are either freeway or transit-oriented, which may effect larger jurisdictions more than other systems.

Differences in Responses by Type of Jurisdiction **-** The survey respondents included cities and towns, counties, and state government. To determine if there were statistically significant differences in perceptions of ITS by jurisdiction type, the responses were analyzed by type of jurisdiction (City/Town, County, or State). When survey data was analyzed by type of jurisdiction, statistically significant differences in responses were found for only one system: the electronic fare collection system.

The two Counties that responded and the State indicated that the system was *Very Helpful.* Most towns and cities indicated that this system would have *No Impact* or would be *Somewhat Helpful.* It may be surprising that there were not more differences in responses according to jurisdiction type, but statistical significance may not have been found because the test was not very powerful. The ability to find statistically significant differences was low since sample sizes were very small: County had 4 responses at most, and State had 1 response at most.

Differences in Responses According to Use of System Nearby **-** For each system that respondents were asked to rate, they were also asked to indicate whether, to their knowledge, a system like this was in place nearby. Table 6 summarizes jurisdictions' responses regarding whether systems were in use nearby.

Table 6 - Systems in Use Nearby

System	Nearby	Not Nearby	Don't Know
Traffic Signal Coordination	73%	5%	23%
Centralized Control	38%	29%	33%
Ramp Metering	50%	27%	23%
Variable Message Signs	55%	27%	18%
Incident Management Systems	52%	17%	30%
Highway Advisory Radio	55%	15%	30%
Fleet Management (AVUAVL)	30%	26%	43%
Transit Signal Priority	30%	35%	35%
Electronic Fare Payment	17%	30%	52%
Real-time Traveler Info. System	26%	30%	43%
Automated Transit Info. (Scheduled Arrivals)	10%	33%	57%
Real-time Transit Info. (Actual Arrivals)	4%	35%	61%
Automated Ridematching System	14%	5%	82%
Dynamic Ridematching (On-line)	9%	9%	82%
HOV Facility Monitoring	20%	20%	60%

To determine if there were statistically significant differences in responses based on respondents indication of whether the system was in use nearby, data was analyzed according to whether systems were in use. This analysis found statistically significant differences in responses for only one system: the electronic fare collection system. Jurisdictions that indicated that they "did not know" if a system like this was in use nearby usually indicated that the system would have *No Impact* on their transportation system, while those who indicated that a system was in use nearby usually indicated that the system was *Very Helpful.*

APPENDIX D - Benefits of Advanced Public Transportation Systems (APTS)*

Real-time Monitoring of Freeway Conditions (In-House Access to WSDOT's Freeway Cameras) - Instantaneous knowledge of a change in freeway conditions allows quicker response and use of by-pass or detour routes. These systems also enable the potential to view an incident involving a bus. The system, however, does not extend to all jurisdictions currently.

Real-time Congestion/Speed Info. on Freeways and Arterials (In-House Access) - Communications between the transit dispatcher and operators regarding delays and detours are currently effective. Real-time monitoring will improve this communication link by providing transit dispatch immediate feedback, similar to the camera system. Rerouting to avoid congestion. Better understanding of the status of the freeway network. Arterial speed information may be used to adjust departure times and traffic signal timing.

Freeway Ramp Metering with HOV Bypass Lanes (Do Your Transit Routes Make Use of These?) - The bypasses enable express buses to avoid congestion thereby enhancing service reliability and travel time. In some cases the combination of ramp-metering and HOV by-pass could have significant travel time benefits for express services since most of the delay experienced by express routes occurs at congested freeway interchanges. Competitive advantage over SOV in terms of travel time. Major reconstruction of Everett's interchanges would be needed to properly design metering and bypass systems.

Traveler Information Accessible to the General Public
- ***Route and Schedule Information***
- ***Real-time Transit Vehicle Location***
- ***Multi-modal Traffic/Transit Information***

By allowing riders to perform more comprehensive trip planning, riding the bus has become a more attractive travel option. Increased ridership as a result of increased ability to access information about transit services and reduced anxiety on the part of bus riders. Reduced uncertainty related to wait times.

Automated Trip Planning
- ***As a Tool For In-House Rider Information Staff***
- ***For the General Public's Access and Use***

Will allow both rider information staff and the general public to access regional transit travel itineraries. By customizing each trip, riders will view transit as fitting more easily into their busy schedules. Reduce training requirements in high turnover position, provide more consistent information to customers, help callers more quickly. Will improve efficiency of fleet vehicles utilization. Will empower public to coordinate several modes of transportation when planning a trip.

* As Reported by Transit Agencies and the WSDOT Ferry System in the central Puget Sound region.

Regional Automated Ridematching

- ***In-House Central Processing***
- ***Public Access to Instant On-demand Ridematching***

Will increase the number of opportunities for people who want to share a ride to/from work. The regional software will identify new concentrations of riders. System provides best possible matches quickly and reduces time required to process matches. Public access may appeal to some who would not wait for response through mail. Will improve ridership both in-house and with the public resulting in reduced congestion in the ferry lines.

Automated Passenger Counting
- ***Sample of the Fleet***
- ***Entire Fleet***

The obvious benefit of this system is more accurate ridership counting without dedicating staff resources to manually perform counts. Ridership data would be current and updated regularly ensuring data integrity. Eliminate labor costs associated with manual counting for FTA reporting purposes.

Transit Signal Priority **-** This system is an important way to enhance service reliability. Will allow bus to travel along busy arterials more quickly resulting in the reallocation of service as well as increased service reliability. This is a unique approach to travel time savings and is one way to increase service without increasing operating and maintenance costs. Increased travel speed and improved service reliability to attract more riders. Reduced travel times, eventually increased ridership.

Electronic Fare Payment (Smart Cards) **-** This system will promote seamless travel between transit systems. This integrated fare media will reduce confusion and expense to the rider and virtually eliminate counterfeiting of transit passes. Increase ridership by simplifying complex regional fares collection. Reduce fare media handling costs. Customer use, allows seamless travel and minimizes cash handling. Reduce administrative costs; extra convenience.

