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MAINSTREAMING ITS WITHIN THE TRANSPORTATION PLANNING PROCESS

A SUMMARY OF STRATEGIES IN TEN METROPOLITAN AREAS

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FOREWORD

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EXECUTIVE SUMMARY

Transportation professionals consider intelligent transportation system (ITS) products and services more often now than ever before as tools to manage travel and congestion. In some areas, however, ITS solutions are not routinely considered as part of the metropolitan transportation planning process. Part of the reason is that decision-makers do not readily endorse ITS projects because they are unfamiliar with ITS technologies and can be skeptical of the benefits. In addition, officials perceive that it is more difficult to implement ITS solutions than traditional capital projects because ITS solutions are regional by nature, requiring multi-jurisdictional and multi-agency coordination.

These obstacles have not deterred transportation professionals and elected officials in several metropolitan areas from considering ITS solutions as part of the metropolitan transportation planning process. A study of ten metropolitan areas, Albany, Chicago, Dallas-Fort Worth, Denver, Los Angeles, Miami, Milwaukee, Seattle, Washington, D.C., and Winston-Salem, revealed three conditions that help incorporate ITS solutions into the process:

Condition 1: Endorsement of ITS by Elected Officials and Transportation Managers

Condition 2: Improved Communication and Coordination Across Geographic Boundaries and Between Agencies

Condition 3: Collection of Data and Use of Information

At least one of the three conditions is present in each of the metropolitan areas reviewed for this study.

Condition 1: Endorsement of ITS by Elected Officials and Transportation Managers

It is important for elected officials and transportation professionals to support ITS products and services, and especially to publicly endorse them to their peers and the general public. This demonstrates to all regional players that ITS is accepted as a tool to solve transportation problems and will be seriously considered as a funding option in a metropolitan area's transportation planning process. Elected officials are key supporters since they make funding decisions and can influence support by other stakeholders, while upper-level transportation managers are key supporters since they inform elected officials and guide funding decisions within their respective transportation organizations.

In some metropolitan areas, the personal endorsement of ITS technologies and services by elected officials and transportation managers has spurred local transportation operators to plan and invest in ITS solutions. A key champion of ITS products and services for the Washington, D.C. region has been a U.S. Congressman from the region. The Congressman strove to "solve problems on the Capital Beltway." His interest encouraged ongoing discussions on how ITS could solve transportation problems in the area and led to the creation of an ITS task force by the National Capital Region Transportation Planning Board.

Condition 2: Improved Communication and Coordination Across Geographic Boundaries and Between Agencies

ITS technologies can be most useful when planned and deployed with a regional perspective that cuts across geographic boundaries, agencies, and transportation modes. This requires elected officials and staff within and across agencies to communicate and coordinate with one another. Improved communications also helps overcome the differences in the goals of modal agencies and reduces the reluctance of planners and operations staff within and across agencies to talk to one another. It can, however, be difficult to achieve the appropriate level of communication and coordination, especially in areas with many local autonomous communities.

In the Chicago Metropolitan Area there are 270 municipalities and another dozen regional or state agencies that have some ties to transportation. In this area there are several efforts through which transportation activities are coordinated at the agency, subregional, and regional level. One of these efforts involves the mayor of Chicago and leaders from more than thirty suburban municipalities in the Chicago Metropolitan Area who have created a policy-level coordinating committee, known as the Metropolitan Area Mayors' Caucus. The overall objective of the committee is to improve the quality of life and make the Chicago area more competitive in attracting and retaining business. Increasing transportation system capacity through improved operations and management of the existing transportation system is one of many agenda items that Caucus members consider.

Condition 3: Collection of Data and Use of Information

Although not as critical for incorporating ITS into the transportation planning process as the first two conditions, collecting, sharing, and turning ITS-generated data into useful information helps policy makers improve their decisions in a multitude of ways. These data can be used to estimate the benefits and costs of ITS projects before and after deployment, estimate operational costs of ITS systems, assess the operational health of the transportation system, and improve the design of future systems. In some areas across the nation, such as the Chicago Metropolitan Area, transportation staff are preparing for the capability to gather, analyze, share, and archive locally generated ITS data.

The Chicago Metropolitan Planning Organization (MPO) staff are leading two efforts to collect and analyze data supplied by the local ITS systems. The first is the development of an ITS strategic early deployment plan. As part of this effort, representatives of participating agencies are deciding how to organize the collection and sharing of data, the key elements of the data to be archived, and the data that will be gathered in the future. The second effort includes the involvement of local transportation representatives in the development of the ITS Deployment Analysis System, a national effort to develop an analytical tool to evaluate ITS products and services.

STRATEGIES THAT HELP TO ATTAIN THE CONDITIONS

Transportation officials apply several strategies to achieve the three desired conditions. The first four strategies are the most frequently cited and are explained in more detail in the next section.

1. Create an ITS committee involving regional stakeholders

ITS-related committees can serve a variety of purposes, such as educating members, influencing policy, and improving communication across jurisdictions and modes on regional needs and specific projects.

2. Educate elected officials and transportation executives

Elected officials and transportation managers need to be provided with information that defines ITS products and services, explains how the technologies are used, and details the benefits that can be realized.

3. Include ITS in MPO planning documents

Including ITS solutions in metropolitan transportation planning documents demonstrates to transportation professionals that ITS solutions will seriously be considered as solutions when addressing transportation problems. In addition, being involved with the development of an ITS strategy or a regional transportation plan that includes ITS can educate transportation providers on ITS.

4. Develop a program of regional ITS projects

A regional ITS program can help improve communication and coordination of ITS plans and projects across a defined region, especially if the planning effort is supported by transportation executives from the region or with dedicated transportation funds.

5. Educate MPO staff

An MPO staff that is educated on ITS products and services can develop a regional vision for ITS applications and promote that vision to the region's transportation organizations and local jurisdictions.

6. Educate other stakeholders

Support for and coordination with ITS programs and projects from non-traditional stakeholders is an outgrowth from efforts to educate them on the existence and benefits of ITS technologies. These non-traditional stakeholders include private transportation providers, public safety agencies, freight operators, seaports, airports, and toll authorities.

7. Educate the general public on specific ITS projects

The success of some ITS projects, such as variable message signs or ramp meters, can hinge on public support. The public should be educated as much as possible before an ITS project becomes operable so that they understand its purpose and mechanics.

8. Use ITS advocates in the region

A regional network of ITS advocates and experts can provide support for ITS-related policy initiatives and technical assistance for particular projects, especially in areas where few in-house staff are dedicated to work on ITS.

9. Utilize the National ITS Architecture to develop a Regional Architecture

A regional ITS architecture provides a framework for regional ITS planning that encourages stakeholders to coordinate with one another and optimizes the opportunities for integration of ITS products and services.

10. Use peer-to-peer networking

Peer-to-peer networking enables planners to learn from the experiences of other planners across the nation. It provides a rich source of information that planners can use when considering the benefits and costs of ITS technologies.

11. Involve academia in regional ITS planning

University talent can be used for a range of studies, from project-specific feasibility studies to conceptualizing how regional ITS data should be gathered and stored.

12. Determine data collection needs for planning purposes

ITS technologies supply data that can be used as inputs into the planning process. The challenge is culling out the data that are useful for planning from the huge amounts that potentially can be gathered.

13. Determine the most efficient and effective ways to distribute and apply ITS-generated data

Creating a standard process for routine distribution of ITS data ensures that it will reach the user in a timely manner and be available to use toward improving operations as well as for longer term planning purposes.

FOUR COMMONLY CITED STRATEGIES FOR INCORPORATING ITS INTO THE METROPOLITAN TRANSPORTATION PLANNING PROCESS

Transportation professionals have cited four strategies as the most useful for incorporating ITS into the metropolitan transportation planning process:

Strategy 1: Create an ITS committee involving regional stakeholders

Strategy 2: Educate elected officials and transportation executives

Strategy 3: Include ITS in MPO planning documents

Strategy 4: Develop a program of regional ITS projects

These strategies help to gain or show endorsement by officials, improve communication among stakeholders, or both.

Strategy 1: Create an ITS committee involving regional stakeholders

ITS committees serve a variety of purposes, such as educating members, influencing regional ITS policy, and improving communication across jurisdictions and modes on regional ITS needs and specific projects.

Participating on ITS committees helps elected officials and transportation managers improve their understanding of ITS products and services, likely leading to their support of ITS deployments in the areas they serve. Some ITS committees are formed which enable elected officials and transportation executives not only to become educated, but also to act as regional advocates for ITS. Through these types of committees, elected officials influence regional ITS policy and encourage staffs of transportation agencies operating within their respective jurisdictions to consider ITS products and services to solve transportation problems. ITS committees also provide forums for operations and planning staff from transportation organizations to come together, improving communication between these two distinct groups and thus the likelihood that ITS products and services will be successfully planned, deployed, and integrated.

Initially, participating on ITS committees provides staff members more opportunities for communication than actual coordination and integration of projects. However, preliminary coordination between stakeholders may occur for individual projects. Many times, improved communications between committee members leads to collaboration and extensive coordination outside of the committee.

The goals and objectives of an ITS committee should be clearly defined, for example, setting parameters as to whether the committee will provide a forum for regional planning and improved communications among members, or for coordination of specific projects. In addition, meaningful and effective assignment of personnel representing each agency is important, and may require securing the commitment of the top management of member organizations. Qualified staff who are knowledgeable about their individual organizations can bring useful information to the committee and can effectively convey information back to their agency. Also, the same representatives should be sent from each agency so committee members become more knowledgeable as a group.

The Miami Metropolitan Area

In the Miami Metropolitan Area, participation on ITS committees helped secure the endorsement of transportation managers and improve communications between agencies. Until the mid-1990's, the Metro-Dade County MPO staff did not know about the benefits of ITS products and services, with the exception of small items like closed circuit television cameras. The MPO Director learned about ITS technologies and the benefits from systems integration while representing the Miami Metropolitan Area on the Public Technologies, Inc.'s (PTI) ITS Committee and while serving as the Vice-Chair of PTI's Urban Consortium Transportation Task Force, which focuses only on ITS. With his new knowledge, the MPO Director presented ITS to the Transportation Planning Council, the policy-making body of the MPO.

This action prompted the Council to create the ITS Coordinating Committee, which provides a forum for all regional and local agencies and organizations to update one another on ITS

activities and to identify opportunities for coordination. This has helped foster a countywide perspective of ITS to transportation operators and relevant agencies. Membership on the committee includes transit, rail, and highway agencies; turnpike and expressway authorities; universities; county agencies, such as the public works and information technology departments; neighboring MPOs; and consultants assigned specific tasks, such as public outreach. To form this committee, now called the ITS Standing Committee, the MPO staff identified people at high levels in each organization who would be familiar with the ITS activities throughout their individual organizations and who had some decision-making authority.

Committee meetings are held at the MPO offices and are facilitated by MPO employees. This allows MPO staff to promote a regional vision of ITS, use their role as the regional planning agency to encourage cooperation of ITS projects between agencies, and incorporate the ITS activities into the metropolitan planning documents at both the policy and project level.

Several initiatives have been developed through the committee: a study to develop a fiber optic network, a study to develop a system of interactive kiosks, the Dade County ITS Plan and ITS Plan Update, and an application for federal Model Deployment Initiative funds. In addition to these products, interaction of committee members has led to a breakdown of agencies' parochial interests. Members discuss which ITS technologies would be useful countywide and have become knowledgeable about the needs of other agencies. Differing opinions and priorities still exist among agencies, but members now talk with one another about project ideas and seek to address everyone's needs. Information available within agencies has also improved as Committee members bring relevant information back to their individual agencies.

The ITS Committee members are conceptualizing ITS projects on a regional nature more than before the Committee was established. For example, the electronic toll collection project for the Florida Turnpike is being planned on a regional scale, whereas in the past the focus would have been more location-specific. Also, the Florida Department of Transportation's (DOT) traffic operations center in Dade County now has the ability to link up to the traffic control centers for Dade, Broward, and Palm Beach Counties. It is acknowledged that this may not have been done before the Committee existed.

Various agencies that are planning similar ITS deployments are encouraged to use compatible technologies. Through the Committee, it was learned that the Miami-Dade County Public Works Department and the Florida Turnpike were using different transponders for electronic toll collection. The two organizations were asked to explore the possibility of using similar technology so automobile drivers need carry only one type of transponder. Although they are continuing to use separate technologies, their administrators have agreed to integrate their technologies at a later date, after the Turnpike's SunPass system has been adequately tested.

The most complex project being handled by the ITS Committee is the development of a fiber optic network. A fiber optics study was completed through the ITS Committee. This generated new ideas for operating the fiber optic system. The ITS Committee members requested that the county fiber optic network support a planned advanced traveler information system and other county transportation needs. The network will enable the Florida DOT freeway operations systems to communicate between the DOT's traffic operations center and field sites, the Miami-

Dade Transit Authority to locate transit vehicles and maintain kiosks, the school board to transmit data between schools, and the court system to communicate through teleconferencing so that prisoners do not have to be transferred for court appointments. The Dade County Information Technology Department staff, who are responsible for much of the fiber network installed throughout the county, attested that participation on the ITS Committee has improved communications, their understanding of projects other agencies are planning, and the data and communication requirements of each agency.

Strategy 2: Educate elected officials and transportation executives

Elected officials and transportation executives who are educated about ITS products and services are more likely to support ITS planning efforts in their areas. Education can occur through informal meetings and discussion, and through formal training, courses, and seminars. Also, before-and-after studies, benefit-cost analyses, and operational data demonstrating the benefits of ITS can be used to educate elected officials and transportation managers.

The Dallas-Fort Worth Metropolitan Area

At the same time that they are participating in the planning for system upgrades and creating institutional agreements for gathering and sharing data, the transportation staff of the North Central Texas Council of Governments, which houses the Dallas-Fort Worth MPO, use qualitative information and common sense to secure elected officials' support for ITS. MPO staff continually brief officials on the logical arguments supporting freeway management; local congestion information; and the relationship among incidents, congestion, and air pollution. MPO staff provide examples of ITS products and services deployed in other metropolitan areas and explain how ITS products and services can help solve transportation problems in the Dallas-Fort Worth Metropolitan Area.

For example, local arrangements for traffic control in the Dallas area impede incident clearance. Each municipal police agency is responsible for its own traffic control, and each has separate incident clearance procedures. According to one elected official, they were not aware of this problem until the MPO staff briefed them. After the staff showed the officials that ITS products and services can help the multitude of agencies operating independently of one another to cooperatively clear incidents faster and reduce congestion, these officials are now considering the ITS products and services that could remedy the situation.

Visiting ITS facilities, such as traffic management centers, in other metropolitan areas is another educational strategy. Staff members from the Dallas-Fort Worth MPO, the Texas DOT Dallas District, and several of the area's elected officials attended scanning reviews in Southern California, Atlanta, and Houston. They visited traffic management centers run by state DOTs, transit agencies, and local jurisdictions.

The scanning reviews provided participants with a broad perspective of ITS that not only highlighted the technologies, but also helped elected officials and transportation executives visualize how the technology could be used. Therefore, instead of focusing on the fact that few ITS products and services were installed in the Dallas-Fort Worth area, participants discussed the needs in Dallas, the users of the technologies, and the value ITS technologies could provide.

Including both elected officials and technical staff enhanced these discussions and improved communications between the two groups in terms of their expectations from ITS products and services. Operations staff gained a better understanding of the non-technical concerns of the elected officials, and elected officials better understood the level of effort and timelines associated with deploying ITS projects. The visits boosted support for the traffic management centers being planned to serve the Dallas-Fort Worth area and provided elected officials with a balanced comparison between Dallas and other metropolitan areas.

Strategy 3: Include ITS in MPO planning documents

Endorsement for ITS is demonstrated by including ITS solutions in transportation planning documents, either at the conceptual level in the regional transportation plan or at the project level in the transportation improvement program (TIP).

Incorporating an ITS policy message in the transportation plan elevates the significance of ITS at the policy level, demonstrates a regional commitment to ITS, and helps encourage transportation professionals to consider ITS solutions when addressing transportation problems. The level of ITS detail and the policy message vary according to the needs of a metropolitan area. ITS can be included directly or a regional ITS strategy can be developed and then incorporated in the regional transportation plan.

Producing the ITS component of the transportation plan provides educational opportunities to the transportation professionals and elected officials involved in the plan development process. Transportation professionals refine their knowledge of ITS solutions and conceptualize how the technologies can help address regional transportation issues. Elected officials learn about ITS solutions and the associated benefits as the drafts of the transportation plan are presented to them for review and approval.

The TIP is also a useful tool to demonstrate support for ITS. Some MPO staff have modified their TIP project evaluation process to accommodate the difference between traditional capital projects and ITS projects, resulting in a higher number of ITS projects selected for inclusion in the TIP.

Albany-Schenectady-Troy Metropolitan Area

Staff for the Albany-Schenectady-Troy Capital District Transportation Committee, which is the area's MPO, have mainstreamed ITS into the metropolitan transportation planning process by including ITS products and services in the regional transportation plan, titled "New Visions," and the TIP. The New Visions plan defines different priority networks, including an ITS network. The staff "can not overstate the regional commitment to ITS that grew through the plan development process."

MPO staff sought broad input while developing the New Visions document and included the views from twelve task forces which included, among others, bike and pedestrian, freight, transit, and expressway. The Expressway Task Force was particularly influential in bringing ITS into the planning process. Members were charged with ensuring that the elements for guaranteeing the continued efficiency and safe operations of the highway system were included in the regional

transportation plan. One person on the task force was the New York State DOT ITS Coordinator. This person brought ITS information to the task force members, such as reference documents from ITS America that described the user services. Increased interest in the potential of ITS products and services led to the development of an ITS strategic plan. This plan is part of the New Visions document.

MPO staff encouraged their Policy Committee, which is composed of elected officials who approve the regional transportation plan, to include ITS in the plan. In the course of developing New Visions, members of each task force wrote a white paper that was presented to the Policy Committee. The Policy Committee also received presentations on individual ITS projects and will continuously receive ITS educational sessions to keep up the momentum for ITS support gained at this point. These sessions will be especially effective once local benefit information is available. Currently, MPO staff rely on benefit information from other states.

Including ITS in the regional transportation plan has increased awareness and support of ITS and, as a result, ITS technologies are considered for possible inclusion in most transportation projects that appear in the TIP. This is an ongoing process. The MPO staff create a fact sheet for each project under consideration for inclusion in the TIP. On each sheet, the staff indicate on which priority network, as defined in New Visions, the project appears (goods movement, ITS, etc.). Each sheet is then reviewed by the funding agency to ensure that it is filled out correctly. This exchange of information provides an opportunity for MPO staff to point out the opportunities for adding ITS technologies to a project, such as laying fiber optic cable during a highway reconstruction. MPO staff also have the opportunity to review individual projects with respect to including ITS technologies as they participate on the scoping and technical committees for many projects, and receive draft design reports, on which they provide comments, for every project in the TIP.

ITS projects were funded in the latest TIP for the Albany area, in part as a result of revised project evaluation methodologies. During the TIP revision process, the MPO staff provided a level playing field upon which to compare ITS projects with other transportation projects. First, MPO staff separated proposed ITS projects from all other projects. Then, benefit-cost estimates were calculated for each ITS project using the travel demand model as it is used for traditional projects. However, the ITS projects were evaluated against incident conditions, such as traffic accidents and severe weather, instead of typical conditions. The inputs for incident conditions more closely resembled the conditions under which ITS projects would be necessary and provide benefits. The resulting benefit-cost estimates were provided to the planning committee, whose members used them along with other considerations in their project selection decisions.

Dallas-Fort Worth Metropolitan Area

The evaluation criteria used to select projects for the Dallas-Fort Worth TIP were modified in order for ITS projects to be fairly evaluated. The MPO's Regional Transportation Council members, who are elected officials, believed that the traditional process unfairly excluded valuable ITS projects by not considering the regional benefits associated with these projects. Working through the MPO committee structure, which combined the efforts of elected officials and transportation professionals, guidelines were developed to help identify acceptable ITS projects for funding.

All projects, including ITS products and services, submitted for inclusion in the TIP were initially evaluated according to the criteria assigned to the projects' funding source. The evaluation criteria favored high occupancy vehicle lanes, intersection improvements, and signal improvements. Those ITS projects that were not selected during the original call for projects were reevaluated. Duplicative ITS projects were removed and guidelines were developed to help identify which projects to fund. The guidelines specified five new criteria:

1. Implement the recommendations in the Congestion Management Plan by targeting incident detection and response technology and mobility assistance programs on congested corridors.
2. Fill gaps in existing corridor management efforts by completing critical system linkages.
3. Enhance the communication and information exchange between the Texas DOT and local transportation agencies.
4. Leverage transportation resources by creating or enhancing public-private partnerships that will target the identification and mitigation of traffic congestion.
5. Leverage transportation resources by targeting investment, where possible, to facilities undergoing reconstruction.

Projects selected according to these guidelines included ITS technologies, such as variable message signs, electronic stations for accident investigation, a fiber optic cable network, closed circuit television systems, inter-district communication systems, motorist information systems, and highway advisory radio. These projects would not have been considered under the previous selection process.

Strategy 4: Develop a program of regional ITS projects

Regional ITS programs that span entire metropolitan areas and include multiple transportation organizations and jurisdictions facilitate communications and improve coordination of ITS plans and projects across the region. While individual ITS committees functioning in the absence of a regional ITS program can improve communications, coordination does not necessarily improve. Regional programs provide an incentive to coordinate either from funding tied to the program or support from the transportation leaders in a given metropolitan area.

Communications and coordination channels in the form of extensive committee structures have been developed to plan for ITS products and services within the transportation corridors of some metropolitan areas, such as Chicago, Los Angeles, and, more recently, Dallas-Fort Worth. The committees bring all stakeholders together to solve identified transportation problems with ITS solutions. This includes stakeholders who traditionally have not been included in the metropolitan transportation planning process, such as representatives of airports, seaports, and trucking interests. Through these committees, regional or agency-specific ITS plans are developed that take into consideration all of the ITS activity in the region.

Los Angeles Metropolitan Area

In Southern California, a regional program has been in place since 1996 to address the technical coordination of ITS across seven counties. ITS had already been deployed for many years but had not been coordinated or integrated across the region. Now, numerous agencies and jurisdictions communicate and coordinate their ITS needs with one another through an elaborate committee structure.

Mid and senior management from both technical and policy areas represent agencies and jurisdictions. A Steering Committee oversees four geographically defined subgroups composed of representatives of transportation agencies within the area covered by the subgroup. Each subgroup has an advisory group, a mission statement that has been signed off by a high-level official, and a subregional plan. The subregional plans are rolled up into one twenty-year long-range ITS plan. The subgroups also help the Steering Committee implement activities at the local level.

Technical groups are created by and report to the Steering Committee. Some members of technical groups work on adapting the regional architecture to conform to the National ITS Architecture. A transit subcommittee was created to better address transit issues, and an outreach subcommittee develops public relations materials for elected officials, cities, counties, transit agencies, the private sector, and the general public.

The Los Angeles MPO has recently made organizational and policy changes to ensure that planning decisions made as part of the regional program are included in the metropolitan planning process. ITS responsibilities have been moved from the MPO's Planning and Policy Department to the Southern California Economic Partnership (The Partnership).

The Partnership, which is part of the MPO structure and uses MPO staff, is a non-profit public-private entity designed to bring the private sector perspective to the planning process and to explore advanced transportation technologies for the regional transportation plan. As part of its new responsibilities, the Partnership staff will ensure that federally funded ITS projects are in the TIP, that they are identified as ITS projects, and that those projects using technologies intended to exchange information are consistent with the regional ITS architecture developed through the regional ITS program. Partnership staff may also bring stakeholders together to facilitate project development and implementation, and may act as a pass through for funding.

ITS programs do not have to span an entire metropolitan area to be useful. At a more local level, the Los Angeles County Metropolitan Transportation Authority staff developed the Traffic Signal Management Program because within any given county in the metropolitan area, it is difficult to manage across jurisdictions, the California DOT's road network, and locally controlled roads. Each city has different funding capabilities, and some cities have more advanced technologies than others. Authority staff help the 88 cities that operate their own traffic signals within the county to coordinate with one another and overcome these challenges.

Authority staff help to build consensus among jurisdictions through the program, which began in 1995 and is expected to continue to 2002. As part of the program, eight local traffic forums have been created. Each is composed of 10-30 cities. The boundaries are defined by the location of

arterial roads. Members of each forum are provided seed money by the Authority for feasibility studies to coordinate their arterials. Each forum has a ten-year plan. Currently, over \$250 million has been allocated for signal synchronization and preparing for future ITS deployments. As signals are upgraded, forum members will consider more advanced technologies. To further facilitate coordination, the Authority staff conduct meetings with the staff from the cities, help identify project needs and provide technical assistance. They also provide administrative assistance to get projects approved and to coordinate signal synchronization and share traffic concerns.

Dallas-Fort Worth Metropolitan Area

The Dallas-Fort Worth Metropolitan Area is composed of many jurisdictions, and transportation planning and operations are not centralized. There is a diversity of thought and need in the Dallas-Fort Worth area and many ITS activities have been planned or deployed independently of one another. To rectify the situation, agencies are coming together from across the region to coordinate the regional deployment of ITS.

The Dallas-Fort Worth area has an unusual situation whereby the transportation executives meet informally but regularly to discuss regional and organizational needs, and to update one another on their organizational activities. From these meetings, they discovered that each was undertaking ITS planning independent of the others. Therefore, in May 1998, a memorandum of understanding was signed by the chief executives from the seven regional transportation agencies in which they agreed to work together to develop a regional ITS program. A regional ITS committee has been formed to implement the program. The committee's membership includes transit and highway agencies, local communities with populations over 50,000, and the toll way and airport authorities. The MPO staff facilitate the meetings and the Texas Transportation Institute personnel assist the committee. The committee is a structure of peers without a board of directors. The North Central Texas Council of Governments and Dallas Area Rapid Transit provide funds for the committee operations.

Since different agencies are at varying levels of ITS readiness, the seven transportation executives told their staffs to begin making their programs "mutually complementary" among agencies. The goals are to create complementary plans, systems, and system operations.

The final product will be a three-ring binder containing all of the ITS plans and an executive summary complete with roadmaps and a timeline defining each agency's responsibilities. Agreements among agencies and jurisdictions will be created for data sharing. Committee members also hope to fill in geographic holes and linkages now that ITS will be planned on a more regional level instead of in a piecemeal fashion.

The committee meets monthly, sharing the hosting responsibilities across the region. Four subject areas are discussed at each meeting:

1. Developing ITS implementing procedures.
2. Identifying additional ITS funding opportunities.
3. Identifying ITS strategies for special events
4. Identifying gaps in existing ITS plans and monitoring parallel planning efforts.

The primary focus on the meetings is how to improve the coordination of technology across the region in order to move toward ITS implementation and the associated operational issues. This subject receives the most attention now that there is a regional transportation plan from the MPO and ITS plans from each of the Dallas and Fort Worth Texas DOT Districts. The goal is to build on the early deployment planning studies, filling in details that were not addressed during the initial planning efforts. Members are seeking to answer four questions:

- How shall interagency communication occur? Do they need to identify interagency agreements?
- What are the implementation issues that need to be answered?
- What data will be exchanged and with whom?
- What operations tests need to be completed?

The committee has hired a communications expert to complete an inventory of interagency communications needs and make a recommendation regarding a wide-area network and the dedication or sharing of fiber optic cable that will soon be deployed from one agency to another.

SUMMARY

There are three conditions that help bring ITS solutions into the metropolitan transportation planning process:

Condition 1: Endorsement of ITS by Elected Officials and Transportation Managers

Condition 2: Improved Communication and Coordination Across Geographic Boundaries and Between Agencies

Condition 3: Collection of Data and Use of Information

Transportation officials in metropolitan areas have employed various strategies to generate these conditions. The strategies used in the disparate localities vary from region to region due to the regions' diverse political and organizational structures and the level of maturity of ITS planning and deployment. There are four strategies that are most commonly used:

Strategy 1: Create an ITS committee involving regional stakeholders

Strategy 2: Educate elected officials and transportation executives

Strategy 3: Include ITS in MPO planning documents

Strategy 4: Develop a program of regional ITS projects

Although the elected officials and transportation managers in different metropolitan areas will not use the same strategies, they should follow the same three basic steps to facilitate the incorporation of ITS solutions into their metropolitan transportation planning processes. First, they must determine which strategies are most useful for their area. Second, after selecting the

strategies, they must then make and keep a commitment to implement those strategies. As part of this crucial step, they must provide the resources to make the selected strategies successful. Third, transportation officials must reassess their approach after a period of time and modify it as their needs change. As ITS planning and development matures, they may give new priorities to the original strategies, eliminate some, and add new ones.

The strategies listed in this report represent the state-of-the-practice for those areas that have taken steps toward incorporating ITS solutions into the metropolitan transportation planning process. As demonstrated in these metropolitan areas, it is possible to create the necessary conditions to bring ITS into the planning process. This action, in turn, will result in identifying better solutions to address the transportation issues facing the nation today.

MAINSTREAMING ITS WITHIN THE TRANSPORTATION PLANNING PROCESS: A SUMMARY OF STRATEGIES IN TEN METROPOLITAN AREAS

1. PURPOSE AND METHODOLOGY

Identifying and integrating intelligent transportation systems (ITS) strategies and other operational improvements within the metropolitan transportation planning and decision-making process presents a challenge to transportation planners and operations staff. Developing ITS involves new disciplines, increased inter-jurisdictional and inter-agency cooperation, and operations planning. State and local transportation officials are beginning to consider ITS solutions for transportation problems but are challenged by the fact that planning for ITS solutions has not occurred wholly within the metropolitan transportation planning process. In addition, operations planning currently receives little or no consideration in the planning process. The consideration of ITS solutions alongside traditional capital investments and transportation demand and management strategies will expand the set of possible solutions available to transportation planners. This action, in turn, should improve the outputs of the metropolitan transportation planning process. Therefore, there are clearly demonstrated benefits from the routine consideration of ITS products and services, which may lead to “mainstreaming” ITS in the “mainstream” transportation investment decision-making process.

How to get to the point of routine consideration of ITS is the problem that most transportation officials must overcome. The purpose of this research is to better understand how consideration of ITS products and services as tools to manage travel and congestion is being “mainstreamed” or integrated into the metropolitan transportation planning process.

From February through October 1998, staff from the U.S. Department of Transportation’s (U.S. DOT) John A. Volpe National Transportation Systems Center (Volpe Center) conducted this research for the Federal Highway Administration’s Office of Metropolitan Planning and Programs. This document details efforts taken to mainstream ITS by the metropolitan planning organizations (MPO), the state departments of transportation (DOT), the regional transit agencies, and other transportation agencies within ten metropolitan areas.

1.1 GOALS OF THE STUDY

The general scope of the study is two-fold: (1) review how ITS has been incorporated into metropolitan transportation planning processes, and (2) document processes that were implemented successfully and can be duplicated by agencies in other metropolitan areas.

Initially, the research focused on answering six questions:

1. What steps are required to incorporate the routine consideration of management and operational strategies, including ITS solutions, into the metropolitan planning process?

2. What are the appropriate mechanisms for achieving the inter-jurisdictional coordination required to develop and operate a multi-modal transportation system involving advanced technologies?
3. What information is needed to equally consider potential investments in improved operations and management, including ITS solutions, in the decision-making process?
4. Are changes in policies required to ensure that the appropriate data, including ITS-generated data, are being collected and used properly to manage and operate the transportation system?
5. What types of operational and management functions should be included in a typical state-of-the-practice regional transportation plan?
6. What, if any, modifications to the regional transportation plan and transportation improvement program (TIP) processes must occur to ensure that the 20-year vision for the transportation system encompasses ITS services?

In the course of the study, however, responses to these questions indicated that there were other questions that the research should seek to answer in order to adequately learn from the mainstreaming efforts being studied. The respondents provided limited insight as to what information was needed to consider ITS solutions, primarily because ITS projects were still so new and the questions asked by the decision-making bodies were not yet consistent. Likewise, there were not enough ITS deployments in operation for an adequate period of time to determine what policies are needed to accommodate the new ITS data and to ensure that the data generated by the ITS components are to be used properly. Finally, while still important, the study revealed that inclusion of ITS into the regional transportation plan and the TIP are only one of many strategies that aids in mainstreaming ITS in the metropolitan transportation planning process.

This research has yielded a number of informational products. The results include an inventory of approaches used by MPOs and other agencies to integrate ITS in the metropolitan transportation planning process. This list highlights effective methods of gaining and demonstrating endorsement of ITS solutions, and identifies mechanisms used to coordinate ITS development and operations. The study team has also provided details on actions needed to address the collection and use of data for monitoring and measuring the performance of advanced transportation systems. This report, which is the final product, presents the documentation of strategies successfully used by MPOs and other agencies to develop, integrate, and ultimately operate ITS programs, projects, and products and services.

1.2 APPROACH

This study used a variety of research methods to both ascertain which metropolitan areas were best for study and to obtain information to apply to this study. Background data and information were gathered on select metropolitan areas, phone interviews were conducted with targeted agencies in ten areas, and site visits were made to four metropolitan areas. During these site visits, representatives from a broad range of transportation agencies were interviewed on ITS activities within their agencies and region.

Approximately 80 metropolitan areas, out of the 341 metropolitan areas with MPOs in the United States, were initially reviewed for possible inclusion in this study. These areas were selected because the U.S. DOT was tracking the extent of ITS deployment in them and the level of ITS deployment was one of the criteria used to select areas for further review. There were other criteria used to select ten sites from the list of 80 metropolitan areas:

- involvement of the MPO in ITS and other transportation projects
- technical capabilities of the MPO staff
- policy-making capabilities of the MPO
- size of the MPO
- geographic distribution
- area population.

Figure 1 shows the geographic distribution of the ten sites selected for telephone interviews. The interview team visited the four sites indicated with white stars. Table 1 provides summary information on the MPOs in the ten metropolitan areas:

- | | |
|-----------------------------|-----------------------------------|
| 1. Albany, New York | 6. Miami, Florida |
| 2. Chicago, Illinois | 7. Milwaukee, Wisconsin |
| 3. Dallas-Fort Worth, Texas | 8. Seattle, Washington |
| 4. Denver, Colorado | 9. Washington, D.C. |
| 5. Los Angeles, California | 10. Winston-Salem, North Carolina |



Figure 1. Metropolitan Areas Reviewed in the Mainstreaming ITS Study

The study team conducted phone interviews with representatives from agencies in the ten metropolitan areas in March and April 1998. The team interviewed ITS staff from all ten MPOs and officials from either the state DOT or the regional transit agency. In total, 25 representatives from ten MPOs, seven state DOTs, and three transit agencies were interviewed by phone. The study team used the preliminary phone interviews to ascertain the degree that ITS is incorporated in the metropolitan planning process by discussing several topics:

- ITS plans and studies
- ITS projects in the area
- regional coordination of ITS projects
- regional transportation plan and transportation improvement program planning process
- involvement of agencies in ITS projects and ITS outreach
- data collection and use
- staff skills and ITS information sources
- appropriate MPO role in ITS activities.

Table 1. Metropolitan Planning Organization Included In Review

Metropolitan Area	Metropolitan Planning Organization	Jurisdiction	Composition
Albany, N.Y.	Capital District Transportation Committee (CDTC)	8 cities, 70 villages 4 counties	Regional Planning Commission
Chicago, Ill.	Chicago Area Transportation Study (CATS)	271 municipalities 6 counties	Policy and Research Organization
Dallas-Fort Worth, Tex.	North Central Texas Council of Governments (NCTCOG)	75 municipalities 9 counties	Council of Governments
Denver, Col.	Denver Regional Council of Governments (DRCOG)	41 municipalities 8 counties	Council of Governments
Los Angeles, Cal.	Southern California Association of Governments (SCAG)	180 municipalities 6 counties	Association of Governments
Miami, Fla.	Miami-Dade County MPO (Miami Urbanized Area MPO)	30 municipalities 1 county	County Agency
Milwaukee, Wis.	Southeastern Wisconsin Regional Planning Commission (SEWRPC)	147 villages and cities, 7 counties	Regional Planning Commission
Seattle, Wash.	Puget Sound Regional Council (PSRC)	64 municipalities 4 counties	Council of Governments
Washington, D.C.	National Capital Region Transportation Planning Board	9 cities, 7 counties 2 states, 1 district	Council of Governments
Winston-Salem, N.C.	Winston-Salem Transportation Advisory Committee (elected)	20 municipalities 1 county	City Agency

After discussing the results of the telephone interviews with the Federal Highway Administration project sponsors, the study team selected four of the ten metropolitan areas for in-depth case studies. Eight factors were used to select the Chicago, Dallas-Fort Worth, Los Angeles, and Miami Metropolitan Areas:

1. MPO Board supports ITS.
2. MPO top management supports ITS.
3. ITS is included in the long-range plan and the transportation improvement program.
4. MPO has an ITS committee that combines both operations and planning people.
5. MPO is involved at a high level (active member of a committee) for regional ITS plans.
6. MPO has a good working relationship with the state DOT and transit.
7. MPO educates elected officials and other groups.
8. MPO is collecting data and using it in the planning process.

The mere fact that the other six areas were not chosen does not mean that the MPOs and their area transportation agencies were not performing efficiently or effectively in regards to ITS planning and deployments. Rather, the four areas selected exhibited some unique characteristics that would lend themselves to more in-depth study.

Based on the preliminary phone interviews, the Chicago Area Transportation Study, the Chicago MPO, exhibited good outreach mechanisms to other agencies and had organized a technical ITS committee. Staff at the MPO are also discussing with other area transportation officials how to use the National ITS Architecture. In addition, outreach is occurring through other channels such as with the Illinois DOT, the DuPage Mayors and Managers Conference, and the City of Chicago's Mayor's Office.

Transportation agency administrators in the Dallas-Fort Worth Metropolitan Area have a strong commitment to ITS, led by the management of the North Central Texas Council of Governments, the Dallas-Fort Worth MPO. A new regional ITS committee has been formed that is being led by MPO management, with strong support from representatives of the Dallas Area Rapid Transit, the Texas DOT, and many other area agencies and organizations. Other special characteristics of the Dallas-Fort Worth Metropolitan Area include an ITS committee for elected officials and the involvement by the private sector in planning for ITS.

Preliminary discussions with ITS staff in the Los Angeles Metropolitan Area revealed that diverse ITS committees exist in which the MPO staff are involved. One of the committees involves the private sector and a second involves top transportation managers who want to ensure that ITS projects continue after the Southern California Priority Corridor Study is complete. MPO officials' intentions to obtain and use operations data from the California DOT for planning are also unique.

The Miami-Dade MPO's coordination with two other MPOs in the region for ITS planning is likewise unique. The Miami-Dade MPO has also formed an ITS committee that brings together both operations and planning professionals.

During site visits to the four case study areas, the study team delved into greater depth as to how ITS is accepted by elected officials and transportation professionals and how ITS is incorporated into transportation planning documents such as the regional transportation plan, TIP, congestion management system (CMS) plan, major investment studies, and ITS plans. The areas also were examined to determine how relationships between planning and operations staffs and between agencies work, and how ITS project and program communication and coordination is occurring. In addition, data needs and processes to collect and use this data were investigated. The study team discussed these issues with 63 officials from 36 agencies or organizations during the four site visits.

There are a number of reports produced as a result of this research that provides insight into how ITS are incorporated into the metropolitan planning process. There are four documents that detail efforts taken to mainstream ITS by the transportation agencies in each of the four case study metropolitan areas. The four companion reports describe the mainstreaming strategies used in the Chicago, Dallas-Fort Worth, Los Angeles, and Miami Metropolitan Areas. This document represents the fifth of the related reports. This cumulative summary report highlights the findings from ten study areas initially contacted about their mainstreaming efforts.