Automatic Vehicle Location/CAD
- ***For Fixed Routes***
- ***For Paratransit***

This system will increase the dispatching efficiency for paratransit service. Fixed route AVL could result in more real-time tracking and communication with operators and real-time schedule information for transit riders. Improved ability to respond to in service operating problems. Improved safety and security for passengers with better response to emergencies. More efficient use of paratransit fleet.

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APPENDIX F
TRAINING

Appendix F.1

Professional Capacity Building Program Course Catalog

PROFESSIONAL CAPACITY BUILDING PROGRAM CATALOG

The latest catalog for the Professional Capacity Building Program can be found at the U.S. Department of Transportation's ITS Web page at http://www.its.dot.gov/pcb/98catalg.htm

or

to request a hard copy contact the
ITS Joint Program Office
(202) 366-9536

Appendix F.2

Intelligent Transportation Systems Executive Scanning Reviews

Intelligent Transportation Systems Executive Scanning Reviews

Federal Highway Administration
Federal Transit Administration

September 1998

INTELLIGENT TRANSPORTATION SYSTEMS
EXECUTIVE SCANNING REVIEWS

The Intelligent Transportation System (ITS) program has reached a critical stage of development in this country as both the public and private sectors are focusing more than ever on system deployment. As discussions with Congress and stakeholders across the country continue regarding the future of the ITS Program and its place in the next reauthorization, the U. S. Department of Transportation (U.S. DOT) is strategically working toward a goal of achieving compatible deployments of ITS services on a national scale. The successful deployment of ITS nationwide must, however, be an integration of many individual local, metropolitan area, rural, and statewide deployments.

To accomplish this goal, the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) sponsor executive scanning reviews. These reviews allow high-level state and local decision makers to visit locations around the country where agencies are already deploying ITS and see for themselves both the benefits of and the requirements for deploying ITS services. From feedback provided by participants in these scanning reviews, federal ITS program managers concluded that successfully planning for and implementing ITS at the local level is greatly enhanced when high-level officials are able to experience real world applications and benefits of integrated ITS services by personally viewing relevant applications.

OBJECTIVES

There are three objectives of the ITS Executive Scanning Reviews:

- Provide the opportunity to bring together the high-level ITS program participants from a state or metropolitan area so that they can jointly see the possibilities and benefits of deploying ITS technologies. The review should provide a foundation for future intermodal cooperation in the planning and implementation of ITS projects.

- Highlight ITS technologies applicable to the review participants' area or state.

- Provide opportunities to confer with peer officials at the review sites to learn what it takes to gain support for ITS deployments. Sponsoring and hosting regions should work closely to assure that these discussions occur at an organizational level commensurate with the review participants.

1997 EXECUTIVE SCANNING REVIEW SUMMARY

A total of 858 executives attended the ITS scanning reviews in FY 1997. Though not funded through the scanning reviews, 45 FHWA and FTA officials also participated in the scanning reviews to show their support for and commitment to implementing ITS. This partnering was helpful to executives because the federal representatives could help to answer specific questions executives had about their regions.

The majority of the participants (42%) were transportation agency executives and chief engineers. About 23 percent of the executives were elected officials or their representatives, including mayors, congressmen, senators, governors, and councilpersons. Executives from transit agencies constituted approximately 13 percent of the assembly. Another 13 percent of the group included planners, and the remaining participants were university officials, emergency management agency representatives, public-private partnership members, Native American representatives, state transportation commissioners, public relations staff, as well as representatives from the National Park Service and the Department of Commerce.

Executives reviewed a wide variety of ITS facilities, including statewide, regional, and local traffic management centers, rural facilities, border crossings, transit management centers, commercial vehicle operations corridors, and others. The location with the greatest number of guests through this program was Atlanta’s showcase of ITS technologies, used during and following the 1996 Summer Olympics, with a total of approximately 205 visitors. Other locations that had numerous guests included Southern California (155); Phoenix, Arizona (65); Seattle, Washington (60); and Ann Arbor, Michigan (40). A total of 35 sites were visited:

Caltrans San Diego, CA Traffic Management Center
San Diego, California - AHS Demonstration
Orange County - CA Traffic Operations Center
City of Anaheim - CA Traffic Operations Center
Yosemite Area Traveler Information System (YATI)
Montgomery Co. Transportation Management Center, MD
Tucson Transit and Traffic Operations Center
Phoenix, Arizona - Freeway Management Center
Seattle, Washington - Tri-Met Operations Center
Guidestar - Minneapolis/St. Paul, MN
Denver, Colorado - Traffic Management Center
Colorado Regional Transportation District
Chicago, IL - Emergency Operations Center
Coronado Bridge Moveable Barrier - San Diego, CA
Maryland Statewide Traffic Operations Center
Minnesota DOT Traffic Management Center
City of Baltimore 9-1-1/3-1-1 Public Safety Answering Point, MD
Baltimore County 9-1-1 Public Safety Answering Point, MD
Reno, Nevada - Nevada Road/Weather and Variable Speed Limit Project
Atlanta, Georgia - Olympic Showcase
Cincinnati, Ohio - ARTEMIS
State Route 91 Electronic Toll Facility
Addco Traffic Control Group
Los Angeles Smart Corridor
Southern California - ITS CVO Review
San Antonio, Texas - TransGuide
Big Sky, MT - Rural ITS Conference
CVO Roving Verification Van
Phoenix, Arizona - AzTech MDI
Chicago, IL - Traffic Systems Center
3M Research Facility - Minneapolis, MN
Ann Arbor, Michigan - Transit
Houston, Texas
Sacramento, California - TransCal
University of Michigan (Ann Arbor)

Table 1 contains a summary of information regarding participating executives for groups from each Region.