1.3 FINDINGS

From the initial discussions, a list of strategies emerged that have helped increase ITS awareness and integrate ITS activities within the planning processes of several metropolitan areas. These strategies may have been conducted either within or outside of the traditional metropolitan transportation planning process, but have been instrumental in moving ITS projects to the forefront of the regional transportation planning process and thereby assisting in the deployment of ITS in the metropolitan area. The list of strategies became very extensive; although no metropolitan area stated they were currently doing or planning to utilize all of these strategies:

1. Using or creating MPO Committees/Task Forces
 - Composed of operations and planning staff or upper management of operating agencies
 - Composed of elected officials
2. Using or creating non-MPO Committees/Tasks Forces
 - Composed of operations and planning staff or upper management of operating agencies
 - Composed of elected officials
3. Including ITS, or a reference to ITS, in the Regional Transportation Plan
4. Including ITS projects in the TIP
5. Including ITS in other MPO planning documents (CMS, major investment studies, etc.)
6. Developing regional ITS plans
7. Determining data collection needs
 - Pre-deployment to determine benefit and cost from ITS deployment (to sell ITS)
 - Post-deployment data being gathered from advanced equipment (to improve operations and long range planning)

8. Determining the most efficient and effective ways to apply the data
9. Educating elected officials and top and mid-management of area transportation providers
10. Educating other stakeholders (public safety officials, emergency response services, trucking industry)
11. Educating MPO staff
12. Educating general public
13. Conducting field trips for upper management
14. Using ITS advocates in the region (at the MPO and other agencies)
15. Developing a major program of regional projects
16. Utilizing the National ITS Architecture or developing a Regional Architecture
17. Using peer-to-peer networking
18. Involving academia

After the site visits were completed, it became clear that there was a great deal of overlap among the strategies, and they could be further condensed into three conditions that aid in mainstreaming ITS within the metropolitan planning process:

1. Endorsement of ITS
 - Gain endorsement of ITS.
 - Demonstrate endorsement of ITS.
2. Improved Communication and Coordination
 - Across geographic boundaries.
 - Across agency jurisdictions and modes.
 - Within agencies.
3. Collection of Data and Use of Information
 - For planning use.
 - For operational use.

Initially, each of these three conditions may not be present in a metropolitan area where ITS is in the early planning and deployment stages. However, these conditions exist or are at least being considered in areas where ITS planning is more mature. There are various strategies that are associated with the three conditions. The strategies used within each metropolitan area will vary because of the differing degrees of ITS planning and deployment efforts, and therefore, the areas will have different needs. Strategies that are implemented will also vary depending on the role that the MPO plays in integrating and coordinating ITS within the planning process. MPOs influence the mix of transportation projects in different ways, depending on staff size and expertise, control over the allocation of funds, and the political environment in which they operate.

2. OVERVIEW OF THE METROPOLITAN AREAS AND THEIR METROPOLITAN PLANNING ORGANIZATIONS

This chapter provides information about the transportation planning processes in each of the ten metropolitan areas. This background information will aid the reader in understanding why an area chose to utilize certain strategies to mainstream intelligent transportation systems (ITS) in its metropolitan transportation planning process. This chapter includes selected demographic and geographic information about each metropolitan area, and the public agencies and organizations of significance to the transportation system, including ITS components. Each of the agencies listed has unique responsibilities for funding, planning, deploying, operating, maintaining, or monitoring the transportation system in each metropolitan area. The chapter also details the structure of each metropolitan planning organization (MPO) and where ITS elements are included within these structures. Much of the information on the MPOs was gleaned from the *1997 Association of Metropolitan Planning Organizations' Profiles of MPOs*, as well as from the interviewees themselves.

2.1 THE CHICAGO METROPOLITAN AREA

The Chicago Metropolitan Area was reviewed because of the outreach efforts and the level of involvement in ITS planning by the Chicago MPO (Chicago Area Transportation Study). There are multiple agencies involved in the numerous ITS deployments, both regional and multi-state efforts.



The Chicago Metropolitan Area is a vast region that ranges 80 miles north to south, 50 miles east to west, and encompasses almost 3,800 square miles. With a population of more than 7.25 million, the Chicago Metropolitan Area is the country's third most populous area. The Chicago region comprises the City of Chicago, located entirely within Cook County, and the five surrounding counties referred to as "the collar counties" (DuPage, Kane, Lake, McHenry, and Will Counties).

In the Chicago area, there are almost 300 jurisdictions, agencies, and organizations that have some governing authority over or other responsibilities with the transportation network. However, many of these agencies currently have little involvement or impact on the ITS efforts in the Chicago Metropolitan Area. Some of the key public agencies actively involved in the ITS program or that have significant influence and impact on the region's transportation policies, programs, and projects are summarized in this section.

The **Illinois Department of Transportation** has responsibility for planning, construction, and maintenance of Illinois' extensive transportation network, which encompasses highways and bridges, airports, public transit, rail freight and rail passenger systems. Both the **Illinois DOT - District 1** and the **Illinois DOT ITS Program Office** are involved in the planning and deployment of ITS in the Chicago Metropolitan Area. The **Illinois DOT ITS Program Office**, under the Office of Planning and Programming's Bureau of Urban Programs, was initially formed to manage the ADVANCE (Advanced Driver and Vehicle Advisory Navigation

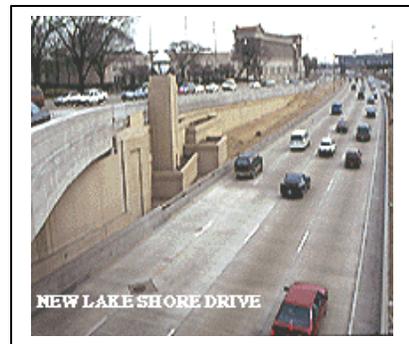
Concept) project, a dynamic route guidance field operational test, but has since expanded to statewide ITS coordination.

The **Illinois State Toll Highway Authority** operates 188 centerline miles of roadways and 44 toll facilities on five interstate highways throughout the Chicago Metropolitan Area. Since 1995, the Toll Authority has deployed the I-Pass electronic toll collection to 200 lanes at toll plazas.

The **Regional Transportation Authority**, created in 1974, is a special purpose unit of local government and a municipal corporation of the State of Illinois. The Authority's mission is to insure financially sound, comprehensive, and coordinated public transportation for northeastern Illinois. In 1983, the Authority was given increased oversight powers concerning budgets and a responsibility to monitor the financial condition of the “Service Boards” (the Chicago Transit Authority, Metra Commuter Rail, and Pace Suburban Bus), including the review of all operating and fare issues, as well as those issues requiring regional perspectives.

The **Chicago Transit Authority**, the nation’s second largest transit system, delivers 1.4 million bus and rapid transit rides on an average weekday in Chicago and 38 surrounding municipalities. **Metra**, the Regional Transportation Authority’s Commuter Rail Division, provides commuter rail service connecting downtown Chicago with 68 other Chicago locations and 100 suburban communities. Metra carries approximately 270,000 weekday riders. **Pace**, the Regional Transportation Authority’s Suburban Bus Division, provides 240 fixed bus routes, dial-a-ride (paratransit) services, vanpools, and special event buses to 210 communities throughout Chicago's six-county suburban region. Pace carries approximately 130,000 weekday riders.

The **City of Chicago Department of Transportation** is the agency within the City of Chicago government responsible for all ground transportation-related functions and regulation of the public way. Management control is provided by the Commissioner’s Office.



Chicago Mayor Richard Daley formed the **Metropolitan Mayors Caucus** in 1997 to work with the chief executives of suburban communities on a list of “priority issues” designed to improve the quality of life and make the Chicago area more competitive in attracting and retaining businesses. As part of this mission, the mayors agree to push for transportation improvements. In addition, the Mayor also formed the **Mayor’s Traffic Management Task Force** in 1996 to improve communication and coordination among the City of Chicago and its abutting municipalities. This group reviews and coordinates projects and special events that have a significant impact on traffic.

Founded in 1962, the **DuPage Mayors and Managers Conference** is a council of 35 municipal governments in DuPage County, Illinois, dedicated to addressing municipal, regional, state, and national public policy issues. Through its Transportation Technical Committee and Transportation Policy Committee, the Conference provides a forum for intergovernmental dialogue where representatives from highway and transit agencies gather monthly to discuss

programs and projects affecting DuPage municipalities. The Conference is one of the MPO's designated eleven Regional Councils of Mayors.

The Chicago MPO's staff coordinate with a number of other planning agencies. The **Northeast Illinois Planning Commission** is the comprehensive land use planning agency for the northeastern Illinois region. The **Northwestern Indiana Regional Planning Commission** is the designated MPO for the northwestern Indiana region in and around Gary, Indiana. The **Southeastern Wisconsin Regional Planning Commission** is the designated MPO for the Milwaukee region.

In addition to the agencies already cited, there are other agencies that were cited as being heavily involved in the transportation system in the Chicago Metropolitan Area. Many of these agencies are also active members of the ITS Task Force being sponsored by the Chicago MPO:

- Argonne National Laboratory
- City of Naperville
- City of Wood Dale
- Cook County
- DuPage County
- Illinois Commerce Commission
- Illinois Environmental Protection Agency
- Illinois State Police
- Illinois Transportation Association
- Lake County
- University of Illinois – Chicago / University Transportation Center.

Since 1975, and reconfirmed in 1981, the **Chicago Area Transportation Study**, through its **Policy Committee** has been the designated MPO for the region and, therefore, responsible for overseeing the regional transportation planning for northeastern Illinois. The Chicago Area Transportation Study region encompasses 152 municipalities in the five collar counties, 123 in suburban Cook County, and the City of Chicago. The Chicago Area Transportation Study Policy Committee, which is multi-modal in nature, is composed of 20 transportation representatives from the federal, state, regional, and local governments, and transportation operators. Each member participates in regional planning and programming related to transportation improvement. The Policy Committee's decisions are made with support from a network of technical and advisory committees and Chicago Area Transportation Study staff.

The Chicago Area Transportation Study has traditionally provided a forum for bringing state and local governments, transit agencies, and others together to reach consensus on regional issues. The Chicago MPO activities are numerous and varied. According to the *1997 Association of Metropolitan Planning Organizations' Profiles of MPOs*, Chicago Area Transportation Study staff's and committees' current roles are to develop the *Destination 2020 Regional Transportation Plan*, the transportation improvement program (TIP), and the annual unified planning work program; oversee and conduct conformity analysis, transportation control measures, and travel demand forecasting; manage the planning for the freight and airport systems, as well as the subregional transit, traffic, and parking plans. In addition, the Chicago Area Transportation Study staff are responsible for the collection and analysis of travel data;

outreach and education for the air quality improvements programs, including the traffic demand management; administration of the region's ridesharing program; and the operations of the Council of Mayors. The MPO staff utilize and apply a variety of planning tools and software to perform their responsibilities, including PlanPac, UTPS, EMME/2, ARC Info, and Atlas GIS.

Chicago Area Transportation Study has created eleven Regional Councils of Mayors, which are assemblies that include the mayors and managers of all municipalities in northeastern Illinois who have joined together for the purpose of providing municipal input to the regional transportation planning and programming process. The **Council of Mayors Executive Committee** is composed of 22 members representing the eleven Regional Councils of Mayors, which represent the 270 suburban municipalities in northeastern Illinois, and the City of Chicago. This committee links local elected officials with the Chicago Area Transportation Study Policy Committee.

The **Work Program Committee** is made up of the same agencies that are on the Policy Committee plus six additional members. The Work Program Committee, a standing technical committee, meets and reviews all the issues that will come before the Policy Committee for resolution. As part of its responsibilities, recipient agencies provide financially constrained lists of projects to the Work Program Committee for approval. The Committee also creates additional MPO committees, subcommittees, and task forces, as well as their chair, membership, and purpose. The Work Program Committee currently is using 17 other committees and task forces to deal with program activities of the MPO. Most groups are a mix of Work Program Committee members and individuals that represent certain interests or can provide specific expertise to the subject of the task force.

While a number of Chicago Area Transportation Study's committees, subcommittees, and task forces review and discuss ITS-related projects and issues, only the **Advanced Technologies Task Force** is specifically charged with handling ITS issues. Along with the Gary-Chicago-Milwaukee ITS Priority Corridor committee structure, this Task Force provides the best opportunities for agencies in the Chicago Metropolitan Area to develop a coordinated regional effort for ITS planning and deployment. According to one MPO official, this Task Force has proven the best way for agencies to understand ITS project phases and stages, how the projects developed fit into the Regional Transportation Plan, and how they should be combined to create a regional architecture. Since the Task Force's inception in 1996, its charge has been to develop the *Northeastern Illinois Strategic Early Deployment Plan*. Once the Deployment Plan is completed, it is expected that the Task Force's responsibilities will expand.

2.2 THE DALLAS-FORT WORTH METROPOLITAN AREA

The Dallas-Fort Worth Metropolitan Area is the largest regional economy in the State of Texas and experiencing substantial population and employment growth. The population of this area is more than 3.6 million, a population greater than that of 27 states. It is estimated that another 1.5 million new residents and 1.4 million new jobs will be added to the Dallas-Fort Worth Metropolitan Area by the year 2020.

In total, there are almost 90 public agencies and organizations in the Dallas-Fort Worth Metropolitan Area that have influence on the region's transportation policies, programs, and projects. This area was selected for inclusion into this study based on ITS commitments and a regional emphasis. Administrators from a large number of the agencies in the metropolitan area



have voiced a strong commitment to ITS deployment initiatives, even without the influx of large amounts of Federal funds earmarked for ITS. In addition, there are a number of regional committees that are increasing a regional perspective among all of the public agencies.

Since the early 1980s, both of the **Texas DOT** districts (the **Dallas District** and the **Fort Worth District**) have been developing independent ITS components for their part of the metropolitan area. In 1992, the Fort Worth District opened a satellite traffic operations center. The Fort Worth District's permanent traffic management center is currently under construction and scheduled to be operational by the end of 1999. The Dallas District opened its Traffic Management Center in 1997.

In 1989, the **Dallas Regional Mobility Coalition** was formed from a coalition of five counties and 26 cities to lobby the state legislature for more transportation funds for the Dallas area. This same group was instrumental in increasing municipal coordination that has led to an incident management program, initiating electronic toll collection, and increasing the use of wireless technologies. A similar non-profit coalition of partners in the Fort Worth area is now being formed.

There are ITS plans for both the Dallas region (1996) and the Fort Worth region (1998). In addition, both the **Dallas Area Rapid Transit** and the **North Texas Tollway Authority** are each developing their own ITS plans for their agencies. The **Fort Worth Transportation Authority** is likewise considering developing an agency ITS plan.

In mid-1998, in the wake of the numerous ITS plans that had been completed or were under development and the increasing number of individual ITS deployments, the administrators from seven state or regional agencies got together to formally pledge their coordination and cooperation in the planning, implementation, and operation of ITS systems. One outcome of the cooperative memorandum of understanding was the creation of the **Regional Comprehensive ITS Program Steering Committee**. In addition to the seven regional and state agencies, this committee's membership includes the municipalities with population or employment bases over 50,000.

One of the principal agencies whose administrator signed the memorandum of understanding was the Dallas-Fort Worth MPO. The **North Central Texas Council of Government** is a voluntary association of local governments within the 16-county North Central Texas region. This council was formed in 1966 to assist local governments in planning for common need, cooperating for mutual benefit, and coordinating for sound regional development. Since 1974, the North Central Texas Council of Government has served as the MPO for transportation in the Dallas-Fort Worth Metropolitan Area. However, the area served by the MPO is significantly

smaller than the entire Council of Governments' jurisdiction. The region served by the Dallas-Fort Worth MPO encompasses approximately 5,000 square miles and comprises nine counties and 64 municipalities. The Regional Transportation Council is the policy body for the MPO, consisting of 35 members who are predominately local elected officials. The Council of Governments' Department of Transportation provides staff assistance to the MPO policy body and its technical committees.

The Department of Transportation provides technical planning services in support of development, project selection, and implementation of transportation projects in the *Mobility 2020 Regional Transportation Plan* and the TIP. The Department also conducts major investment studies, travel forecasting, air quality analysis, transit and traffic operations planning, and gives technical assistance to local governments.



Under the MPO Policy Committee, there exists the Surface Transportation Technical Committee, the Travel Demand Management Committee, the Clean Cities Technical Coalition, and the North Texas Clean Air Coalition. There are also a number of citizen advisory committees and task forces, such as the Transportation Providers and User Task Force.

Within the metropolitan transportation planning process, the Surface Transportation Technical Committee traditionally reviewed ITS issues and other committees formed to review and develop the regional transportation plan and the TIP. These ITS programs and projects were included under the Advanced Transportation Management System category in the transportation plan and the TIP. While the MPO revised its selection criteria for the TIP to credit regional and multi-agency projects, there was still a need for greater coordination.

The seven principal state and regional agencies agreed that the MPO staff would direct the new Regional Comprehensive ITS Program Steering Committee. Other significant jurisdictions and organizations with representation on the Regional ITS Committee include the Cities of Dallas, Fort Worth, Arlington, Irving, Richardson, and 14 other municipalities; the Counties of Dallas, Denton, and Tarrant; Dallas-Fort Worth International Airport, and the Texas Transportation Institute. The initial product of this committee will be a regional ITS Plan that incorporates the common goals and projects of all of the area, agency, and municipal plans currently developed.

2.3 THE LOS ANGELES METROPOLITAN AREA

The Los Angeles Metropolitan Area has a history of ITS deployment that continues today. ITS deployments have been built in a piecemeal fashion and have been used, in part, as experimental problem solvers in isolated incidents. However, transportation professionals in the area are now thinking more regionally. Over the last three years, the availability of better technology has prompted the California DOT staff to become an advocate for integrating ITS deployments through the transportation management centers scattered throughout the region. An extensive committee structure exists through which the coordination of ITS planning and integration of

ITS projects on a regional scale are taking place. The many agencies and municipalities that make up the region are represented in these committees. The needs of the private sector also are increasingly represented in the regional ITS planning process. ITS solutions are now on the verge of becoming a major element of the regional transportation strategy.

The region served by the Los Angeles Metropolitan Area MPO encompasses approximately 38,000 square miles and comprises the six Counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura. With a population of more than 16 million, this locale is the country's most populous area. The City of Los Angeles, the center of the urbanized area, is joined by at least 12 other urban centers as primary destinations for travel. There are 184 cities within the area. In total, there are over 200 public agencies and organizations in the Los Angeles Metropolitan Planning Area that have influence on the region's transportation policies, programs, and projects.



The **California Department of Transportation (Caltrans)** is responsible for the network of freeways and expressways throughout the state. Four Caltrans Districts serve the Los Angeles Metropolitan Area: **District 7** (Los Angeles and Ventura Counties), **District 8** (Riverside and San Bernardino Counties), **District 11** (San Diego and Imperial Counties), and **District 12** (Orange County).

District staff work directly with representatives from the county and municipal transportation staffs for project ideas. Each District has a Division of ITS with staff people who coordinate with county-level ITS Planning Committees. The Department has been deploying ITS products and services for two generations and is a main player in the most recent efforts to integrate ITS systems throughout the area. The ITS program was first elevated within the Transportation Planning Program (1990), then moved to the Research Program (1993), and then to the **New Technology and Research Program** (during 1995-1996). According to Caltrans staff, this new program is aimed at developing partnerships with local government and private industry to implement traffic management strategies, and to research and apply new technologies to improve the flow of traffic.

The **Los Angeles County Metropolitan Transportation Authority**, the **Orange County Transportation Authority**, the **Riverside County Transportation Commission**, the **San Bernardino Associated Governments**, the **Ventura County Transportation Commission**, and the **Imperial Valley Association of Governments** are the six county transportation commissions that are responsible for the allocation of highway funds within their respective counties. These commissions develop and implement transportation policies, projects, funding, and priorities for projects that involve all modes of transportation. Some county transportation commissions have the authority to tax and provide matching transportation funds.

In addition to functioning as the transportation commissions, the Orange County Transportation Authority and the Los Angeles County Metropolitan Transportation Authority function as the main transit operators within their respective jurisdictions. There are another 14 federally funded operators that provide transit services in Los Angeles County and another 50 cities that operate locally funded bus, shuttle, and demand response services. The Riverside County Transportation

Commission is responsible for allocating transit funds; however planning and operating transit systems within the county is the responsibility of two transit agencies. The **Riverside Transit Agency** plans and operates the transit system for the majority of the 2,500 square-mile Riverside County. **SunLine Transit** operates transit service in the eastern portion of Riverside County.

The **Southern California Association of Governments** is the regional planning agency, council of governments, and the MPO for the six counties comprising the Los Angeles Metropolitan Area. A board comprising 72 elected officials from the area governs the Association. The region is divided into 15 subregions for planning and governing purposes. The Los Angeles MPO's role includes policy and planning functions for the region, of which, transportation represents the greatest level of activity. The MPO's transportation program activities include developing the regional TIP and regional long range transportation plan, modeling transportation and vehicle emissions, analyzing transportation control measures, developing congestion and intermodal management systems, freight planning, and growth forecasting.

Transportation planning and programming activities occur through a multi-layered process in the Los Angeles Metropolitan Area. The staff of the Los Angeles MPO share some planning and programming responsibilities with six county transportation commissions. The MPO manages the planning funds, while implementation funds flow through the commissions. These county transportation commissions plan for over 70 percent of the discretionary transportation funds in the region and some of the commissions also have the authority to build, tax, and provide matching funds. The Los Angeles MPO staff assemble the county transportation plans, have the primary programming responsibility for federal transportation funds, and as part of this responsibility, develop the regional TIP.

In the Southern California Association of Governments' 1994 **Regional Transportation Plan**, ITS products and services were grouped into two broad categories, signal synchronization systems and advanced technology. The current 1998 Plan identifies ITS as potential solutions to the area's transportation problems. It recommends focusing on the development and deployment of ITS projects consistent with the ITS Strategic Plan. It also recommends the development of policies and guidance to incorporate ITS projects in the development, design, and funding of regional projects. Recently, the MPO Director has given ITS a higher priority within the MPO structure by moving the program under the direction of the Southern California Economic Partnership and by instituting an ITS project tracking process.

The **Southern California Economic Partnership**, which is part of the Southern California MPO, is a non-profit public-private entity designed to bring the private sector perspective to the planning process and to explore five advanced transportation technologies to the transportation plan: electric vehicles, alternative fuel vehicles, ITS, telecommunications, and smart shuttle transit. Recently, the MPO's ITS program was moved from the Planning and Policy department to the Partnership. The Partnership facilitates the creation of public-private business partnerships and provides education and outreach activities for each of these advanced technologies. Membership consists of high-level business and institutional officials representing Caltrans; the Southern California Association of Governments; the South Coast Air Quality Management District; the automobile, petroleum, telecommunications, and aerospace industries; academia; and the environmental community.

The **San Diego Association of Governments** comprises the San Diego county government and the 18 cities within the county. It is the federally designated Metropolitan Planning Organization for the San Diego area. This region and the Los Angeles region make up the Southern California Priority Corridor.

Together, the Los Angeles and San Diego Metropolitan Areas have been selected as one of four Priority Corridor sites, and as such receive federal funds to plan for the integration of ITS products and services in the region. The **Southern California Priority Corridor Program** effort calls for a regional ITS Strategic Plan. This plan will be the combination of four subregional ITS strategic plans and a plan that addresses commercial vehicle operations and border issues. The four subregional plans are being developed for the seven counties that make up the Southern California Priority Corridor:

- ❖ Los Angeles and Ventura Counties
- ❖ Orange County
- ❖ Riverside and San Bernardino Counties
- ❖ San Diego and Imperial Counties.

Members of the Los Angeles/Ventura County **Regional ITS Coordinating Committee** are creating a long-range **ITS Strategic Deployment Plan**. Members of the committee include representatives from relevant county agencies, the Southern California Association of Governments, Caltrans, the California Highway Patrol, and the Southern California Air Quality Management District.

The goal of the **Southern California Priority Corridor Showcase Project** is to create an intermodal transportation management and information system by integrating a compilation of deployments of advanced traffic management and transportation information systems that traverse all modes of transportation within the designated Corridor. The Showcase Project is being implemented incrementally, thus giving agencies that have systems ready to deploy the assurances that they will be compatible with future systems deployed within the Showcase architecture. Eight early start deployment projects have been identified. Several are nearing design completion and will be operational by the year 2000. Each project is being used as a catalyst that will promote additional deployments throughout the Corridor.

Of the eight early start projects, three are being initiated within the Los Angeles Metropolitan Area. The **TravelTIP** project will create a countywide traveler information system in Orange County that will collect congestion and incident information from four traffic management centers and bundle it with real-time transit data, special event, yellow pages, and road closure and construction information. The **IMAJINE** (Intermodal and Jurisdictional Integrated Network Environment) project will integrate freeway operations, arterial street operations, and the Los Angeles County Metropolitan Transportation Authority transit operations in southeast Los Angeles County. Integration will occur through the synchronization of local and state signals, the adjustment of signal coordination to transit vehicle priority, and the coordination of schedules between paratransit and fixed-route transit vehicles. A traveler information system, known as the **Integrated Modal Shift Management System**, will provide real-time, accurate, and

consistent access to a wide variety of transportation related information to travelers in Los Angeles and Ventura Counties.

The **Southern California Priority Corridor Steering Committee** provides a forum for the development of the Southern California ITS Priority Corridor Strategic Deployment Plans and the implementation of the Showcase projects. The Steering Committee provides the overall direction to the Showcase program. The Committee is made up of representatives from numerous federal, state, and local agencies. Government organizations represented include the FHWA, Caltrans, California Highway Patrol, Southern California Association of Governments, San Diego Association of Governments, San Bernardino Association of Governments, South Coast Air Quality Management District, county transportation commissions, transit operators, other regional transportation agencies, and the larger municipalities.

The **South Coast Air Quality Management District** is the air pollution control agency in Southern California. The District comprises Los Angeles and Orange Counties and parts of Riverside and San Bernardino. Through the Showcase Project, this agency has become increasingly involved with the implementation of ITS products and services.

2.4 THE MIAMI METROPOLITAN AREA

The Miami Metropolitan Area was reviewed because the planned ITS activities are being deployed over multiple metropolitan areas, encompassing the jurisdictions of more than one metropolitan planning organization. Miami-Dade County is the influential center of the three-county Southeast Florida region, which also includes Palm Beach and Broward Counties.

The region served by the Miami-Dade County MPO encompasses almost 2,000 square miles and all of Miami-Dade County, including its 30 municipalities. The population of this area is almost 2.1 million, making it the 16th most populous metropolitan area in the United States. From a



transportation perspective, Miami-Dade County is recognized as the fourth most congested metropolitan area in the United States. Because of the extensive urbanization and regional topography with the Everglades to the west and the Atlantic Ocean to the east, there are limited available right-of-ways in which to improve traffic flows through

“conventional” types of capacity improvements. The need to find additional solutions to reduce congestion has given rise to the application of intelligent transportation systems in Miami-Dade County and Southeast Florida.

ITS efforts in the Southeast Florida region began in the mid-1980s when the Florida DOT staff developed a project to create a freeway management system for the Golden Glades Interchange in north Miami-Dade County. Initially known as “FLAMINGO” (Florida Motorist Information Network for Guidance and Operations), the project was subsequently expanded to a full tri-county freeway management system. The Southeast Florida Intelligent Corridor Systems was

the outgrowth of the initial FLAMINGO project and includes the I-95 corridor, along with the Florida Turnpike, other regional expressways and freeways, and pertinent arterials that tie into the freeway corridors. In 1995, the Florida DOT opened an interim traffic operations center to monitor the initial project site, now known as Mini-Flamingo. While some deployments have continued after 1995, the staffs from the area's agencies realized that the greatest need was cooperative and coordinated ITS deployments that were supported by the metropolitan area's politicians and policy makers. The current period has concentrated on planning for coordinated and integrated ITS deployments and designing these systems.

During the course of the Miami-Dade County Case Study, a wide range of transportation professionals from transportation and related agencies throughout the metropolitan area were interviewed. Each of the agencies has unique responsibilities for planning, operating, and maintaining the transportation system. In total, there are approximately 40 public agencies and organizations in the Miami Metropolitan Area that have influence on the region's transportation policies, programs, and projects.

The **Florida Department of Transportation** maintains and operates all of the freeways throughout the State of Florida. The **Central Traffic Engineering Office**, located at Florida DOT Headquarters in Tallahassee, has assumed the coordination responsibilities of the Statewide ITS program. The Central Traffic Engineering Office staff are involved with ITS technology exchange to the Florida DOT District Offices and other public agencies. Decentralization within the Florida DOT occurred in the early 1990's, giving the District Offices greater roles in both planning and deploying ITS and other transportation functions. Construction, operations, and maintenance of the major roadways are the responsibilities of the **Florida DOT District Six** that has jurisdiction within Miami-Dade and Monroe Counties. Much of Southeast Florida's planning for ITS is out of District Six's Office, which houses the ITS Program Manager for Districts Four (Palm and Broward Counties) and Six.

The **Florida Turnpike District Office**, also known as the **Florida DOT's District Eight**, is responsible for all planning, construction, operations, and maintenance along the 321-mile Florida Turnpike running through 13 counties. The Turnpike District's ITS efforts are coordinated through its ITS Director. The major focus of the Turnpike District at this time is the installation of its **SunPass** electronic toll collection system and the statewide fiber optic backbone, known as the **Florida Fiber Communications Network**. The Florida Fiber Network will run along the 2,000 miles of interstate and turnpike highways and connect the traffic operation centers along the transportation system.

The Florida DOT and various departments within the Miami-Dade County Government are the principal agencies involved in the transportation network in Miami-Dade County. **Miami-Dade County** is a Constitutional Charter County with all powers for local self-government, including specified authority over surface, air, and water transportation granted to the county. It is a unique government structure in which the cities own and maintain non-arterial and local roads, but have no other authority. The Miami-Dade County MPO is the primary transportation planning agency and the Miami-Dade County Public Works Department, Information Technologies Department, and Miami-Dade Transit Agency are the primary deploying and operating agencies.

The **Miami-Dade County Metropolitan Planning Organization**, also known as the Miami Urbanized Area MPO, is the designated agency to coordinate federal, state, and local transportation solutions for the 30 municipalities in Miami-Dade County. The Miami-Dade County MPO operates under a Management Services Agreement with Miami-Dade County and operates under the County Manager's Office. The MPO's Governing Board comprises 16 members, including all of the Miami-Dade County Commissioners, a School Board member, a municipal mayor, and a citizen appointed by the Governor. Under the MPO Governing Board is the Transportation Planning Council, made up of Directors of all the local agencies involved in transportation or planning, along with representatives from state transportation and environmental agencies and the public school system. Among the MPO committees are the Citizen Transportation Advisory Committee, the Transportation Aesthetics Review Committee, the Technical Bicycle and Pedestrian Advisory Committee, and the ITS Standing Committee.

The MPO's mandate is to develop a long-range multimodal transportation plan and a short-term implementation program, prioritizing funding for transportation projects. Staff at the Miami-Dade County MPO act as liaisons between local governments, elected officials, and the general public. Since 1996, the MPO has taken a leadership role in assuring the proper level of coordination and accountability for ITS deployments in both Miami-Dade County and Southeast Florida by developing the *Dade County Area-wide ITS Plan*. As part of this coordinating effort, the MPO created the ITS Technical Steering Committee. The ITS Committee is composed of staff representatives from the various Miami-Dade County agencies, the Florida DOT Headquarters and local district, tollway representatives from the Florida Turnpike and the Miami-Dade Expressway Authority, academic representatives from the local transportation research centers, and contracted private sector representatives. The primary focus of the ITS Standing Committee is the Miami-Dade County fiber optics program and the tri-county advanced traveler information systems program.

The **Miami-Dade County's Public Works Department** handles the transportation system within Miami-Dade County. Staff at the Public Works Department are charged with installing, operating, maintaining, and modifying all traffic signals in the county, as well as the striping, signing, and repairs of all municipal and county roads. Work involving ITS is primarily concentrated in the Traffic Signals and Signs Division and the Highway Division. The Traffic Signals and Signs Division maintains the Miami-Dade County Traffic Control Center, from which all traffic signals in the county are operated. A new traffic management center along with upgraded signal controllers is currently in design. Public Works staff coordinates many of their projects with the automated traffic management systems being developed by the Florida DOT.

Since 1956, Miami-Dade County has had an in-house staff responsible for improving data processing operations. In 1992, this group was renamed the **Miami-Dade County Information Technology Department** to reflect the scope and diversity of the technologies which provide information services to the county and local communities. This department is playing a crucial role in efficiently linking the communications of the new transportation technologies, based on the 1998 *Fiber Optic Communications Concept Plan for Dade County's Intelligent Transportation Infrastructure* developed for the Miami-Dade County MPO.

The transit system in the Southeast Florida region is primarily composed of three organizations: the **Miami-Dade Transit Agency**, the **South Florida Tri-County Commuter Rail Authority** (Tri-Rail), and the **Broward County Mass Transit Division**. The Regional Transit Organization enables these agencies and other transportation service providers to coordinate on regional issues unique to transit. The Miami-Dade Transit Agency, an agency within the Miami-Dade County Government, provides transit service to all of Miami-Dade County and the southernmost part of Broward County. By county charter, the Miami-Dade Transit Agency is entirely responsible for transit operations in Miami-Dade County, which involve bus service; the Metromover automated elevated guideway; and the Metrorail heavy rail that operates on a 21-mile elevated rail line. Both the Miami-Dade Transit Agency and the Tri-Rail use automatic vehicle location and global positioning satellite technology for transit management and customer information.

The **Miami-Dade Expressway Authority** was created as an independent special district by local ordinance and state statute in December 1994. The Expressway Authority is charged with acquiring, building, improving, and maintaining certain toll roads, multimodal corridors, and intermodal facilities in Miami-Dade County. The Expressway Authority currently owns 32 miles of unconnected roadway on five facilities, four of which have tolls. The Expressway Authority utilizes the region's roving service patrol and is also installing electronic toll collection systems, compatible to the Florida Turnpike's SunPass systems. Express by-pass toll lanes are being designed for the Dolphin Expressway (State Route 836), the state's most congested roadway.

Beyond the Florida DOT and Miami-Dade County Government, there are other agencies that were cited as having some significant interplay into the planning, deployment, or operations of the transportation network in the Southeast Florida region. These agencies include the **Florida Department of Environmental Protection**, the **Dade County Department of Environmental Resources Management**, the **Florida International University**, the **University of South Florida – Center for Urban Transportation Research**, the **University of Miami**, and the **Broward and Palm Beach County MPOs** and other agencies of these counties. The Miami-Dade County **Airport Authority**, Miami-Dade County **Seaport Authority**, and the **Bureau of Tourism** were also cited as agencies that should be involved with the ITS Standing Committee. Because Miami-Dade County has the majority of responsibilities for the transportation system, the municipalities' principal transportation responsibility is through community planning. The most prominent municipalities in Miami-Dade County include the **City of Miami**, the **City of Hialeah**, the **City of Miami Beach**, and the **City of Coral Gables**. The municipalities are represented on the ITS Standing Committee by the **Miami-Dade County League of Cities**.

2.5 THE ALBANY METROPOLITAN AREA

The Albany Metropolitan Area was reviewed, in part, because of the heavy involvement of the Albany MPO, the **Capital District Transportation Committee**, in the development of a smart highway corridor project along the 16-mile Route 5 corridor between Albany and Schenectady. This project will use a variety of technologies and applications, including traffic signal control system coordination, transit signal priority, automatic vehicle location systems, and automatic

passenger counters. In addition to the one project, the Capital District Transportation Committee's staff has professional competence regarding how to apply ITS to the region. The Albany Metropolitan Area provides a good example of MPO involvement for small and medium-sized metropolitan areas.

The region served by the Capital District Transportation Committee covers approximately 2,000 square miles and comprises four counties (**Albany, Rensselaer, Saratoga, and Schenectady Counties**) and 78 municipalities, including the Cities of **Schenectady, Troy, and Albany**. The



population of this area is approximately 770,000. The Albany Urbanized Area encompasses the communities at the convergence of two major transportation networks, the Hudson and Mohawk Rivers and the New York State Thruway, I-90, and I-87. There are over 90 public agencies and organizations in the Albany Metropolitan Area that have influence on the region's transportation policies, programs, and projects.

The most prominent among the state agencies are the **New York State DOT**, the **New York State Thruway Authority**, and the **New York State Police**. In addition to the MPO, there are a few regional agencies that have input into the transportation issues. This short list includes the **Capital District Transportation Authority**, which is the local transit agency, and the **Capital District Regional Planning Commission**. Many of the area's cities, towns, and villages also play key roles in the region's ITS projects.

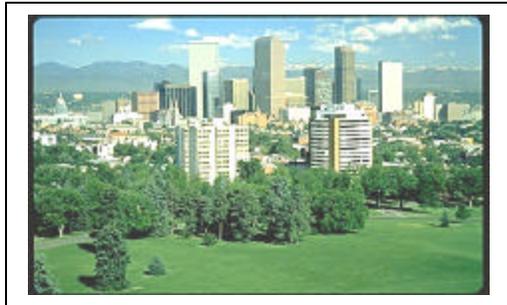
A 22-member Policy Board, officially called the Capital District Transportation Committee's Policy Board governs the MPO. The Policy Board voting members include locally elected officials from the four counties and eight cities, and two representatives from the other 70 towns and villages, as well as representatives from the New York State DOT and the transit operators. The Policy Board sets the MPO's agenda for planning activities and investigations into issues critical to the future of the Capital District. The MPO staff uses its committee structure to further its endeavors. The Technical Committee is composed of agency directors and their staff and is the key committee in advocating ITS applications. In addition, the Capital District Transportation Committee has a Planning Committee and a number of task forces, including ones for bicycle and pedestrian mobility, and goods movement.

This MPO conducts the typical MPO program activities that include travel demand forecasting, air quality conformity analysis and vehicle emission modeling, and monitoring the congestion management systems. In addition, the Albany MPO staff are involved in the intermodal management system, freight planning, and operating a regional ridesharing program. Since late 1993, the primary activity by the MPO has been the development of the detailed 2015 Long Range Transportation Plan, known as the *New Visions*. This effort included the creation of nine new task forces and extensive outreach and education by the MPO staff of the Policy Board regarding the Plan and ITS applications.

2.6 THE DENVER METROPOLITAN AREA

The Denver Metropolitan Area was reviewed because of the large number of individual ITS projects being deployed throughout the region. Another rationale for studying the Denver Metropolitan Area was the Traffic Signal System Improvement Program, which is a cooperative effort led by the Denver Regional Council of Governments, the Denver MPO, to expand the number of coordinated signal systems throughout the region.

The **Denver Regional Council of Governments**, established in 1955, is an association of 48 city and county governments in the Denver Metropolitan Area. The eight-county Denver Regional Council of Governments region covers 5,075 square miles and contains a 1999 population over 2.1 million, making it the 22nd most populous urbanized area in the United States. The metropolitan area is bordered to the west by the Rocky Mountains and to the east by the Great Plains. Interstates I-25, I-70, and I-76 all feed into the Denver Metropolitan Area. In addition, the transportation system must accommodate extensive cross-country commercial truck traffic, a large influx of tourists, and extreme and unpredictable weather conditions.