TABLE 1
FY 1997 EXECUTIVE SCANNING REVIEW SUMMARY

REGION	# OF REVIEWS	TOTAL PARTICIPANTS	PARTICIPANTS VISITING 75 LARGEST METROPOLITAN AREAS
REGION 1	4	341	27
REGION 3	3	55	55
REGION 4	3	67	67
REGION 5	9	88	88
REGION 6	6	58	52
REGION 7	2	80	80
REGION 8	5	51	45
REGION 9	2	49	49
REGION 10	4	69	69
TOTALS	**38**	**858**	**532**

Prepared by the FHWA Office of Traffic Management and ITS Applications

The majority of the executives participating in the Scanning Reviews and the FHWA and FTA officials who accompanied them were very positive regarding the impact of the Scanning Review program. Many participants felt that the success of the program was due, in no small part, to the efforts of the FHWA and FTA field staff to identify meaningful review locations and the attention to detail in making travel arrangements.

The federal ITS specialists strove to assemble an appropriate mix of participants in the individual Reviews. A number of the regional reports indicated it was beneficial to include elected officials on these scanning reviews both to develop their interest in ITS and to help them understand the feasibility of ITS applications both financially and technologically. At the same time, it was important to send transportation professionals from the various organizations in a metropolitan area who are in the process of developing or expanding ITS applications in their area. The Executive Scanning Reviews were an appropriate arena for building partnerships between agencies and across jurisdictional boundaries. The Reviews also served to bring the regional staff of the FHWA and FTA closer together.

While the Scanning Reviews were successful in raising the ITS technical awareness of the participants, perhaps the most important outcomes were the peer-to-peer communications established between executives both within the Review groups themselves and with the officials at the sites that have been successful in implementing ITS applications. Small informal "break-out" groups formed randomly throughout each trip to discuss issues applicable to their home regions. Individuals also got to know one another in an environment outside local politics and pressures. Interagency cooperation was enhanced, and common goals were identified that will allow for a more focused effort in ITS deployment. As a result of these discussions, some participants are now actively discussing the implementation of ITS at a regional level.

ACKNOWLEDGEMENT

Information presented in this paper was taken from the report, "1997 Intelligent Transportation Systems Executive Scanning Reviews," prepared by Jennifer Hoaas in the FHWA Office of Traffic Management and ITS Applications. Morris Oliver in the FHWA Office of Traffic Management and ITS Applications administers the program.

Appendix F.3
Intelligent Transportation
Peer-to-Peer Program

U.S. Department
Of Transportation
Federal Highway
Administration
Federal Transit
Administration

Solutions to Transportation Challenges

Intelligent Transportation Peer-to-Peer Program

AN FHWA & FTA TECHNICAL ASSISTANCE PROGRAM

Intelligent Transportation Systems (ITS)

ITS is the use of advanced sensor, computer, electronics and communication technologies in an integrated manner to increase the effectiveness of the entire surface transportation system, for both passenger and goods movements. ITS approaches are applicable across the full spectrum of settings, modes, purposes, technologies, and schedule and financial needs.

What is the Peer-to-Peer Program…

The Intelligent Transportation Peer-to-Peer Program supports the deployment of ITS for the public sector through a free technical assistance program for the transportation community, including state and local professionals, policy makers, planners, and other interested groups. The program is sponsored by the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA), and managed by COMSIS Corporation. The Peer-to-Peer Program provides short term assistance to initiate ITS efforts, identify and resolve challenges in existing ITS efforts, and foster the state of the art in ITS. The Peer-to-Peer Program addresses all of these factors in assessing each individual situation and delivering expert guidance on how various approaches to ITS may address the challenges facing you.

The Peer-to-Peer Program is comprised of professionals from both the public and private sectors who are "on-call" to provide assistance to requestors such as yourself. The program uses a per-to-peer approach, assigning requests for assistance to Program members who have successfully addressed issues similar to yours.

The Peer-to-Peer Program staff will craft an individual assistance program specific to your situation, and then deliver the assistance within a pre-agreed schedule. Assistance is available in the United States and its territories and possessions. The higher priority requests will be responded to first. All requests for assistance will be addressed. Success stories will be shared with all participants.

Assistance for…

- State Transportation Officials – DOTs, turnpike and tollway authorities, and related agency staff
- Regional and Local Transportation Officials – MPOs, transit agencies, public works departments, and other related agencies
- Elected and Appointed Officials
- Other Interested Groups – chambers of commerce, shippers, motor freight companies, business and community leaders, tourism agencies, and others

Mission Statement

The Intelligent Transportation Peer-to-Peer Program assists transportation agencies, their partners, and their customers in meeting transportation challenges through minor assessments and the development of strategies for the implementation of and/or linking of ITS components.

How the Peer-to-Peer Program Can Help YOU

Accessing the Peer-to-Peer Program is simple, just call 301-589-4826 and describe your assistance needs. The Program staff will work with you to craft an approach that will meet these needs and peer-to-peer requirements. The Peer-to-Peer Program can also utilize an array of FHWA and FTA field office resources to address your Intelligent Transportation issues.

Peer-to-Peer Program services are provided free, so there is no need for vouchers, purchase orders, or other authorization items. Most assistance is delivered based on a telephone request. For certain types of assistance, a letter requesting services may also be required.

The Peer-to-Peer Program provides short term assistance in planning, major investment analysis, alternatives analysis, engineering, programmatic design, financial issues, and decision maker education, and related efforts.