The MPO has the responsibility to identify future transportation needs, to recommend an integrated, multimodal metropolitan transportation plan to meet these needs, and to identify priorities for implementation contained in the Denver Regional TIP. The Denver Regional Council of Governments

effectively has some authority in determining the distribution of federal transportation funds to those projects that comprise the TIP. In addition to the development of the TIP and the Comprehensive and Long Range Plan, called *Metro Vision 2020*, the MPO staff also conduct major investment studies, travel demand forecasting, intermodal management, conformity analysis, and activities related to its role as the regional planning agency, including land use and open space studies. As noted, the Denver MPO is also heavily involved in the regional coordination of the traffic signal network.

A 50-member Policy Board that includes locally elected officials, as well as the general manager of the Regional Transit District, State Transportation Commissioners, and the Colorado DOT Executive Director governs the Denver MPO. All of the elected MPO Board members are also members of the larger Council of Governments Board. Technical committees include the Regional Review Team and the Transportation Advisory Committee. ITS issues are discussed the most in the Plans Working Group. Regarding ITS planning and deployments, the Denver MPO staff has taken a supporting role, such as being a member of the Incident Management Coalition and the Corridor Management teams.

In the Denver Metropolitan Area, the **Colorado Department of Transportation** has assumed the primary role in both planning for and deploying ITS. The Colorado DOT maintains and operates all of the freeways in the Denver Metropolitan Area. The Colorado DOT Headquarters, located in the Denver Metropolitan Area, sets Colorado DOT policy and performs statewide planning, coordination, and development functions. The appointed Colorado Transportation

Commission approves overall policy, projects, and funding. To coordinate and lead the statewide ITS effort, the Colorado DOT Executive Director created the ITS Program Office in 1994. While the Regional Offices are involved in many aspects of the ITS operations, the ITS Program Office assumed many of the central coordination functions involved in planning, developing, and deploying ITS in both Denver and throughout the State of Colorado. Construction, operations, and maintenance of the physical system are responsibilities of the three Colorado DOT Regional Offices that have jurisdictions within the Denver Metropolitan Area.

The **Regional Transportation District of Denver** provides transit services to a 2,406 square mile, six-county regional service area that contains a population of almost 1.9 million. In addition to regional coverage, the Regional Transportation District runs local routes in Denver, Boulder, and Longmont. The District operates a transit fleet of 769 buses, 11 light rail vehicles, and 56 demand responsive (paratransit) vehicles. In addition to the 156 bus routes, the Regional Transportation District opened the 5.3-mile, 14-stop Metropolitan Area Connection light rail line in downtown Denver in October 1994. This agency is planning for future expansion of the light rail system in seven principal corridors.

In addition to the MPO, the state DOT, and the regional transit agency, there are over 60 agencies and organizations that provide input into the transportation policies and operations in the Denver Metropolitan Area. The most prominent of these entities include the **City and County of Denver**; the **City of Aurora**, located east of the City of Denver; the **City of Lakewood**, located west of the City of Denver and home to the Colorado Traffic Management Center; the **Colorado State Patrol**, which co-operates the **Colorado Traffic Management Center** with the Colorado DOT; the **Denver International Airport**; and the **E-470 Public Highway Authority**, a toll authority established in 1988.

2.7 THE MILWAUKEE METROPOLITAN AREA

Because the Milwaukee MPO, the Southeastern Wisconsin Regional Planning Commission, was an early advocate of the use of ITS technologies to solve transportation problems, the Milwaukee Metropolitan Area was deemed as a valuable area to be reviewed by the research team. In 1978, the Regional Planning Commission developed the *Freeway Traffic Management Plan* for the metropolitan area that recommended many elements that could now be classified as ITS, including an expanded ramp meter system, traveler advisories and information distribution channels, and a regionally-coordinated incident management network.

There have been many attempts to moderate the congestion in the southeastern Wisconsin region for over two decades. In addition to the 1978 *Freeway Plan*, the MPO completed the 1988 *Freeway Traffic Management System Plan for the Milwaukee Area* that provided systems planning and preliminary engineering for the projects recommended in the 1978 Plan. One of these projects was the MONITOR Freeway Traffic Management System and Operations Center. This system was first included in the 1978 Regional Transportation Plan. However, it was the Gary-Chicago-Milwaukee (GCM) Priority Corridor that brought the MONITOR project to the forefront and made this a regional system, beyond the central city of Milwaukee. There are other ITS deployments in the Milwaukee Metropolitan Area and these individual systems are now

being integrated through the GCM program, as well as through expanded statewide efforts, especially along the I-94 corridor.

With a population of 1.8 million, the Milwaukee Metropolitan Area is the 27th most populous metropolitan area in the country. The geographic area covered by the Milwaukee MPO is 2,700 square miles and includes seven counties (Kenosha, Milwaukee, Ozaukee, Racine, Waukesha, Washington, and Waukesha Counties). There are over 180 different agencies and organizations with some responsibilities and influence in the transportation system of the Milwaukee Metropolitan Area.



The **Wisconsin Department of Transportation** has jurisdiction over 12,000 miles of the Wisconsin state trunk highway and interstate systems. Representatives of this agency are responsible for the design, maintenance, and operation of these highways. The lead agency within the Wisconsin DOT for planning ITS is the Division of Highways. The five other DOT agencies, State Police, Department of Motor Vehicles, Planning, Business Management, and Transportation Assistance, are represented on an interdepartmental ITS Steering Committee. There are critical units within the **Milwaukee District Office** for ITS planning and operations, including the freeway operations unit that staffs the regional traffic operations center.

The **Milwaukee County Transit System** is the only public transit agency operating in the Milwaukee Metropolitan Area. This agency provides fixed route and demand response service to populations throughout the Metropolitan Area. These transit services provide over 150 million total annual passenger miles to transit users. The Milwaukee County Transit System has a representative on the ITS Advisory Committee to the Wisconsin DOT. Planning for ITS is a joint effort by department heads in the Transportation and Schedule and Maintenance units, which are part of the Operations Department; while deployment of ITS is handled primarily by the Transportation Department. In 1996, automatic vehicle location technology was installed in all 600 of the transit agency's buses, as well as other service vehicles.

The law enforcement community is playing an ever-expanding role with the transportation system in the southeastern Wisconsin region. The **Wisconsin State Patrol**, a part of the Wisconsin DOT, works closely with the Wisconsin DOT Division of Highways. They provide emergency services and are involved with any planned new construction in the state. The **Milwaukee County Sheriff's Department** was instrumental in getting the freeway safety courtesy patrols deployed. The County Sheriff is still reliable as a strong advocate.

In addition to the state agencies, transit, law enforcement, and the MPO, there are other significant stakeholders included in the transportation system. The principal local entities cited were the **Milwaukee County Department of Public Works** and the **City of Milwaukee Traffic Engineering and Electrical Services Division**. A Wisconsin DOT representative said that these agencies are heavily involved with projects' technical teams and without their support little ITS could be deployed. The Cities of **Waukesha, Racine, and Kenosha**, and other municipalities

where ramp meters exist were also mentioned. In addition, private entities, such as the American Automobile Association, large freight haulers, and private tow truck operators were seen as critical to the success of ITS deployments.

The **Southeastern Wisconsin Regional Planning Commission** is the designated MPO for the Milwaukee Metropolitan Area. A 21-member Policy Board governs the MPO. The MPO staff are part of an area-wide regional planning commission staff that collects and analyzes data and prepares system plans for the seven counties and 147 cities, towns, and villages within its jurisdiction. The MPO's activities include travel demand forecasting, air quality conformity analysis, vehicle emission modeling, monitoring the congestion management systems, intermodal management system, freight planning, and operating a regional ridesharing program. There is an extensive committee structure within the MPO. The MPO was the initial agency that had set up multi-level advisory and steering committees to examine and discuss the deployments of advanced transportation technologies. However, no MPO committee is now devoted specifically to ITS issues, nor does a separate ITS division exist within the Regional Planning Commission. Rather, the agency as a whole has been championing ITS for 20 years. The Milwaukee area MPO staff does sit on several ITS steering and advisory committees sponsored by the Wisconsin DOT and the GCM Priority Corridor Coalition.

2.8 THE SEATTLE METROPOLITAN AREA

The Seattle Metropolitan Area was reviewed, in part, because of the unique involvement of the Seattle MPO, the Puget Sound Regional Council, in ITS outreach and education to the elected officials and the public agency staffs as well as its ten-year traffic study of 2,000 households. In addition, the Seattle Metropolitan Area was one of four areas designated as a metropolitan model deployment initiative site. This federal program has necessitated the cooperative efforts on the



part of numerous state, regional, and local public agencies and private partners to plan, deploy, and integrate existing and new ITS products and services. It was informative to see how the model deployment initiative, the traffic survey results, and the public outreach efforts affected ITS' visibility within the metropolitan transportation planning process.

The region served by the Puget Sound Regional Council covers approximately 6,300 square miles and comprises four counties (**King, Kitsap, Pierce, and Snohomish Counties**) and 65 municipalities, including the Cities of **Seattle, Bellevue, Bremerton, Everett, and Tacoma**. The population of this area is approximately three million. Because the region has one of the fastest growing and strongest economies in the United States, the population is projected to continue to grow at a rate of 1 ½ percent per year.

Located on Puget Sound, the ports in the Seattle Metropolitan Area represent a major transportation mode. In addition to the water transportation and port activities, regional travel occurs along I-5, I-90, and I-405, as well as the state routes and local arterials. There are also

five public transit agencies that serve the metropolitan area (**King County Metro Transit, Pierce Transit, Kitsap Transit, Community Transit,** and the **Regional Transit Authority**). In total, there are over 90 public agencies and organizations in the Seattle Metropolitan Area that have influence on the region's transportation policies, programs, and projects.

The **Washington State DOT** is the most prominent among the state agencies involved in transportation in the Seattle region. The Washington DOT's Advanced Technology Branch manages the Smart Trek model deployment program, which involves 19 other public agencies, as well as a number of private sector companies. This office was also responsible for the development of three early deployment planning studies and a statewide ITS strategic plan completed in 1993. Other state agencies involved in transportation issues and ITS efforts include the **Washington State Department of Information Services,** and the **Washington State Police**. ITS activities in the Seattle Metropolitan Area also include the involvement of the MPO, the five transit agencies, the University of Washington, and many of the area's counties and towns, especially King County, and the Cities of Seattle and Bellevue.

The **Puget Sound Regional Council** is an association of cities, towns, counties, three ports, and two state agencies that serves as a forum for developing policies and making decisions about regional growth management, economic, and transportation issues. The Puget Sound Regional Council is governed by a General Assembly that is composed of all member jurisdictions and agencies and meets once a year, and a 28-member Executive Board that is appointed by the General Assembly. The Executive Board is the MPO's policy-making body. The Growth Management and Transportation Policy Boards advise the Executive Board. These Boards include member agency representatives and representatives from appropriate business, labor, civic, and environmental groups. The Council relies on the work of key committees and four countywide groups to provide advice and recommendations on various regional issues. The committees include Regional Staff Committee, made up of high-level agency staff, the Operations Committee, and three technical committees – the Regional Project Evaluation Committee, the Transportation Operations Committee, and the Regional Technical Forum. None of these MPO committees have an ITS agenda. Most ITS committees are under the Washington State DOT, but regional representatives foresee the Puget Sound Regional Council taking a more active role with ITS and increasing the level of ITS discussions within its existing committees.

The Council is relatively new as a MPO. The MPO's responsibilities were established through the same 1991 intergovernmental agreement that designated the Council as the MPO. The Council's functions include growth management, long and short-term transportation planning, and monitoring for consistency of land-use and transportation with state, regional, and local plans. The Council and its staff are also responsible for development and maintenance of a regional data base utilizing a geographic information system; providing technical assistance to the public sector, business community, and community organizations; and providing a forum to discuss emerging regional issues. One of the Council's current responsibilities is to develop the Regional ITS Strategy Plan. Tied to this new responsibility, the Seattle MPO debuted its ITS web page in the summer of 1998.

2.9 THE WASHINGTON, D. C., METROPOLITAN AREA

Metropolitan Washington has one of the highest levels of traffic congestion among the major metropolitan areas. It has been one of the fastest growing metropolitan areas in the country since the 1960's and this growth is forecast to continue. Between 1990 and 2020, daily vehicle-miles of travel are projected to rise by 78%, but only 23% more roadway lane miles will be added. Better management of the existing transportation system is now being stressed, including the use of ITS applications. Since 1997, these applications have been discussed and coordinated through the Metropolitan Washington's ITS Task Force. The extensive subcommittee structure of the ITS Task Force was one aspect that made this area the subject of review for this study. In addition, the existence of a fragmented MPO jurisdiction and how the MPO staff overcome these disparate areas to mainstream ITS within its transportation planning process were also worthy of examination.



The **Metropolitan Washington Council of Governments** is the designated regional planning agency for the Washington, D.C., Metropolitan Area. A Council board, the **National Capital Region Transportation Planning Board** is the officially designated MPO. The region served by the Transportation Planning Board encompasses about 4,000 square miles and comprises two states, seven counties, one district, and nine independent cities. The population of this area is more than 3.9 million. The District of Columbia sits at the center of the multistate urbanized area. In total, there are over 30 public agencies and organizations in the Washington, D. C., Metropolitan Area that have influence on the region's transportation policies, programs, and projects.

While other MPOs may have to coordinate with many more jurisdictions and agencies, none have to coordinate with all levels of government - local, regional, state, and federal agencies, in the manner required by the staff for the 39-member Transportation Planning Board. The MPO's policy board include representatives from local governments, state DOTs, the Maryland and Virginia General Assemblies, the **Washington Metropolitan Area Transit Authority**, the Metropolitan Washington Airports Authority, and federal agencies. The Department of Transportation Planning of the Metropolitan Washington Council of Governments provides staff support to the MPO Board.



There are three primary products that direct the MPO's activities. They are the six-year (near-term) TIP; the financially-constrained long-range transportation plan, currently planned through the year 2020; and the *Vision Plan*, which looks at needs beyond 2020, and those needs before 2020 without considering financial constraints. Because of each state's financial autonomy, the TIP and long-range plan are actually compilations of the projects and plans developed separately by the Maryland members, by the Virginia members, and by the District members. Other MPO program activities include travel demand forecasting, vehicle emission modeling, conformity analysis, traffic congestion management analysis, development of congestion management systems, and geographic information system applications. The Washington, D.C., MPO staff are

also responsible for the management of the Commuter Connections Program, which includes the provisions for ridesharing, employer services, telecommuting, guaranteed ride home, and transit information.

The MPO uses an extensive committee, task force, and subcommittee structure to direct these activities. The Transportation Planning Board committees include the Program Committee, the Technical Committee, and the Citizen Advisory Committee, which has an open membership. The MPO task forces include the Bylaws Task Force, the Private Transit Providers Task Force, and the Washington Region Intelligent Transportation Systems Task Force. At the request of the

Maryland State Highway Administration, the Virginia DOT, and the District of Columbia's Department of Public Works, the MPO formed the ITS Task Force in



January 1997. Over 30 transportation and public safety agencies from around the Washington region participate on the ITS Task Force. The task force works through its subcommittees to address its priority areas of focus. Currently, there are five ITS subcommittees: 1) electronic payment systems, 2) traveler and tourist system databases, 3) traffic operations and traffic signal coordination, 4) ITS considerations in major investment studies, and 5) using ITS as a data resource for planning. Other technical subcommittees include aviation planning, bicycle planning, Commuter Connections, financial planning, and travel forecasting.

2.10 THE WINSTON-SALEM METROPOLITAN AREA

The Winston-Salem Metropolitan Area was reviewed because there is some ITS activity occurring in this area and it could be informative to examine how ITS is mainstreamed within a small metropolitan area. The Winston-Salem Metropolitan Area encompasses one North Carolina county. The Forsyth County population is 275,000, making the **Winston-Salem/Forsyth County Urban Area MPO** region the smallest in population of any MPO area



within this study. Within the county, there are 20 municipalities and another half dozen public agencies and organizations that have influence on the region's transportation policies, programs, and projects.

The MPO's policy board is the **Transportation Advisory Committee**. The Advisory Committee is composed of locally elected officials appointed

jointly by the City of Winston-Salem Aldermen and the Forsyth County Board of Commissioners. The City of Winston-Salem Transportation Department provides staff support for the MPO. The MPO functions center on the development of short and long-range multimodal transportation plans, as well as fulfilling other federal transportation planning requirements. There are no MPO committees that target ITS applications, but there have been opportunities for the MPO support staff to make recommendations concerning ITS projects to the deploying agencies.

There are few congestion issues that warrant an extensive ITS program in Forsyth County or even in the larger Triad North Carolina region, which encompasses the three **Cities of Greensboro, Winston-Salem, and High Point**. Regionally, the Triad contains a population of 750,000. However, each of the three cities has its own MPO, thereby increasing the difficulties of regional coordination. In Greensboro, the **Greensboro Transportation Advisory Committee** is the designated MPO. In High Point, the **High Point Transportation Advisory Committee** is the designated MPO. Comparable to the Winston-Salem MPO, the jurisdictions of the other MPOs cover a single North Carolina county each.

The **North Carolina DOT** has been instrumental in developing an early deployment plan for the Triad region, coordinating the Incident Management Program, and creating a freeway management system with ramp metering, variable message signs, lane-use control signs, and closed circuit TV cameras. The North Carolina DOT continues to involve a small group of representatives from key agencies, especially on the Incident Management Team. These agencies include representatives from the North Carolina DOT Headquarters and the local division office, the **City of Winston-Salem DOT**, the City and Forsyth County Fire and Police Departments, the **North Carolina Highway Patrol**, the North Carolina Division of Motor Vehicles, and the regional wrecker patrol.

The North Carolina DOT and the **Winston-Salem Transit Authority** are the two agencies most involved with ITS activities in the Winston-Salem area. The Transit Authority has been engaged since 1995 with its Mobility Manager Project, which is a multi-phased Federal Transit Administration demonstration project that provides one-stop transit information, computer-aided dispatching, fleet management, and eventually a multi-use fare card. The Mobility Manager Project Team consists of the Transit Authority, the City of Winston-Salem DOT, the North Carolina DOT, and academic members from the North Carolina State University's Department of Civil Engineering and the North Carolina State University's Institute for Transportation Research and Education. The MPO staff have assisted by ensuring the project was included within TIP.



3. REGIONAL STRATEGIES FOR ITS PLANNING AND DEPLOYMENT

This chapter relates how the transportation officials and agency staff in the ten metropolitan areas are utilizing the various strategies enumerated in Chapter 1 to aid in mainstreaming intelligent transportation systems (ITS) activities into the metropolitan transportation planning process. Mainstreaming can be greatly assisted by fulfilling any or all of three conditions:

1. The public *endorsement of ITS* initiatives by elected officials or agency administrators.
2. The presence of *communication and coordination* among transportation agencies in the metropolitan area that leads to a regional perspective for the deployment of ITS technologies.
3. The willingness of area agencies to *collect, share, and use data and information* to determine the benefits of deploying ITS products and services, and to make ongoing improvements to operations and planning of the transportation network.

In this chapter, each strategy will be presented under its related condition. Figure 2 displays the three conditions for mainstreaming ITS and their associated strategies. Some of the strategies are associated with more than one of the three conditions. When a strategy is used to achieve more than one condition the objective of that strategy may undergo subtle changes to attain each condition. For example, an ITS committee may be directly responsible for increased communication and coordination among agencies, but indirectly linked to gaining the endorsement for ITS from elected officials or agency management through the increase in ITS awareness that the committee brings about.