Examples of short term assistance types include:

- Review and Analysis of Situations and Plans
- Needs Assessment
- Identification of ITS Approaches
- Technical Guidance on Hardware and Software
- Information on Similar Implementations Elsewhere
- Financial and Programmatic Assessment

Peer to Peer Program provides:

- Printed Information and Literature Searches
- Referrals to Agencies and Individuals
- Consultations by Telephone and Other Means
- Off-Site Reviews and Analyses
- Speakers and Facilitators for Seminars, Conferences, and Workshops
- On-Site Consultations

ITS Major Topic Areas

Deployment of ITS technologies creates an intelligent transportation infrastructure. The Peer-to-Peer Program provides information and short term assistance on facilitating deployment of integrated intelligent transportation infrastructure components:

1. Regional Multimodal Traveler Information Centers
2. Traffic Signal Control Systems
3. Freeway Management Systems
4. Transit Management Systems
5. Incident Management Systems
6. Electronic Fare Payment Systems
7. Electronic Tool Collection Systems
8. Highway-Rail Crossing Protection
9. Emergency Management Services
10. Other Related Issues

ITS Sub-Topic Areas

For each of the major topic areas above, the Peer-to-Peer Program provides more detailed short term assistance on the following:

1. Planning and Programming
2. Institutional Issues
3. Design and System Architecture
4. Operations and Maintenance
5. Scoping and Purchasing Documents
6. Resource Materials
7. Financial Issues
8. Education and Training
9. Facilitation
10. Awareness
11. Partnerships
12. Systems Integration
13. Modeling and Simulation
14. Telecommunications
15. Other Related Topics

How to Get the Peer-to-Peer Program Working for You…

Accessing the Peer-to-Peer Program is simple. Just call 888-700-7337 and describe your situation. Peer-to-Peer Program services are provided free, so there's no need for vouchers, purchase orders, or other authorization items. Most assistance is delivered based on the telephone request. For certain types of assistance, a letter requesting services is also required.

Put the Peer-to-Peer Program to Work for YOU!

Obtaining assistance from the Peer-to-Peer Program is simple and free.

Just call the Peer-to-Peer Program at **888-700-7337**

We will assist you directly or refer your call to one of our staff or experts.

If you prefer, you may contact The Peer-to-Peer Program by:

Fax	301-588-5922
Electronic Mail	Dotpeer@erols.com
Mailing Address	Intelligent Transportation Peer-to-Peer Program *An FHWA & FTA Technical Assistance Program* C/o COMSIS Corporation 8737 Colesville Road, Suite 1100 Silver Spring, MD 20910-3921

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APPENDIX G

BENEFITS

G.1 ITS-Massachusetts Technical Committee, Benefits Task Force, Documents Identifying ITS Benefits

Appendix G.1

ITS-Massachusetts Technical Committee, Benefits Task Force, Documents Identifying ITS Benefits

LIST OF DOCUMENTS IDENTIFYING
BENEFITS ACCRUED WITH
INTELLIGENT TRANSPORTATION SYSTEMS

Prepared by the
ITS Massachusetts Technical Committee
ITS Benefits Task Force

1. Key Findings from the Intelligent Transportation Systems Program - What have we Learned? Prepared by Mitretek Systems, McLean, VA. Printed September 1996. Prepared for US DOT Federal Highway Administration ITS Joint Program Office. *Summarizes positive and negative lessons in these areas; advanced traffic management systems, advanced traveler information systems, commercial vehicle operations, collision avoidance, automated highway systems, Public Transportation and Rural Transportation.*

2. Benefits Assessment of Advanced Public Transportation Systems Prepared by Office of Operations Engineering & Assessment, John A. Volpe National Transportation Systems Center, Research & Special Programs Administration, US DOT. Printed June 1996. Prepared for: Office of Mobility Innovation Federal Transit Administration US DOT. *Provides an order of magnitude estimate of expected benefits to the transit industry with the application of advanced public transportation systems technologies.*

3. SMARTMOVES - A Decision Makers Guide to the Intelligent Transportation Infrastructure. Prepared by Public Technology, Inc. Printed 1996. For Federal Highway Administration US DOT. Guide to understanding the technologies and associated benefits/costs of ITS. *Discusses; understanding ITS, choosing the proper technology for the application, anticipated benefits, how to secure funding, partnerships, smart purchasing.*

4. Traveling with Success - How Local Governments Use Intelligent Transportation Systems. Prepared by Public Technology, Inc. Printed 1995. Prepared for Federal Highway Administration US DOT. *Presents actual case studies for traffic management, parking, mass transit, incident management, traveler information, traffic safety, toll collection, and public safety. Presents benefits for each case study.*

5. Existing Air Quality Impact Evaluations of ITS. Prepared by JHK Emeryville, CA. Printed May 1996. Prepared for Southern California Association of Governments. *Provides a summary of the existing air quality studies including the reports' findings and methodology of study*.

6. Air Quality Impact Methodologies for Evaluating ITS Technologies. Prepared by JHK Emeryville, CA. Printed May 1996. Prepared for Southern California Association of Governments. *Compares the existing methodologies and how they were applied to specific situations*

7. Assessment of Transportation and Air Quality Impacts of ITS Technologies. Prepared by JHK Emeryville, CA. Printed May 1996. Prepared for Southern California Association of Governments. *Examines several studies, presenting the methodology of data collection and presentation of results.*

8. ITS National Investment and Market Analysis. Prepared by Apogee Research Inc. Prepared for US Department of Transportation and ITS America. Printed May 1997. *Identifies likely costs, benefits and risks associated with ITS investments, projects the size of the ITS market over the next two decades, and estimates the potential national economic impact of public investments.*

9. Assessing Consumer Response to Advanced Traveler Information System: Symposium Summary. By C. Kenneth Orski. ITE Journal October 1997. *Covers issues such as effects of ATIS on Travel Behavior, system-wide effects of ATIS, anticipated benefits, consumer market for ATIS products and services.*

10. Success over Stop-Start: Results of the M25 'Controlled Motorway' pilot. Prepared by Brian Harbord, Telematics Group, Highway Agency, UK. Traffic Technology International, October/November 1997. *Provides benefits derived from variable speed limits and automatic violation enforcement.*

11. An Estimate of Transportation Cost Savings from Using Intelligent Transportation System (ITS) Infrastructure. By Joseph Peters, Michael McGurrin, Dwight Shank, and Melvyn Cheslow. ITE Journal November 1997. *Benefit-Cost comparisons between "Build-Only" alternative and "Build-plus-ITS" alternative.*

12. Intelligent Highways: Creating a National System. By Dr. Christine Johnson. The Parking Professional December 1996. *Provides benefit estimates for the nine ITI components: Advanced Traffic Control, Freeway Management, Transit Management, Incident Management, ETC, Electronic Fare Collection, RR-Grade Crossings, Emergency Response, and Regional Multi-modal Traveler Information System*.

13. ITS Applications Do Work. ITE ITS Council newsletter August 1997. *Reports benefits from FAST-TRAC's SCAT system in Troy Michigan in terms of accident reduction*.

14. Testimony of James Costantino to US Senate Transportation and Infrastructure Subcommittee. March 6, 1997. *Provides benefits already realized as well as expected benefits from ITS deployment.*

15. Why Intelligent Transportation System? *Compilation of Statistics on ITS Benefits* by the Federal Highway Administration Joint Program Office, 1996.

16. Intelligent Transportation Systems - Real World Benefits. Prepared by Apogee/Hagler Bailly for ITS JPO US DOT, 1997. *Adapted from ITS Benefits: Continuing Success and Operational Test Results by Mitretek Systems. It covers metropolitan, rural, CVO and Intelligent Vehicle implementations.*

17. ITS Benefits: Continuing Successes and Operational Test Results. Prepared by Mitretek Systems for ITS JPO US DOT, October 1997. *Evaluates deployed systems by these measures: time, crashes, fatalities, throughput, cost, customer satisfaction.*

18. Review of ITS Benefits: Emerging Successes. Prepared by Mitretek Systems for Federal Highway Administration, September 1996. *Summarizes major ITS benefits, refers to detailed studies for those seeking further research in ATIS, ATMS, APTS, Advanced Rural Systems, CVO, Advanced Vehicle Control and Safety, and system integration.*

19. Intelligent Transportation Infrastructure Benefits: Expected and Experienced. Prepared by Mitre Corporation for Federal Highway Administration, January 1996. *Provides decision makers with expected benefits from traffic signal control systems, freeway management systems, incident management systems, transit management, electronic toll collection and results from actual implementation.*

20. Measured Benefits of Deployed ITS Technologies. Available through International ITS Information Clearinghouse, Fact Sheet #7, ITS America. *Provides reported benefits from ATMS (FAST-TRAC, Minneapolis MN, Abilene TX), ATIS (Orlando FL), AVCS (Greyhound), ETTM (Oklahoma), APTS (Baltimore, Kansas City, Toronto) and CVO (A large trucking company).*

ITS BENEFITS TASK FORCE MEMBERS
Sudhir Murthy, Louis Berger & Associates, Inc.
Joe Barrett, Cohu Electronics, Inc.
Tom Mottl, Stratec Consulting, Inc.
Stephen Pepin, BTP&D, MassHighway

TABLES OF QUESTIONS

Tables of Questions

Print Adobe Reader pages 741 to 764 to obtain a printout of all these tables.

Table 1.4 Questions to Consider when Developing a Regional Perspective

QUESTION	RESPONSE
BUILD ON EXISTING RELATIONSHIPS	
• Have existing working relationships that can be used to facilitate the deployment of ITS been identified?	
◊ Have forums for transportation officials been identified?	
◊ Have forums for public safety officials been identified?	
◊ Have any activities that bring operators of transportation facilities been identified?	
• Have members of these groups been approached to solicit their involvement in planning and developing ITS?	
• Are there any other actions that need to be taken to ensure that you are building on existing relationships?	

(Table continued on next two pages.)

Table 1.4 Questions to Consider when Developing a Regional Perspective (continued)

QUESTION	RESPONSE
INVOLVE NON-TRADITIONAL PLAYERS	
• Have non-traditional public and private organizations been approached to participate in ITS activities?	
◊ public safety agencies?	
◊ air travel and airport-related service providers?	
◊ private busing and transit organizations?	
◊ universities and other academic institutions?	
◊ major employers?	
◊ the tourism and resort industry?	
◊ operators of special event facilities?	
◊ hospitals and other emergency medical providers?	
◊ non-profit research centers?	
◊ school districts?	
• Have private sector firms been approached to participate in ITS activities?	
◊ wire-line and wireless communications providers?	
◊ paper and electronic media?	
◊ information service providers?	
◊ software developers?	
◊ system integrators?	
◊ equipment manufacturers and providers?	
◊ public relations and marketing firms?	
◊ automobile manufacturers and part suppliers?	
◊ Internet and cable television service providers?	
• Are there other actions that need to be taken to ensure that non-traditional players are involved?	

(Table continued on next page.)

Table 1.4 Questions to Consider when Developing a Regional Perspective (continued)

QUESTION	RESPONSE
DEVELOP A SHARED VISION	
• Have previous ITS and other transportation studies been identified?	
• Have representatives from the appropriate transportation agencies, private sector firms, non-traditional organizations, and the general public been consulted?	
• Have the overall ITS goal for the region, the expected outcomes, the time frame and milestones, and the functional and organizational responsibilities for implementation, operations, and management been explicitly stated?	
• Has this ITS vision been communicated to policy makers, upper management, and the public?	
• Are there other actions that need to be taken to ensure that a shared ITS vision is developed?	
AUGMENT EXISTING SYSTEMS	
• Has an inventory been made of existing ITS and other transportation, communications, and information systems?	
• Has a plan be developed to integrate these systems as appropriate?	
• Are there other actions that need to be taken to ensure that existing systems will be integrated into the region's ITS?	

Table 2.5 Questions to Consider when Making ITS Visible

QUESTION	RESPONSE
REACH OUT TO THE GENERAL PUBLIC	
• Have you adopted the philosophy that the traveling public is your customer?	
• Has a public relations campaign been designed to increase public awareness and understanding of ITS?	
◊ Have the most effective media been identified?	
◊ Should focus groups be used to determine the public's awareness of ITS?	
◊ Have expectations for ITS been properly defined and not exaggerated?	
◊ Have the benefits of ITS specific to your area been conveyed?	
• Does the project provide readily available and easy-to-use ITS information to the public?	
◊ Is ITS information made accessible to individuals in all income levels?	
◊ Is ITS information made accessible to users of different modes of transportation?	
• Are there any other actions that need to be taken to ensure that you reach out to the general public?	