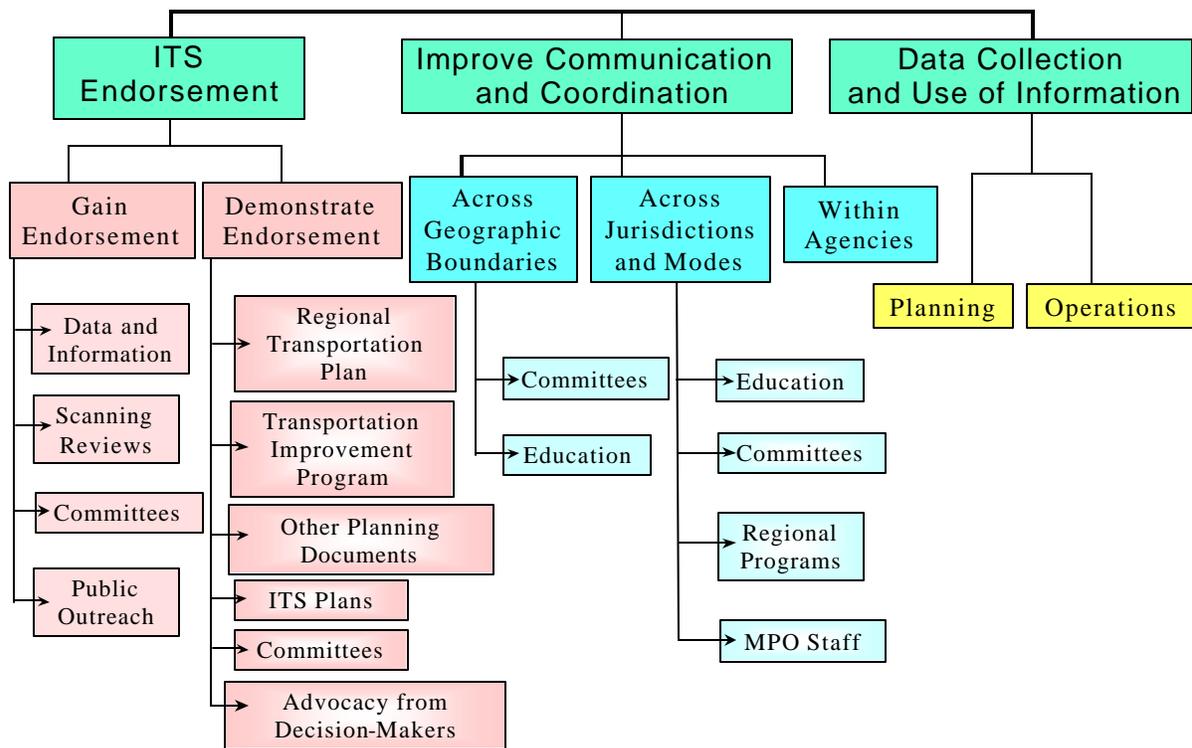


Figure 2. Three Conditions and Associated Strategies for Mainstreaming ITS in the Transportation Planning Process

3.1 ENDORSEMENT OF ITS

Publicly endorsing ITS products and services demonstrates to all regional players that ITS is accepted as a tool to solve transportation problems and will be seriously considered as a funding option in a metropolitan area's transportation planning process. According to interviewees, one of the most important endorsements for ITS products and services comes from elected officials. Elected officials not only set the tone for spending priorities, but their support raises the level of awareness for ITS products and services to other transportation agencies. Interviewees also cited upper- and mid-managers as important supporters who can increase awareness and advocate ITS technologies to other transportation professionals and to elected officials.

This section is divided into two subsections:

- ❖ Strategies to Gain Endorsement of ITS
- ❖ Strategies to Demonstrate Endorsement of ITS.

Section 3.1.1 describes the strategies used in some metropolitan areas to gain endorsement of ITS. It is not a given that elected officials and transportation managers will readily endorse ITS products and services; they may need to be convinced of the benefits through different education strategies. Section 3.1.2 provides examples of strategies used to demonstrate endorsement. Once support for ITS solutions is gained, there are channels through which to demonstrate endorsement of ITS solutions to organizations throughout the metropolitan area, such as through planning documents.

3.1.1. Strategies to Gain Endorsement of ITS

All interviewees indicated that elected officials are the most important people from whom to garner support for ITS since they make funding decisions and can set the tone for support by other stakeholders. It is also important for mid- and upper-level transportation managers to support ITS since they inform elected officials and guide funding decisions within their respective transportation organizations. To gain their support, elected officials and transportation managers need to be provided with data and information that define ITS products and services, explain how the technologies are used, and detail the benefits that can be realized. This information can be made available through one-on-one discussions with agency management, presentations, scanning reviews, and committees. Educating the general public is also a viable way to inform elected officials.

This section discusses four strategies:

- ❖ Data and Information
- ❖ Scanning Reviews
- ❖ Committees
- ❖ Public Outreach

Convincing elected officials to endorse ITS is not always easy or successful. Issues such as welfare and crime can receive priority over transportation issues, which can be complex and difficult to understand. Interviewees also stated that elected officials at the local and county levels need to be convinced that the system-wide benefits produced by ITS also produce benefits at the local jurisdiction level. Efforts to coordinate arterial signal systems across counties may cost a single county only \$20,000, but those funds are competing for other projects that are important to voting citizens, such as senior citizens centers. Overall, elected officials think ITS is a good idea, but are skeptical and need proof that there are benefits for their jurisdictions. Another common hurdle is that the many acronyms used to describe ITS products and services make ITS concepts difficult for elected officials and others not familiar with the technologies to understand.

Transportation managers, although more knowledgeable and usually more accepting of ITS solutions than are elected officials, have to make funding decisions between competing interests within their organizations. ITS products and services are only one of many items that compete for funds. One interviewee stated that he has educated four different presidents of a transit agency. The current president is the first to openly support ITS. In the past, other presidents favored buying new transit vehicles over investing in ITS technologies. Interviewees from some agencies stated that they do not have direct access to elected officials, and that educating elected officials is a role most appropriately assumed by the metropolitan planning organization (MPO). Those interviewees from regions where they know their elected officials on a first-name basis were more likely to conduct some ITS outreach directly to them. Many interviewees in upper management positions indicated that educating elected officials is a time-consuming part of their job.

Data and Information

Many interviewees stated that operational data demonstrating the benefits of ITS would be useful to educate elected officials but that the data are not yet available on a regular basis or in large quantities since ITS technologies are in the early stages of deployment. Most areas have plans to gather operational data, which can be used for before-and-after studies. There appears, however, to be little data being gathered currently for specific projects or on a system-wide basis. Therefore, elected officials and managers must be sold on ITS through the presentation of qualitative and anecdotal information, and from quantitative studies, such as benefit-cost estimates, completed in other metropolitan areas.

There are many methods to inform elected officials and managers in the absence of operational data. The most common method cited during the interviews was for MPO or state DOT staffs to make presentations to the MPO Board and management staff of key agencies, or to discuss specific projects with elected officials on a one-on-one basis. Managers also receive information through publications. One interviewee suggested that the message to elected officials and managers must be that they consider ITS products and services as one of many tools used in transportation and that integration of ITS projects across a metropolitan area takes a long time to achieve. Elected officials should be provided with benefit information and with a realistic timeframe for deployment and integration. Although many interviewees stated that the MPO is

the natural entity to inform elected officials, staffs from both transportation operators and universities also assume this responsibility.

A few interviewees suggested that elected officials need to be provided only with simple facts. A number of transportation officials felt that because of the smaller budgets of ITS projects, ITS projects are not a primary concern to most politicians, therefore not requiring a great deal of data to overcome any opposition. In addition, the current operating costs are not high since ITS projects tend to be in the early stages of deployment. However, most interviewees conjectured that once ITS projects are operational for a period of time, elected officials will want information to decide whether it is worthwhile to continue funding the operations as well as to upgrade or expand the advanced systems. At that point, there will be even more intensive competition with traditional capital projects and more need to provide sound operational data and information to elected officials to enable them to justify their support of ITS projects and possible increases in operating costs.

Dallas-Fort Worth

Elected officials on the Regional Transportation Council, the transportation policy-making body of the MPO for the Dallas-Fort Worth Metropolitan Area, are informed by the MPO staff using local congestion information and “common sense” as to what level of detail that the Council wants to hear. The Council members have a high level of trust for the MPO staff that has been cultivated over many years. The message from the MPO staff is that transportation professionals in the region should aggressively manage traffic and focus on reliability over mobility.

To secure the Council members’ support, the MPO staff brief them on the logical arguments supporting freeway management. The members of the Council receive congestion information and are shown the relationship among incidents, congestion, and air pollution. Local problems and how ITS products and services can help solve them are explained. For example, local arrangements for traffic control in the Dallas area impede incident clearance. Each municipal police agency is responsible for its own traffic control and there is a tendency to shut down lanes for the police officers’ safety, instead of clearing the incident quickly. If the agencies involved cooperated with one another, used variable message signs, and implemented common wrecker and clearance policies, incidents could be cleared faster, reducing congestion and improving air quality. According to one elected official, until the MPO staff educated them, the elected officials were not aware that agencies, such as the police departments from the different jurisdictions, did not coordinate their activities with one another and did not have similar incident clearance operating procedures. The Council is now considering ITS products and services that can provide some remedy to the problems with incident clearance.

Twice a year, the MPO staff update the Regional Transportation Council on the ITS program, planning, and implementation. As part of this, the Council is given results of the courtesy patrol, a very popular program, and performance reports on all of the advanced systems being used in the Dallas-Fort Worth region. On an *ad hoc* basis, elected officials are informed of the ITS products and services that are deployed in other cities and of those technologies where interest have been expressed about applying them to help solve transportation problems in the Dallas-Fort Worth Metropolitan Area.

Other

Officials from the California DOT use an outreach consultant to present the regional strategic ITS deployment plan to elected officials in the Los Angeles area. The goal is to educate officials on ITS benefits and to peak their interest. In the short amount of time usually allocated for such presentations, the consultants deliver a directed message and provide handouts.

The Florida International University coordinated a workshop on ITS held in Broward County (Fort Lauderdale) that was attended by a number of transportation operators throughout the State of Florida. The workshop provided an introduction to ITS and described current and planned regional deployments.

Over a five-month period in 1998, staff from the Chicago Area Transportation Study made presentations on ITS to all eleven Regional Councils of Mayors, which coordinate the 271 municipalities comprising the Chicago Metropolitan Area. A key purpose of these presentations were to update the mayors and local transportation officials on the status of the *Northeastern Illinois Strategic Early Deployment ITS Plan*, to discuss ITS in general, and to provide an opportunity for additional input into the Deployment Plan development process.

A Chicago MPO official noted that the level of data and information provided to elected officials and managers must be targeted to the ITS sophistication of the audience. Staff from the DuPage Mayors and Managers Conference, a council of local governments in Chicago's Metropolitan Area that is far ahead in considering ITS products and services, believe that information should be shared to build support in any method possible; so they welcome the MPO awareness presentations and provide training for projects specific to the DuPage County area. Conference staff have educated their local elected officials to the point that the municipal leaders in DuPage County are comfortable with ITS-related terminology.

Scanning Reviews

Scanning reviews, or the visiting of facilities in cities that have deployed ITS, is one useful strategy being used nationally for informing not only elected officials and upper management, but other stakeholders as well, such as staff from fire, police, and public works departments. Scanning reviews, such as visits to traffic management centers, help make people aware of ITS when it was not previously a priority to them. An Executive Director of an MPO in California turned from skeptic to supporter after visiting ITS facilities in San Antonio, Tucson, and Seattle.

Interviewees stated that combining operations staff with elected officials or high-level policy staff on scanning reviews provides an unusual opportunity for the two groups to communicate about the ITS products and services that can meet regional transportation needs. It also enables operations staff to better understand non-technical concerns of the elected officials. Some interviewees remarked that sponsoring scanning reviews can also be beneficial. In Chicago, as part of the ADVANCE (Advanced Driver and Vehicle Advisory Navigation Concept) project, the Illinois DOT conducted many scanning reviews of their facilities. This provided an additional opportunity for Illinois DOT's ITS staff to communicate with and learn from elected and technical representatives of other metropolitan areas.

Interviewees also recommended that scanning reviews be taken at the beginning of regional planning efforts or when exposure is needed in advance of a specific project to help decision-makers conceptualize what they need. It helps to visualize what the technology will look like and use the information to identify ITS needs early on. If funding or time constraints are an issue, one interviewee suggested that pictures and slide shows accomplish much the same, but emphasized that words alone are not enough.

Committees

Elected officials and transportation managers can become educated on ITS technologies, products, and services by participating on committees, especially those established to consider ITS solutions. The goal of some ITS-related committees is to educate members on ITS technologies in general, while the goal of other committees is to examine ITS options that can help solve regional transportation problems. Participation on either type of committee improves the knowledge base of elected officials, who are then more likely to support ITS deployments. ITS advocates are especially important if they are linked to the policy-level decision-making process as are elected officials and upper managers in transportation organizations.

Miami

The Miami-Dade County MPO staff did not know about the benefits of ITS products and services until a few years ago, with the exception of individual pieces of technologies such as closed circuit television cameras. The MPO Director learned about ITS technologies and the benefits from systems integration while representing the Miami Metropolitan Area on the Public Technologies, Inc.'s ITS Committee. Currently, the Director is Vice-Chair of Public Technologies, Inc.'s Urban Consortium Transportation Task Force which focuses only on ITS. The task force is a resource group to all of Public Technologies, Inc.'s members. According to the Director, through his involvement with this organization, he had access to ITS materials and concepts and was able to crystallize his ideas. He began to see ITS as a tool for congestion relief.

With his new knowledge, the MPO Director described to different Miami-Dade County MPO committees the benefits to expect from ITS. Also in 1995, the MPO Director presented ITS to the Transportation Planning Council, the policy-making body of the MPO. After the presentations to Council members, the Council decided to create an ITS committee. This ITS Committee has helped foster a countywide perspective of ITS to transportation operators and relevant agencies.

Los Angeles

Although primarily formed to demonstrate the endorsement of ITS within the Regional Transportation Plan, the Southern California Association of Governments' Advanced Technology Task Force actually produced a dual function by increasing policy makers' awareness of ITS. The MPO's Advanced Technology Task Force was originally created to address air quality and other local issues with technological solutions, including ITS, for the 1994 Regional Transportation Plan. To better fulfill its responsibilities, the Task Force created a subcommittee to specifically address ITS strategies and provide even greater depth of information about ITS to the area's policy makers. The Task Force existed for only two years,

but was responsible for introducing ITS products and services to many elected officials and upper managers of transportation agencies in the Los Angeles Metropolitan Area. Through this education, the MPO's Advanced Technology Task Force became instrumental in increasing the level of endorsement by policy makers for ITS activities as part of the transportation planning process.

Public Outreach

Gaining citizens' support for ITS products and services is an alternative way to indirectly gain elected officials' support. It is hoped that by educating citizens, they will in turn demand that their local elected officials support the deployment and operations of ITS products and services. This is seen as a slow process. Many agency representatives admitted that public outreach is a later step in their local ITS program. However, this strategy has emerged as a priority in Miami.

Miami

This strategy is being developed and used extensively in the Miami Metropolitan Area where there are no at-large elected offices and elected officials represent individual jurisdictions within the single county. The lack of countywide representation and the fact that the ITS program is in its infancy, makes it difficult to garner support from elected officials for area-wide ITS deployments.

The MPO, through strong leadership from the Executive Director, educates its governing board members on ITS. However, an assortment of transportation professionals in this region stated that the best way to get elected officials' support was through the citizenry, who will then influence the elected officials. A key County Commissioner even advised the Florida DOT and MPO staffs to increase the public's knowledge regarding ITS. Therefore, Miami-Dade County's *ITS Plan* has a chapter on educating the public.

The responsibility for public outreach and education on ITS will fall primarily to staff from Florida International University, who are piloting an education project. Miami has a very diverse community, which requires a multi-ethnic outreach program. University staff have already held a town meeting in Fort Lauderdale for the Broward County ITS Plan, which the University authored. University staff will also hold town meetings to discuss and explain the ITS plans for the Miami International Airport and the Miami Seaport.

In addition to the University's work, the MPO staff have already held a series of one-day public hearings to inform the public about ITS technologies and applications, and have completed mass mailings to the public of both the County *ITS Plan's* Executive Summary and a brochure on ITS. While MPO staff agree that this is a slow process, they have seen that more people are actually learning about the potential of ITS products and services.

The Miami-Dade MPO's ITS Committee members felt that even more ITS outreach and education efforts needed to be done than was outlined in the *Dade County ITS Plan*. The Florida DOT has added to this effort by providing state funding so the ITS Committee, through the MPO, could hire a public education consultant. The consultant is now developing a broad-based public information campaign. The goal is to "reach people who will reach people," such as key

members of homeowners associations or Chambers of Commerce. The consultant will create a video and accompanying brochure for the general population to be distributed at fairs, clubs, and to various associations. They are also working on a media tool kit and a marketing campaign for the Service Patrol Program.

The Florida DOT staff's only contact with elected officials is through the MPO. This condition encourages the state staff to educate at the grass roots level and build political support with a wide range of interest groups and individual constituents. Florida DOT staff use in-house resources for outreach and are developing an organized approach that includes an ITS presentation that can be used for a variety of audiences. Florida DOT District staff have already presented to the local League of Cities, Chambers of Commerce, condo associations, students and faculty at universities, at town meetings, and to a number of professional organizations, such as the Institute of Transportation Engineers. Florida DOT staff stated that they are willing to make presentations and "talk to anyone who will listen," but want to target interest groups to achieve the greatest awareness that will ultimately lead to political support.

3.1.2. Strategies to Demonstrate Endorsement of ITS

Once support has been garnered, endorsement of ITS deployments can be demonstrated through planning and programming activities, including those required as part of the MPO's federal responsibilities, or other planning activities that occur outside of the MPO process. This section describes channels through which ITS endorsement can be demonstrated:

- ❖ Regional Transportation Plan
- ❖ Transportation Improvement Program (TIP)
- ❖ Other Planning Documents
- ❖ ITS Plans
- ❖ Committees
- ❖ Advocacy from Decision-Makers.

The first four strategies demonstrate ITS endorsement through planning and programming activities. For example, citing ITS in the MPO's regional transportation plan provides a policy statement that the region is committed to ITS, allowing all operating agencies to know that ITS products and services are options that can be considered to solve transportation problems. These strategies can be especially useful in areas where there is little direct support from elected officials. In such areas, ITS tends to be planned and deployed piecemeal, in a bottom-up fashion, instead of top-down. Including ITS in planning documents can help transportation providers think through how to bring together all of the decentralized ITS activities and integrate them into a regional context.

Table 2 summarizes how ITS projects and services are being included in the planning documents in the ten metropolitan areas. Documents reviewed include regional transportation plans, transportation improvement plans, congestion management plans, major investment studies, and other plans that include early deployment plans, priority corridor plans, and project plans.

The fifth strategy is the use of committees through which elected officials and upper-managers support regional planning and deployment of ITS. The sixth and final strategy is the effort of some elected officials and transportation managers who have publicly acted as advocates of ITS solutions.

Table 2. Inclusion of ITS Projects in Metropolitan Planning Documents

Metropolitan Area	RTP	TIP	CMS	MIS	Other Planning Activities
Albany	Separate ITS Chapter	Not in separate ITS section, included with other projects	---	Corridor MIS with some ITS	Regional EDP Feasibility study for transit project with ITS
Chicago	Policy statement and as part of TMS	Yes, only GCM Priority Corridor projects separated	In current CMS plan	Yes, as an alternative	GCM Corridor Plan Northeast Illinois Strategic EDP
Dallas – Fort Worth	Advanced technologies support in RTP	Yes, included in other sections, but not as ITS	In current CMS plan	Yes, as an alternative	Dallas ITS Plan Fort Worth ITS Plan Regional ITS Plan
Denver	Redrafting plan to include ITS	ITS as part of larger projects– HOV, signals, TOC	Inclusion in future CMS	In 3 MIS, as low-cost options	Traffic signal improvement (coord.) program State SIP has other ITS
Los Angeles	Includes ITS in RTP processes	Yes, as separate section	Included as CMS strategies	---	State ITS Plan Southern Cal. Priority Corridor Plan
Miami	Includes ITS in RTP processes	ITS section in TIP, cross-referenced to other sections	In current CMS plan	Inclusion in current MIS	ICS Corridor Plan Dade County ITS Plan ATIS Regional Plan
Milwaukee	Includes ITS projects since 1977	No specific ITS focus; some FMS & TMS projects	CMS recommends ITS	Inclusion in current MIS	'88 Freeway Traffic Management Plan GCM ITS Plan
Seattle	Updated RTP contains ITS section	Included in other sections. Future ITS section.	---	---	Smart Trek MDI Plan WSDOT ITS Plan Seattle–Portland EDP
Washington, D.C.	New RTP will contain ITS section	No ITS section in TIP, may include in future TIP	ITS considered for CMS	---	Capital Area EDP Washington, D.C. EDP Northern VA EDP
Winston-Salem	Minimum language that applies to ITS	Few ITS projects, primarily transit, No ITS category	---	---	Mobility Manager Plan
<p>Abbreviations used in Table: RTP – regional transportation plan; TIP – transportation improvement program; CMS – congestion management system; MIS – major investment study; EDP – early deployment plan; TMS – transportation congestion management strategies; FMS – freeway management system; SIP – state implementation plan; ATIS – advanced traveler information system; MDI – model deployment initiative</p>					

Regional Transportation Plan

Nationally, many MPO staffs include or are planning to include ITS in their regional transportation plans. Some plans contain more detail than others, depending on the area’s ITS needs and level of ITS development. The main objective is to raise the significance of ITS at the policy level and make a regional commitment to ITS. This legitimizes ITS products and services

and helps encourage transportation professionals to consider them as solutions when addressing transportation problems and to include them within other planning documents, such as in major investment studies.

Staff from MPOs include different policy messages in regional transportation plans. The Washington, D.C., MPO staff are currently rewriting their regional transportation plan to include an expanded section on ITS. Their intent is to increase the exposure and support at the policy level and to raise the importance of traveler information and transit applications. In the regional transportation plan for the Chicago area, there is a stated need for integrating ITS technologies, and ITS use is supported in a policy statement as a Transportation Congestion Management strategy. In fact, six of the eleven Transportation Congestion Management strategies are ITS-related. The regional transportation plan for the Dallas-Fort Worth Metropolitan Area includes a traffic management philosophy asserting that the development in the region has matured to the point that traffic needs to be managed. The Executive Director of the Dallas-Fort Worth MPO suggests that regional transportation plans with traffic management philosophies should address such issues as which corridors need to be managed and at what times of day. Beyond this, he suggests the level of ITS detail in an regional transportation plan depends on the area's needs.

Most transportation plans do not include specific ITS projects. The regional transportation plan for the Chicago Metropolitan Area lists major facility projects, mostly transit and highways. However, ITS, bicycle and pedestrian, and arterials projects are not listed in the plan since it is difficult to know what these projects might be over the next 20 years. This is especially true in the case of ITS projects, in which technologies can change in a short amount of time making their long-range direction unclear. Staff from several MPOs mentioned this explanation as the reason that they do not list specific ITS projects in the regional transportation plan.

One interviewee suggested that it is particularly important for transportation staffs from metropolitan areas that are just beginning to plan for ITS to include ITS in the transportation plan. Staff at these areas need to remain focused since it takes a long time to implement ITS. If ITS is not in the regional transportation plan, it will not become a priority for regional funding.

No operating costs for ITS are currently included in regional transportation plans. The Miami Metropolitan Area's transportation plan includes operating and maintenance costs in one lump sum, but these are not costs specifically for ITS. Officials in Chicago remarked that their area's regional transportation plan is slowly evolving and conjectured that the Plan should eventually include advanced transportation systems and their associated operational impacts. Many acknowledged that operating costs would have to be addressed in the future with increased ITS deployment. However, there is no consensus on whether these costs should be included in regional transportation plans and TIPs.

Albany

Staff for the Capital District Transportation Committee, the Albany Metropolitan Area's MPO, emphasized that they cannot overstate the regional commitment to ITS developed through the planning process. ITS products and services are included in both the regional transportation plan and a corridor-based early deployment plan. This has increased awareness and support in the

area and, as a result, every transportation project is considered for the possible inclusion of ITS technologies, including laying fiber optic cable.

In addition to the constrained regional transportation plan, an unconstrained plan, *New Visions*, has been developed. The MPO staff sought broad input while developing the *New Visions* long-range plan. The broadened input included the views from twelve task forces, including many anti-road groups whose contributions to other transportation plans had been minimal. Representatives from bicycle and pedestrian interests and from the freight and transit industries provided input. The Capital District Transportation Committee staff educated these new groups on the benefits of ITS. After they were educated, the task force members were more willing to support road expansion and improvement projects that were balanced with increased transit services made possible with ITS applications.

Dallas-Fort Worth

The current regional transportation plan for the Dallas-Fort Worth Metropolitan Area supports ITS products and services through a traffic management philosophy that emphasizes squeezing capacity from the existing system. It justifies this philosophy based on federal financial constraint requirements and mitigation that has to be undertaken due to the area's air quality non-attainment status. The Executive Summary of the plan is used as a marketing piece and provides direction to agencies in the region. There is a current and ongoing effort to link the Dallas and Fort Worth ITS Plans with the regional transportation plan to make stronger linkages between the planning documents.

The current regional transportation plan stresses incident and emergency management and lists ITS as a traffic management tool that could integrate strategic arterials. One section of the current *Mobility 2020 Regional Transportation Plan* is devoted to three ITS areas: advanced traffic management systems, advanced traveler information systems, and advanced public transportation systems. The 1999 plan update (*Mobility 2025*) will include three more ITS areas: commercial vehicle operations, advanced vehicle control and safety systems, and advanced rural transportation systems.

Los Angeles

ITS have increasingly become a significant element in the Los Angeles Metropolitan Area regional transportation plan, especially with the air quality conformity of the Clean Air Act of 1990 and associated demonstration projects. Interviewees stated that including ITS in the transportation plan indicates that constituents acknowledge that these technological applications are acceptable ways to spend funds. Caltrans staff are particularly supportive of including ITS in the regional transportation plan. Although they have deployed advanced systems to improve freeway operations since the 1970s, staff stated that it has been much more difficult to be innovative without regional support. The statement in the transportation plan is that ITS is important and that transportation providers should explore innovative ways to move the public and freight, to develop multimodal systems, and to use advanced technologies.

Miami

The ITS Plan for the Miami Metropolitan Area is included as an addendum to the regional transportation plan. However, the regional transportation plan will be updated to include a

special section dedicated to ITS. MPO staff want ITS to be highlighted so that more attention will be paid to it. Interviewees in the Miami Metropolitan Area stated that incorporating ITS in the transportation plan and the TIP elevates the use of technologies throughout the region and helps elected officials see individual ITS projects as part of a planned program. MPO staff, who have become strong proponents of ITS products and services, stated that it was useful to be able to refer to the fact that ITS is in the regional transportation plan when justifying project ideas to operating agencies.

Transportation Improvement Program

Most ITS projects, like other transportation projects receiving certain types of federal funds, must be included in a region's TIP. Some MPO staff, however, go beyond this basic requirement and use the TIP to highlight ITS projects. Administrators from the Illinois DOT and the Chicago Area Transportation Study cooperatively decided to include Gary-Chicago-Milwaukee (GCM) Priority Corridor projects funded through the Illinois DOT in the Chicago Metropolitan Area's latest TIP, even though they were not required to go into the TIP. Officials from the Illinois State Toll Highway Authority likewise included ITS projects in the Chicago TIP, although not required because they were neither federally funded nor capital improvement projects. These projects were included for informational purposes. Other MPO staffs have modified their TIP project evaluation processes to accommodate the difference between traditional capital projects and ITS projects, resulting in an increased number of ITS projects selected for inclusion in the TIP.

Miami

Many MPO officials stated that the TIP is not particularly useful as a resource document for transportation professionals because the contents can be difficult to decipher. The Miami MPO staff, however, designed the TIP to be a useful source of information for elected officials, management of transportation agencies, and representatives of other interested organizations. The Miami MPO staff use the TIP to increase awareness of ITS projects. All ITS projects in Miami-Dade County are cross-referenced in the TIP in both an ITS section and other categories, such as highway infrastructure and transit facilities. The MPO staff includes a one-page summary in the TIP that identifies the ITS projects that are listed elsewhere in various project categories within the document. This presents the projects as an ITS program and demonstrates how the projects planned for the area are interrelated to each other and to traditional projects and how individual deployments work together to help reduce congestion. This page is capable of being faxed to interested parties to respond to their concerns and questions. The MPO staff routinely send the County Commissioners a list of projects in their individual jurisdictions, including those categorized under ITS. Other interested parties have included a variety of public agency and private sector transportation professionals, real estate agencies, insurance companies, and even students.

One interviewee from the Miami area stated that it has been useful having ITS projects highlighted in the TIP because it makes the projects more visible. For example, a new operations center was identified on the TIP's unfunded needs list and had the highest priority of all the projects on that list. Therefore, the project gained recognition and the MPO Board is finding ways to fund it.

Albany

Several ITS projects were identified for funding in the latest TIP for the Albany Metropolitan Area, in part because of revised project evaluation methodologies. During the TIP revision process, the Capital District Transportation Committee staff provided a level playing field upon which to compare ITS projects with other transportation projects. First, MPO staff separated out the proposed ITS projects. Then, benefit-cost estimates were calculated for each ITS project using the travel demand model as it is used for traditional projects. However, the ITS projects were evaluated against incident conditions, such as traffic accidents or severe weather, instead of typical conditions. The inputs for incident conditions more closely resembled the conditions under which ITS projects would be necessary and provide benefits. The resulting benefit-cost estimates were provided to the planning committee, whose members used them along with other considerations in their project selection decisions.

Seattle

Prior to 1997, ITS projects in the Puget Sound area did not compete well in the project selection process for the TIP. The benefits for ITS projects were not well known, which was a disadvantage in a system where all projects, including capital and ITS projects, competed on the same level for federal funds. Staff for the Puget Sound Regional Council, the MPO for the Seattle Metropolitan Area, are now leveling the playing field for ITS projects by working with staff from operating agencies submitting projects for the TIP and by modifying project selection criteria. MPO staff provide examples of successful ITS project proposals, explain why an ITS application does or does not score well, and suggest improvements to ITS project proposals.

In addition to improving how ITS projects are presented in the project selection process, TIP project selection criteria have been modified to help ITS and transportation demand management projects compete more equitably with traditional projects. Points are now given to multi-jurisdictional projects so they receive a higher priority. In the past, no one agency wanted to “sponsor” a high cost multi-jurisdictional, or corridor, project because the total TIP expenditures would be charged to that single agency, rather than breaking the cost among the agencies actually involved. This penalized ITS projects since most of them are regional in nature and are therefore multi-jurisdictional. An agency that took the lead on a multi-jurisdictional project would unfairly appear to receive so much funding in the TIP that it could have hurt the agency’s chances of receiving funds for other agency-sponsored projects. An interviewee from Albany reported that they were experiencing the same situation. To overcome this concern, the MPO officials are beginning to publicize that the lead agencies of these regional projects are not the sole recipient of the project’s benefits.

Los Angeles

In the Los Angeles Metropolitan Area, each of the county transportation commissions is responsible for selecting projects and submitting them to the MPO for inclusion in the TIP. The staff for the Los Angeles County commission have special categories for projects in their project selection processes. All projects are classified into six categories: (1) transportation system management, (2) freeways and traffic operation centers, (3) regional transportation improvements (roads), (4) bikeways, (5) transit operations, and (6) enhancements. The transportation system management category has four tiers:

- Tier 1. Traffic engineering improvements
- Tier 2. Bus priority
- Tier 3. Computerized traffic control systems
- Tier 4. SMART Corridor and ITS.

The Los Angeles County staff have attempted to prepare project categories that will accommodate the future ITS needs of the area under the transportation system management category. Most proposed transportation system management projects fall into the first three tiers. However, staff stated that more Tier 4 (ITS) projects may be proposed in the future as the needs in the first three tiers are met.

Dallas-Fort Worth

The evaluation criteria used to select projects for the latest the Dallas-Fort Worth TIP were modified in order for ITS projects to be fairly evaluated. The MPO's Regional Transportation Council members believed that the traditional process unfairly excluded valuable ITS projects by not considering the regional benefits associated with ITS projects. Projects selected as a result of the new criteria included changeable message signs, electronic total stations for accident investigation, a mobile incident vehicle, a fiber-optic cable network, a closed circuit television system, inter-district communication systems, motorist information systems, and highway advisory radio.

All projects, including ITS products and services, submitted for inclusion in the TIP were initially evaluated according to the criteria assigned to the projects' funding source. The evaluation criteria favored high occupancy vehicle lanes, intersection improvements, and signal improvements. Those ITS projects that were not selected during the original call for projects were reevaluated through the Regional Corridor Management effort. This was a combined effort by elected officials, through the Regional Transportation Council, and transportation officials, through the Surface Transportation Technical Committee and an Advanced Transportation Management Task Force. The committee members first removed duplicative ITS projects and then developed guidelines to help identify which projects to fund. The guidelines specified five criteria:

1. Implement the recommendations in the Congestion Management Plan by targeting incident detection and response technology and mobility assistance programs on congested corridors.
2. Fill gaps in existing corridor management efforts by completing critical system linkages.
3. Enhance the communication and information exchange between Texas Department of Transportation and local transportation agencies.
4. Leverage transportation resources by creating or enhancing public-private partnerships that will target the identification and mitigation of traffic congestion.
5. Leverage transportation resources by targeting investments, where possible, to facilities undergoing reconstruction.

Based on the responses from all of the interviewees in this study, most agency officials believe that adding ITS projects to the TIP does not produce the exposure that adding an ITS policy statement in the regional transportation plan provides. The TIP is seen as a large document that

compiles the priority projects from a number of transportation entities and regional associations, but not a list of priorities for the entire region. Many transportation officials said the approach of documenting individual agency priorities limits the ability to flexibly plan how to best apply transportation resources to accomplish complex and occasionally conflicting regional transportation and air quality objectives.

Other Planning Documents

In a number of areas, ITS products and services are now included in planning documents such as feasibility studies, conformity determinations, congestion management plans, and major investment studies. Including ITS in any of the documents indicates movement toward mainstreaming ITS products and services into the transportation planning process. Similar to including ITS in the regional transportation plan, this action increases awareness of ITS products and services to agencies and operators and makes a statement that ITS products and services are acceptable solutions.

Albany

In Albany, the MPO staff completed a feasibility study on a busy corridor to address declining transit ridership by improving service with technology. Route 5 is a 16-mile corridor that functions as a major arterial between Albany and Schenectady. This corridor handles 20 percent of all transit ridership for the Capital District Transportation Authority. The idea was to make bus service resemble light-rail service using technologies such as signal priority and traveler information. The MPO Director suggested that the corridor could be efficiently served by bus instead of light-rail after an earlier study showed that light rail could not be fiscally justified along the corridor. The MPO staff brought a regional perspective to the feasibility study. The Transportation Authority staff will consider this corridor as a flagship service to be used as an example for other services.

Chicago

The respondents from the Chicago Metropolitan Area stated that with the initiation of the GCM project and the *Northeastern Illinois Strategic Early Deployment Plan* effort, there is newly attained knowledge of ITS, and the use of advanced technologies are now referenced in a number of Chicago Area Transportation Study's planning documents. The Congestion Management System study includes several ITS strategies, such as improved signal system performance. While the Chicago MPO staff does include signal coordination and other ITS projects in the network models for conformity determinations, it is difficult to break out individual ITS impacts from the entire network model. Chicago Area Transportation Study staff did, however, complete a special analysis for the I-Pass system during the last round of conformity analyses, underlying the significance of this electronic toll collection deployment for the Illinois State Toll Highway Authority.

Los Angeles

ITS products and services are becoming a significant element in the Los Angeles Metropolitan Area's conformity analysis due to extensive air quality concerns. Staff from the Southern California Association of Governments use the air quality conformity determination, required by

the Clean Air Act Amendments of 1990, as a tool to encourage regional thinking, thereby enhancing the demand for ITS applications and operations.

Miami

In Miami, the project manager for the MPO's Congestion Management System began including ITS in the congestion management plan after attending one of the MPO-sponsored ITS Committee meetings in 1994. The ITS projects identified in Miami's congestion management plan are also cross-referenced in two principal ITS plans, the *Dade County ITS Plan* and the regional *Southeast Florida Intelligent Corridor System Plan*.

Dallas-Fort Worth

The MPO staff for the Dallas-Fort Worth Metropolitan Area have categorized ITS as part of the Congestion Management System special projects group since 1995. In the Metropolitan Area, two major investment studies for transit are underway and two more are planned. ITS technologies are included in all four of them. In the two that are underway, which are highway corridors Interstate 30 and U.S. 75, ITS solutions will stand alone. In the two major investment studies yet to begin, ITS will be part of the alternative options.

ITS Plans

ITS plans can be useful tools to both gain and demonstrate endorsement of ITS by transportation managers and elected officials. Interviewees revealed that ITS plans can capture the attention of the top management of transportation operators who had never before considered ITS products and services. The plans can also provide a regional perspective that ties together ITS projects in those areas in which ITS has been planned for and deployed on an individual project basis.

Finally, it is with these plans that the first steps can be taken to incorporate ITS projects into the metropolitan transportation planning process. The creation of a plan causes many transportation officials in a region to consider ITS technologies for the first time. The plan provides a roadmap and helps to develop consensus among operators and agencies. One local official espoused the value of sharing these plans with their elected officials. The individual noted that although only planning agencies and operators generally read the plans, the sharing of the plans has helped develop support for regional ITS deployments from those who make funding decisions. After the initial ITS project consideration, the next step occurs and many projects identified in these ITS plans are submitted for funding through the regional TIP development process.

Albany

In Albany, the Capital District ITS Strategic Plan is a tool used to identify what steps need to be taken to tie many projects together. The previous regional system approach had been to develop a large ITS project and then experience a multi-year drought in new deployments. The ITS Strategic Plan will provide interim connections between the large projects. One corridor-wide ITS project from the plan, the Route 5 corridor between Albany and Schenectady, is in the TIP.

Chicago

In the Chicago Metropolitan Area, there has been a great deal of effort to develop ITS plans at every level. At the multi-state level, the *Gary-Chicago-Milwaukee Priority Corridor ITS Plan*

was completed in 1995 and updated in 1997. At the metropolitan level, *the Northeastern Illinois Strategic Early Deployment Plan* has been under development since 1997. At the local level, the DuPage County Strategic Plan has been in place since 1995 and the City of Chicago has drafted an ITS Master Plan as a compendium to the City's Transportation Management Plan.

Like many large metropolitan areas with numerous agencies and organizations, ITS products and services in the Chicago Metropolitan Area have been deployed individually, in a project-by-project fashion. The initial focus of the GCM Plan was on the expressways. The *Northeastern Illinois Strategic Early Deployment Plan* has brought the GCM effort closer to the local level by concentrating on the arterials as connectors to the expressway. There has been a conscious effort not to have the Deployment Plan duplicate the larger GCM effort. The Deployment Plan is a unique subset of the GCM Plan; it addresses local projects and lays out vision for how things will be locally. This Deployment Plan, led by Chicago Area Transportation Study, and co-sponsored by the Illinois DOT, Illinois State Toll Highway Authority, Regional Transportation Authority, and Chicago DOT, helped to create a regional view of individual ITS projects of individual agencies. The Deployment Plan provided each agency with information on ITS activities, and areas were identified where integration could occur. Short and mid-range project proposals from the plan are now being developed and completed.

On a more local scale, members of the DuPage Mayors and Managers Conference consider ITS technologies as part of their three-year strategic plan. The Mayors and other local leaders had little concept of the GCM Priority Corridor until the Conference's Strategic Plan was developed, which required that they find out what was happening elsewhere in Illinois. The DuPage officials learned that they could benefit by tying their efforts to the GCM Priority Corridor. The Early Deployment Plan has incorporated the projects from the Conference's Strategic Plan, but the Strategic Plan does not directly tie into the MPO's *Destination 2020 Regional Transportation Plan*, which was adopted in 1997. However, like the City of Chicago's ITS Plan, the ITS projects included in the Conference's Strategic Plan will eventually be incorporated within a future update of the regional transportation plan.