(Table continued on next three pages.)

Table 2.5 Questions to Consider when Making ITS Visible (continued)

QUESTION	RESPONSE
GAIN SUPPORT FROM DECISION MAKERS	
• Have policy makers and upper management who are key to the success of ITS been identified?	
◊ Have key committees within governmental jurisdictions and state DOTs that can provide visibility to ITS been identified?	
◊ Should an ITS committee comprising upper management be established?	
• Should a program to educate key decision makers on ITS be established?	
◊ Have decision makers been invited to tour existing facilities in the area and attend product demonstrations?	
◊ Have the benefits of ITS specific to your area been conveyed?	
• Have the officials who would benefit from ITS scanning reviews been identified?	
• Have ITS champions in your area been identified?	
• Are there other actions that need to be taken to ensure that support is gained from policy makers and upper management?	

(Table continued on next two pages.)

Table 2.5 Questions to Consider when Making ITS Visible (continued)

QUESTION	RESPONSE
INVOLVE MPOs	
• Has the MPO policy board members been briefed on ITS activities and encouraged to participate?	
• Should the MPO structure be modified to accommodate ITS?	
◊ Should an ITS Coordinator position be established?	
◊ Should an ITS Committee be created?	
◊ Has an existing committee that would promote ITS been identified?	
• Have MPO staff been encouraged to participate in ITS activities?	
◊ Should a training program on ITS for the MPO staff be developed?	
• Have the public forums and outreach programs conducted by the MPO been used to promote ITS?	
• Has the role of the MPO in future ITS activities been established?	
• Are there other actions that need to be taken to ensure that MPO policy board and staff members are involved in ITS planning and development?	

(Table continued on next page.)

Table 2.5 Questions to Consider when Making ITS Visible (continued)

QUESTION	RESPONSE
ENCOURAGE STAFF INVOLVEMENT	
• Have staff been encouraged to participate in ITS activities?	
◊ Have staff been informed early of ITS activities?	
◊ Have staff been shown how ITS can help them be more effective?	
• Have staff from different functions been encouraged to work together?	
◊ Have operations and maintenance staff been included in the design, procurement, and development phases of the ITS project?	
◊ Have construction staff been involved in ITS planning and design?	
◊ Have public safety staff and other users been encouraged to participate?	
◊ Have union members been kept informed and asked to participate?	
◊ Should staff from different functions working on the ITS project be housed in one location?	
• Are there other actions that need to be taken to encourage staff involvement?	

Table 3.5 Questions to Consider when Understanding the Nuances of Partnering

QUESTION	RESPONSE
RECOGNIZE DIFFERING OBJECTIVES	
• Have the participants in the ITS project explicitly stated their organization's mission and business objectives?	
• Have the participants articulated what they hope to realize from the ITS project?	
• Have you identified areas in which you may have to adjust the way you previously operated to accommodate the other participants in the ITS project?	
• Are there any other actions that need to be taken to ensure that you recognize the differing objectives of the potential participants of the ITS project?	
REALIZE IT TAKES TIME TO DEVELOP TRUST	
• Have the participants in the ITS project established proper communication channels to foster the development of a trusting relationship?	
◊ Have the appropriate number of meetings been scheduled?	
◊ Have the appropriate individuals been identified and invited to attend meetings?	
◊ Have you decided how to accommodate possible turn over of staff?	
• Are there other actions that need to be taken to ensure that you realize it takes time to develop trust among potential participants of the ITS project?	

(Table continued on next page.)

Table 3.5 Questions to Consider when Understanding the Nuances of Partnering (continued)

QUESTION	RESPONSE
DEFINE ROLES AND RESPONSIBILITIES	
• Have the strengths of the participants in the ITS project been identified?	
• Have the roles and responsibilities of the participants in the ITS project been put in writing?	
◊ Have the functions of the ITS project that will remain in the public sector been stated explicitly?	
• Are there other actions that need to be taken to ensure that the roles and responsibilities of the participants are defined clearly for the ITS project?	
PROVIDE INCENTIVES FOR PARTICIPATING	
• Have the benefits of participating in ITS projects been shown to potential participants?	
◊ Have public sector officials been shown that their participation in the ITS project will provide tangible improvements to their operations and serve their constituency better?	
◊ Have private sector managers been shown that participation in the ITS project will advance their business objectives?	
• Should the public sector agencies work with the private sector firms to ensure that a market for ITS products and services is developed?	
◊ Have the actions that will be taken by the public sector agencies been explicitly defined?	
• Should policies and procedures that allow partnering arrangements developed at the proposal stage be continued in the design and development stages be developed?	
• Are there other actions that need to be taken to ensure that the potential participants have an incentive to participate in ITS projects?	

Table 4.4 Questions to Consider when Planning for Long-term Operations and Management

QUESTION	RESPONSE
MAINTAIN THE SUPPORT OF PARTICIPANTS	
• Have participants been shown that the ITS project will further the goals of their agencies?	
• Have the benefits and costs of implementing the ITS project been distributed equitably?	
• Have the goals, relationships, and financial considerations for the operations and management phase of the ITS project been clearly articulated?	
◊ Should a business plan be written for the ITS project?	
◊ Have the necessary inter-agency agreements been executed?	
• Are there any other actions that need to be taken to ensure that support from the participants is maintained?	
BUILD SUPPORT OF STAFF, USERS AND OPERATORS	
• Have staff from all disciplines been encourage to participate in ITS activities?	
◊ Has the staff been shown that ITS products and services may reduce their workload or improve customer service?	
◊ Should specific work in the ITS project be set aside for agency staff?	
◊ Should agency staff be used to train other staff members?	
◊ Should staff who are reluctant to accept ITS or have little experience with ITS be given training?	
◊ Should staff be cross-trained in different ITS functions?	
• Have operations and maintenance staffs been included in the design, build, and implementation phases of the ITS project?	
• Are there other actions that need to be taken to ensure that support is built among field staff, users, and operators?	

(Table continued on next page.)

Table 4.4 Questions to Consider when Planning for Long-term Operations and Management (continued)

QUESTION	RESPONSE
FACILITATE PRIVATE SECTOR INVOLVEMENT	
• Have incentives been shown to private sector representatives to encourage their involvement in the ITS project?	
• Has a market been created in which the private sector firms can sell their products and services?	
◊ Has the representatives of the private sector been convinced that the ITS project is a showcase in which they can display their products and services?	
• Have additional private sector participants in the ITS project been identified and approached?	
• Should any regulations, policies, or procedures be changed to facilitate private sector involvement in ITS activities?	
• Are there other actions that need to be taken to facilitate the involvement of the private sector?	

Table 5.5 Questions to Consider when Developing a Regional Management Structure

QUESTION	RESPONSE
ASSIGN ROLES BASED ON STRENGTHS	
• Have the existing capabilities of the participants in the ITS project been identified?	
◊ Should a regional committee be established to identify the roles of the participants in managing the ITS project?	
• Have the agency or agencies with the capability to lead the ITS project been identified?	
◊ Have the managerial roles of the other participants in the ITS project been identified?	
• Are there any other actions that need to be taken to ensure that the roles of the participants are based on their strengths?	
IDENTIFY A FULL-TIME PROJECT MANAGER	
• Has a full-time project manager been appointed?	
◊ Have the responsibilities of the project manager been defined clearly?	
◊ Has the project manager been assigned the appropriate authority?	
• Are there other actions that need to be taken to ensure that a full-time manager is identified and given proper authority?	

(Table continued on next page.)

Table 5.5 Questions to Consider when Developing a Regional Management Structure (continued)

QUESTION	RESPONSE
DEDICATE OTHER SUPPORT AS REQUIRED	
• Have the skills and staffing required to manage the ITS project been identified?	
• Have representatives from the participating agencies with these skills been identified?	
◊ Should staffing adjustments been made to perform the assigned managerial responsibilities?	
• Have capabilities required by the ITS project but not existent in the participating agencies been identified?	
◊ Should support from non-participating agencies or consultants be obtained?	
• Are there other actions that need to be taken to ensure that other staff is dedicated to the ITS project as required?	
USE A COMMITTEE STRUCTURE	
• Has the appropriate committee structure been established to manage the ITS project?	
◊ Should committees be created to address specific technical and administrative issues?	
• Are there other actions that need to be taken to ensure that an appropriate committee structure is established?	

Table 6.7 Questions to Consider when Facilitating ITS within Your Organization

QUESTION	RESPONSE
CONSIDER ORGANIZATIONAL CHANGES	
• Should your agency's organizational structure be changed to facilitate ITS within your agency?	
◊ Should the management of ITS activities be centralized or decentralized within your agency?	
◊ Should an ITS Coordinator position be created?	
◊ Should an agency-wide ITS Committee be established?	
◊ Have the roles and responsibilities of the sections within the agency been clearly defined for ITS projects?	
• Will ITS activities be incorporated within the existing staffing levels?	
◊ Should management and staff be dedicated to specific ITS projects?	
◊ What will be the impact of the ITS project on current workloads?	
◊ What opportunities are lost by having staff involved in the ITS project?	
◊ Will staff be able to accommodate the operations and maintenance of the ITS products and services?	
• Are there any other actions that need to be taken to ensure that your agency's organizational structure will accommodate ITS projects?	

(Table continued on next two pages.)

Table 6.7 Questions to Consider when Facilitating ITS within Your Organization (continued)

QUESTION	RESPONSE
ASSESS SKILLS AND STAFFING REQUIREMENTS	
• Has a skills and staffing assessment been completed for the ITS activity?	
◊ Has staff with previous ITS experience been identified?	
◊ Have near-term ITS skills requirements been identified?	
◊ Have long-term ITS skills requirements been identified?	
◊ Does a staffing plan for the ITS project need to be developed?	
• Have the appropriate adjustments been made to staffing levels to accommodate the ITS project?	
◊ Will assistance from consultants or other public agencies be required?	
◊ Does the staff have to be cross-trained in ITS skills to accommodate the loss of a key individual?	
◊ Does staff in one discipline need to be exposed to other disciplines working within the ITS project to facilitate communications?	
• Are there other actions that need to be taken to ensure that the proper skills and staffing are available for the ITS project?	

(Table continued on next page.)

Table 6.7 Questions to Consider when Facilitating ITS within Your Organization (continued)

QUESTION	RESPONSE
ADDRESS TRAINING NEEDS	
• Has an inventory of training needs been completed for staff working on ITS projects?	
◊ Has an ITS training plan been developed?	
◊ Who should receive ITS training?	
◊ What is the most appropriate format for ITS training?	
◊ Would staff from other agencies benefit from proposed ITS training?	
• Are operations and maintenance staff included in acceptance testing of the ITS technologies?	
• Are management and staff familiar with U.S. DOT’s Professional Capacity Building Program and scanning tours?	
◊ Have managers who would benefit from these opportunities been identified?	
◊ Have staff members who would benefit from these opportunities been identified?	
• Are there other actions that need to be taken to ensure staff has the proper training in ITS?	

Table 7.4 Questions to Consider when Identifying Appropriate Procurement Mechanisms

QUESTION	RESPONSE
BE FLEXIBLE IN SELECTING LEAD AGENCIES	
• Have the procurement capabilities of the participants in the ITS project been identified?	
◊ Have representatives from the participating agencies with the required procurement skills been identified?	
• Have the agency or agencies with the capability to lead the procurement process for the ITS project been selected?	
◊ Have the procurement roles of the other participants in the ITS project been identified?	
◊ Will ITS procurement activities be incorporated within existing staffing levels?	
• Has a single point of contact been identified for the lead procurement agencies?	
• Should public safety and other non-traditional organizations be included in the procurement process?	
• Are there any other actions that need to be taken to ensure that the most appropriate lead agencies are selected?	

(Table continued on next two pages.)

Table 7.4 Questions to Consider when Identifying Appropriate Procurement Mechanisms (continued)

QUESTION	RESPONSE
BE FLEXIBLE IN DETERMINING MECHANISMS	
• Have various procurement mechanisms been considered?	
◊ federal competitive process?	
◊ state catalog?	
◊ multi-party agreements?	
◊ competitive contracts?	
◊ sole-source contracts?	
◊ phased contracts?	
◊ on-call or other existing contracts?	
◊ design/build contracts?	
◊ joint, inter-jurisdictional procurements?	
◊ turnkey procurements?	
• Should legislation, policies, or procedures be changed to permit more flexibility in the use of contracting mechanisms?	
• Have procurement mechanisms used in other areas been considered?	
• Are there any other actions that need to be taken to ensure that the most appropriate contracting mechanisms are used?	

(Table continued on next page.)

Table 7.4 Questions to Consider when Identifying Appropriate Procurement Mechanisms (continued)

QUESTION	RESPONSE
DEVELOP FLEXIBILITY WITHIN CONTRACTS	
• Have contract terms and conditions been written to provide flexibility in defining task products and costs?	
◊ Should policies and procedures be modified to provide for more flexibility in contracts used in ITS projects?	
• Should standard terms and conditions be modified to accommodate the ITS project?	
◊ intellectual property rights clauses?	
◊ liability and indemnification clauses?	
◊ delivery clauses?	
◊ performance clauses?	
◊ termination clauses?	
• Has contract language used in other areas been considered?	
• Have the interdependence of project systems been taken into account when developing ITS contracts?	
• Does the contract provide for the transition of the system from the vendor to the operator?	
• Has a method to determine the value of goods and services provided by ITS project participants been established?	
• Are there other actions that need to be taken to ensure that flexibility in terms and conditions is provided within contracts?	

Table 8.3 Questions to Consider when Addressing Intellectual Property Rights Issues

QUESTION	RESPONSE
DEVELOP A CLEAR POLICY EARLY	
• Have you requested the federal policy on the assignment of intellectual property from the federal funding agency?	
◊ Should you used this policy to initiate discussions with private sector participants in the ITS project?	
• Has your agency developed a clear policy on the assignment of intellectual property?	
◊ Should this policy be written?	
◊ Should this policy be distributed to potential private sector participants and vendors in ITS projects?	
• Are there any other actions that need to be taken to ensure that a clear policy on the assignment of intellectual property is developed early in the life of the ITS project?	

(Table continued on next page.)

Table 8.3 Questions to Consider when Addressing Intellectual Property Rights Issues (continued)

QUESTION	RESPONSE
ADDRESS THE POSSIBLE AREAS OF CONCERN	
• Has the appropriate language been developed for contracts used for the ITS project to address potential areas of concern?	
◊ preexisting products brought to the ITS project by private sector participants?	
◊ products developed during the ITS project using private funds?	
◊ existing products enhanced during the ITS project using public funds?	
◊ products developed during the ITS project using public funds?	
• Should a policy be developed covering the use and distribution of source code?	
• Has contract language used to address IPR concerns in other geographical areas been considered?	
• Has your agency developed a policy on the ownership and dissemination of traveler information?	
◊ Should this policy be written?	
◊ Has your agency determined what information will be disseminated without charge and what can be distributed for a fee?	
◊ Should a policy be developed on the use of value-added data provided by information service providers to ITS project participants?	
• Are there other actions that need to be taken to ensure that the potential areas of concern are addressed?	

Table 9.5 Questions to Consider when Developing Written Policies

QUESTION	RESPONSE
ADDRESS EQUIPMENT ISSUES	
• Should written policies be developed to address equipment issues?	
◊ use of changeable message signs?	
◊ use of closed circuit television cameras?	
◊ ownership equipment?	
◊ replacement of equipment?	
◊ provision of kiosks?	
◊ location of kiosks?	
◊ distribution of equipment, such as AVI tags?	
• Have policies used to address equipment issues in ITS projects in other areas been considered?	
• Has the National ITS Architecture been employed during the design and implementation of the equipment?	
• Are there any other actions that need to be taken to ensure that equipment issues have been addressed?	

(Table continued on next two pages.)

Table 9.5 Questions to Consider when Developing Written Policies (continued)

QUESTION	RESPONSE
DELIMIT THE USE AND DISTRIBUTION OF DATA	
• Should written policies be developed to address data issues?	
◊ ownership of data generated by the ITS project?	
◊ sharing of data among participants in the ITS project?	
◊ release of data to non-participants?	
◊ protection of confidential information?	
◊ use of video images?	
◊ retention of video recordings?	
◊ provision of information and advertising on kiosks?	
• Have policies used to address data issues in ITS projects in other areas been considered?	
• Are there other actions that need to be taken to ensure that the use and distribution of data are delimited?	
ADDRESS LEGAL CONCERNS	
• Should written policies be developed to address legal concerns?	
◊ liability?	
◊ indemnification?	
◊ intellectual property rights?	
◊ transfer of traffic signal system control?	
• Have policies used to address legal concerns in ITS projects in other areas been considered?	
• Are there other actions that need to be taken to ensure that legal concerns have been addressed?	

(Table continued on next page.)

Table 9.5 Questions to Consider when Developing Written Policies (continued)

QUESTION	RESPONSE
DEFINE ROLES AND RESPONSIBILITIES	
• Have the roles and responsibilities of the participants in the ITS project been defined clearly?	
◊ administrative?	
◊ operational?	
• Should these roles and responsibilities be put in writing?	
◊ policy statement?	
◊ contracts?	
◊ partnering agreements?	
◊ inter-agency agreements?	
◊ memoranda of understanding?	
• Are there other actions that need to be taken to ensure that the roles and responsibilities of the ITS project participants are defined?	