Dallas-Fort Worth

The Dallas-Fort Worth Metropolitan Area is composed of many transportation operators and agencies; staff from each of these stakeholders have begun to consider ITS technologies, but at varying paces. Whereas ITS plans are typically geographically based, the Dallas-Fort Worth plans are all agency-based. The Texas DOT Fort Worth District was the first agency in the area to develop an ITS-type plan. In 1985, District staff completed an advanced traffic management plan. The Texas DOT Dallas District drafted its ITS Plan in 1996. Currently, both Texas DOT Districts are updating their ITS plans and nearing completion. ITS plans or studies are also being initiated for the Dallas Area Rapid Transit and planned for the Fort Worth Transit Authority and the North Texas Tollway Authority. A decision was made by the area's transportation directors to coordinate all of these and any future ITS plans and create a single ITS Plan for the Dallas-Fort Worth Metropolitan Area. As of the summer of 1998, this is occurring through the Regional Comprehensive ITS Program Steering Committee, a regional committee composed of transportation agencies and operators.

The ITS Plans have already been instrumental in initiating some agency coordination. Because they were able to bring a regional perspective to the process, MPO staff from the North Central Texas Council of Governments were asked to facilitate and coordinate the development of the Texas DOT District plans and participate on the respective planning committees. Input from the Dallas Area Rapid Transit staff was sought for the Dallas plan. Staff from the Dallas-Fort Worth International Airport participated in the development of the Fort Worth District's second ITS Plan. The Dallas-Fort Worth Airport management's interest was peaked by the programming of projects being tied to the National ITS Architecture, and management's own interest in utilizing technologies being considered or already in use in the region, such as variable message signs and electronic toll collection. This new interest has forged a cooperative effort between the Airport management and the North Texas Tollway Authority to work together to develop the Tollway's ITS plan.

Today, over 40 percent of the projects first proposed in the Fort Worth District's 1985 advanced traffic management plan has been implemented. While projects from the 1985 Fort Worth plan were slowly being deployed through the years by the Texas DOT District, projects from this plan were first submitted to the MPO for funding in the 1994 TIP. Fort Worth's new ITS Plan includes compliance with the National ITS Architecture and details regarding the integration of existing and planned systems. This plan has similar priorities for ITS technologies as the region's TIP because the same criteria used by the MPO's Regional Transportation Council to select ITS projects for the TIP was used to select projects for the Fort Worth ITS Plan. With the inclusion of the National ITS Architecture, system integration, and TIP selection criteria, the Fort Worth District's new ITS Plan is an effort to look beyond its agency needs and meet the regional ITS needs to the degree possible by the Texas DOT District.

Miami

The *Southeast Florida Intelligent Corridor System Plan* was the first organized effort by the State of Florida to plan for ITS. It is a master plan for ITS deployment along the I-95 corridor, covering 70 miles, and includes Florida DOT Districts 4, 6, and the Turnpike, and Miami-Dade, Broward, and Palm Beach Counties. Florida DOT operations staff completed the draft ITS study in 1993 and presented it to the Miami-Dade County MPO for comment and review. Before 1993, Florida DOT operations staff had never participated in the MPO planning process.

The Southeast Florida Intelligent Corridor System Plan, along with the encouragement from the MPO Director, helped attract the interest of the Miami MPO's Transportation Planning Council to ITS products and services. The Council reviews all technical issues put forth to the MPO and makes recommendations to MPO Governing Board. In 1995, the Council created an ITS Committee to develop an ITS plan that focused only on Miami-Dade County and include the local transportation network. An MPO staff member was assigned as the project manager for the *Dade County ITS Plan*. The MPO and consultants took the regional *Intelligent Corridor System Plan* and used it to create the plan for Miami-Dade County. The *Dade County ITS Plan* identified key and potential players at all levels, including Florida DOT, public works departments, traffic engineering, and the airports and seaports, and made sure all of the agencies were in agreement regarding the purpose and direction of the County's Plan. There are four objectives of the *Dade County ITS Plan*:

1. Establish a general policy planning process for ITS products and services.

2. Introduce ITS products and services and integrate them into the overall planning process to compete for capital improvements funding, not just discretionary funds.
3. Make investments accountable to the public, but also educate the public that, unlike capital investments, they may not see results right away with investments in ITS products and services.
4. Create a sound plan that will attract private investors and aid in establishing public-private partnerships.

The *ITS Plan* for Miami-Dade County was adopted by the MPO Governing Body in early 1997. The ITS Committee will soon update the *Dade County ITS Plan*, including more specific projects. The *ITS Plan* is a supplement of the *Mobility 2020 Regional Transportation Plan*, which will also be updated with a special section dedicated to ITS. A benefit from the discussions about the *Dade County ITS Plan* at the ITS Committee has been the creation of the June 1998 *Fiber-Optic Communications Concept Plan for Dade County's Intelligent Transportation Infrastructure*.

Milwaukee

In 1988, the Southeastern Wisconsin Regional Planning Commission staff, with assistance from the Wisconsin DOT, completed the Milwaukee Area *Freeway Traffic Management Plan*. This plan recommended projects to improve traffic congestion. The main impetus was to get state and local agencies and operators to see the need for, understand, and build consensus around ITS products and services. The proper roles of agencies involved in the advanced systems were described in the plan.

Recommendations in the plan included expansion of the ramp meter system, increased usage of variable message signs, an improved incident management system, and improving the accuracy of traveler information provided to the distribution outlets. These outlets included radio and television stations, the Internet, and kiosks. Expansion of the information dissemination network and the ramp metering system is currently being completed.

Los Angeles

The Orange County Transportation Authority staff used the approval process for the *Orange County ITS Strategic Plan* to ensure that the elected officials were aware of local ITS activities. The Authority staff presented the *ITS Plan* in two parts. First, the staff presented the *ITS Plan* to members of the ITS Management Team, which is also the regional team representing Orange County on the Southern California Priority Corridor committees. Next, staff brought the Plan, with the ITS Management Team's stamp of approval, before the Orange County Board of Directors. The Board is composed of County Supervisors, city elected officials, a public non-elected representative, and an *ex-officio* non-voting representative from Caltrans. By the time the Board voted on the document, they were comfortable with the *ITS Strategic Plan*. The Board members accepted the *ITS Plan* with no changes because they felt the technologies were not too complex or unusual.

Committees

Elected officials and transportation managers sometimes use or form committees through which they act as regional advocates for ITS. Through these committees, they influence ITS policy and specific projects. They also encourage staff of transportation agencies to consider ITS products and services at a regional level to solve transportation problems. For example, the Washington, D.C., MPO Board created the *Vision Plan* Steering Committee composed of Board members. The committee members decided to include an ITS component for the *Vision Plan*, the unconstrained regional transportation plan.

Dallas-Fort Worth

The Dallas Regional Mobility Coalition, a non-profit government organization, is composed of elected officials from five counties and 26 cities, as well as business interests. Executives from the MPO, transit, tollway, and other transportation providers are *ex-officio* members. The primary goal of the Coalition is to improve mobility through means of political and project advocacy. The Coalition members consider ITS products and services as solutions that will help reach the Coalition's goal.

A primary responsibility of the Coalition members is to lobby state legislators and their staff. Although these discussions focus more on overall funding for the Dallas area, Coalition members also generate ideas and seek upper management and elected officials' support for projects. An administrator of this organization asserted that this role will be even more important in three to five years when funds may be scarcer.

The Dallas Regional Mobility Coalition members annually adopt a set of projects to promote and monitor. The projects must have regional significance. Coalition members personally hold discussions with transportation staff from the Tollway Authority, the MPO, and the Texas DOT, among others, about these projects. They do not manage projects but promote them to city managers and local transportation officials. The Coalition members promote the use of new technologies, such as toll tags, for speed monitoring and incident detection. Elected officials even bring ideas on technical issues offered by citizens to the Dallas Regional Mobility Coalition.

Los Angeles

Two committees in the Southern California region have been used to endorse ITS activities and to develop ITS solutions as part of the transportation planning process. The Southern California Association of Governments' Advanced Technology Task Force was created to address air quality and other local issues with technological solutions, including ITS, for the 1994 Regional Transportation Plan. The Task Force members identified technical strategies at the conceptual level. For example, members estimated the emission reductions from operating a certain number of electric vehicles. The effort was designed to educate the members on the options for improving air quality. The Task Force members included operations and planning staff, as well as the private sector.

The Southern California ITS Alliance Task Force was formed to provide direction and to relieve mid-level technical staff from having to address policy level ITS issues. The Task Force

members develop an understanding of and advocacy for ITS at the executive director level, work to pass legislation that supports ITS, and are responsible for institutions working together to develop a regional architecture. The members, looking at ITS in the region after the Priority Corridor is complete, have examined how to maintain ITS institutional relationships and find new ways to fund ITS deployments and operations. More recently, the members began developing a marketing plan for ITS technologies. Task Force members are the executive directors of institutions represented on the Southern California Priority Corridor Steering Committee. Representatives from Caltrans, the South Coast Air Quality Management District, the six county transportation commissions, the MPOs for the Los Angeles and San Diego Metropolitan Areas, and the Southern California Economic Partnership participate on the ITS Alliance Task Force.

Advocacy from Decision-Makers

In some metropolitan areas, elected officials and transportation managers have personally taken on the responsibility to act as advocates for ITS products and services. In a few metropolitan areas, transportation personnel remarked that they had “quiet support” for ITS from their area officials. In these areas, ITS deployments have been in operations as coordinated signal systems, traffic control centers, and motorist assistance patrols for a number of decades and are accepted as normal operations, not needing a high-profile proponent of ITS. Many interviewees also added that external advocates would be valuable to push for inclusion of ITS solutions into the MPO’s planning process.

Washington, D.C.

A key proponent of ITS products and services for the Washington, D.C., region has been Representative Frank Wolf, a U.S. Congressman from Virginia. Congressman Wolf strove to “solve problems on the Capital Beltway.” His interest encouraged ongoing discussions on how ITS could solve transportation problems in the area. As a result, the Virginia and Maryland DOTs sponsored a study that included a list of projects for the region and recommendations for further actions. This study and the associated discussion prompted the National Capital Region Transportation Planning Board, the MPO for the Washington, D.C., Metropolitan Area, to create the regional ITS Task Force. Representatives from the private sector and from over 30 local, regional, state, and federal transportation and public safety agencies participate on the Task Force. The multi-state ITS Task Force reports directly to and advises the Transportation Planning Board on ITS issues.

Chicago

Without making a specific commitment to ITS, Chicago Mayor Richard Daley has become one of the most influential ITS advocates in the Chicago Metropolitan Area. The Mayor did make a commitment to add capacity to the transportation system without building more roadways, opting to manage and operate the area’s existing transportation systems better. At the same time, Mayor Daley has stressed a regional and cooperative view. The Commissioner of the Chicago Department of Transportation and his staff have determined that ITS applications are one method of meeting the Mayor’s goals and, therefore, consider ITS to solve transportation problems. In keeping with this policy direction, the Chicago DOT staff have developed an ITS Master Plan

that will be incorporated into the city's transportation management plan and eventually into the regional transportation plan.

Milwaukee

In Milwaukee County, Wisconsin, the Sheriff pushes the deployment of the motorist assistance patrols and touts the program's benefits to the media. These courtesy patrols use ITS technologies to expedite the location and clearance of incidents and stranded motorists. Although the Sheriff does not publicly advocate for the technologies used, a number of transportation officials remarked that the Sheriff's vocal support of the courtesy patrols also highlight the positive and beneficial effects from applying advanced technologies.

Other

In other metropolitan areas, the transportation managers have acted as advocates for ITS products and services. In these areas, upper level managers influence elected officials and set the tone in their own agencies for consideration of ITS, including stressing cooperation among agencies. Strong leadership from the top management of the transportation providers in the Dallas-Fort Worth region, including the area's MPO, has been cited by transportation professionals and elected officials in that area as the most helpful factor in elevating ITS throughout the region. Together, the managers created a new regional ITS committee which will coordinate all of the ITS efforts throughout the Dallas-Fort Worth Metropolitan Area. In the absence of strong support from elected officials, transportation professionals at the Miami MPO and the Florida DOT have elevated the awareness of ITS technologies to upper management of the area's transportation agencies.

3.2 COMMUNICATION AND COORDINATION

ITS technologies can be most useful when planned and deployed with a regional perspective that cuts across geographic boundaries, agencies, and transportation modes. This requires elected officials and staff within and across agencies to communicate and coordinate with one another. It can, however, be difficult to plan and deploy ITS within a region, especially in areas composed of many local autonomous communities. For example, in Los Angeles there are about 190 governmental jurisdictions and over 20 other agencies that have some ties to transportation. In Chicago, there are about 271 governmental jurisdictions and another ten regional or statewide agencies that are involved in transportation. The Winston-Salem, North Carolina, Metropolitan Area was the smallest studied. Even in this area, consensus requires the coordination of over 20 localities and government agencies.

The staffs of public works departments and transit operating agencies tend to focus on only those activities that fall within the boundaries of their individual jurisdictions, such as roadway construction and maintenance, transit service, and incident clearance. It is also difficult for one agency to communicate and coordinate with another agency about ITS planning and deployments if there is not a centralized process internal to each agency that allows representatives to speak and act for the agency.

Section 3.2 is divided into three subsections:

- ❖ Strategies to Improve Communication and Coordination across geographic boundaries
- ❖ Strategies to Improve Communication and Coordination across jurisdictions and modes
- ❖ Strategies to Improve Communication and Coordination within agencies.

Strategies for communicating and coordinating across geographic boundaries call for the involvement of policy makers and elected officials. Strategies for communicating and coordinating across jurisdictions and modes depend on the active participation of transportation professionals. Coordinating ITS solutions within agencies is an intra-agency strategy. This strategy focuses on the importance of coordination between departments within the same agency, such as between the ITS and capital improvements staffs.

3.2.1. Strategies to Improve Communication and Coordination across Geographic Boundaries

Encouraging transportation staffs to plan and operate ITS on a regional level requires elected officials from cities and suburban communities to communicate and coordinate with one another and encourage the transportation agencies within their jurisdictions to do the same. Interviewees stated that elected officials create committees to accomplish these goals. Although not as widely used, targeted ITS education can also be an effective strategy.

Committees

Interviewees collectively expressed that elected officials' support was most useful for obtaining funding and raising the awareness and acceptability for ITS products and services. However, some elected officials have taken their support a step further and have formed committees to coordinate ITS activities throughout the metropolitan region. This ongoing coordination among committee members helps to shorten the time needed for project development and to procure funding.

Chicago

Mayor Daley of Chicago and leaders from more than 30 suburban communities have created a policy-level coordinating committee, known as the Metropolitan Mayors Caucus. The overall objective of the Caucus is to improve the quality of life and make the Chicago area more competitive in attracting and retaining business. Increasing transportation system capacity through improved operations and management of the existing system is one of many agenda items that Caucus members consider. This Caucus has had meetings to identify corridors where certain ITS technologies would be applied.

Because of the Caucus, politicians and administrators from area jurisdictions now talk more often with one another. This has provided the opportunity to initiate new ideas for integrating ITS among the City of Chicago and other jurisdictions. These ideas include coordinated traffic signal systems and bus-priority corridors. In addition, the Caucus has endorsed solutions developed by other regional organizations, which assists their likelihood for funding. The DuPage Mayors and Managers Conference identified a bottleneck at an interstate location where

two tollways merge. This congested area presents a local problem with regional impacts. The Conference's consulting engineer suggested interim ITS solutions costing \$500,000 until the long-term solutions can be designed and implemented. The Caucus members endorsed the idea.

The Metropolitan Mayors Caucus operates outside of the MPO structure, although the MPO staff participate in the group's efforts. There are also coordination activities within the MPO structure. The suburban mayors have a representative on the Advanced Technologies Task Force, the ITS coordinating committee formed by the MPO. At the Task Force meetings, staff from the area's operating agencies discuss local ITS activities with one another. The Councils of Mayors' representative to the Technologies Task Force relays issues discussed by members of the Task Force through the Council of Mayors network and directly to the mayors. The Councils of Mayors themselves have acted as a forum, within the MPO structure, that has increased communication and coordination of ITS issues among the suburban elected officials.

Dallas-Fort Worth

The Dallas Regional Mobility Coalition is a group of elected officials who act as advocates for ITS policies, products, and services. The Coalition also aids in coordinating ITS activities across jurisdictions and agencies. In keeping with the coordinating role, the Coalition formed a workgroup, to improve procedures for incident clearance and make the procedures more uniform within the region. The workgroup consists of law enforcement personnel, MPO staff, staff from the Texas DOT Dallas District, and officials from select cities.

Incident detection and clearance is an important issue to the Coalition. The variation in clearance procedures is a significant cause of congestion in the Dallas area. There are currently no uniform incident removal and investigation procedures for the region because each of the many local jurisdictions is responsible for managing the incidents occurring on their own freeway segments. Wrecker agencies contract with each city and the lack of standardized procedures and coordination has prevented incidents from being cleared quickly. The workgroup members' efforts have increased awareness of these consequences.

As part of the workgroup's activities, closed circuit television cameras were used to observe incidents. Workgroup members used these observations to learn how to manage incidents better and develop applicable aspects of traffic management for which the stakeholders would be responsible. The workgroup made recommendations to the Coalition's Executive Committee. Then, local governments were asked to create resolutions to adopt the recommendations. It is hoped that this initiative will lead to countywide incident management responsibilities being assumed by the County Sheriff's Office. The closed circuit television cameras and other technologies will be used on a trial basis after the recommendations have been implemented to measure the performance of the new institutional procedures, including any incident clearance time improvements.

Education

According to the interviewees, there have been few educational efforts that have been targeted specifically to elected officials. Most ITS training courses have been for transportation professionals. Nationally, select elected officials have been invited to attend some of the Federal

Highway Administration's ITS awareness courses. When elected officials are included, the by-product of these education initiatives is the enhancement of ITS discussions among elected officials from various jurisdictions. In Chicago, as part of its outreach effort to inform and involve local governments in the development of ITS, Chicago Area Transportation Study staff conducted a series of presentations to and discussions with the MPO's eleven Councils of Mayors. These presentations have produced some discussions of what could be coordinated across geographic boundaries. In the spring of 1998, the Illinois DOT's ITS Program Office developed a public relations and outreach plan that outlines methods to be taken to educate local officials about ITS and to increase communication among the decision makers regarding ITS deployments.

Many transportation officials throughout the United States see scanning reviews as an extremely useful process to get the participating elected officials to learn about how to use the technologies. Including both elected officials and technical staffs has enhanced the discussions occurring on the scanning reviews. However, transportation officials from some of the areas believe that there are better ways to educate elected officials and to enhance communication regarding ITS deployments. They concede that while some awareness training for elected officials is occurring, extensive efforts targeting elected officials to increase their communication and coordination will occur later, after the ITS components are producing easily defined benefits. These officials admit that their first effort is to increase knowledge and communication among the management and staffs of the transportation agencies.

3.2.2. Strategies to Improve Communication and Coordination across Jurisdictions and Modes

All stakeholders should have input into ITS planning and deployment activities since many of these agencies will be required to operate these systems or must provide some coordination or information to enable these systems to run efficiently. In addition, ITS projects are inherently capable of serving the needs of many agencies. This requires improved communications and coordination across agencies and jurisdictions. Interviewees listed a variety of strategies to accomplish this:

- ❖ Education
- ❖ Committees
- ❖ Regional Programs
- ❖ MPO staff.

The first two strategies involve educating staff members and participation on committees. Most interviewees stated that committees were the most commonly used strategy to improve communications and foster coordination. However, some interviewees stated that before a committee is formed, agency and jurisdiction staff should be educated on the benefits of regional planning for ITS so that the proper level of importance would be attached to the concept of working with other agencies. This may be the first time some agency staff would find themselves being asked to coordinate with other agencies. One interviewee stated that the most appropriate staff member might not be sent to represent an agency unless that agency attaches enough importance to a committee. This can make the committee less effective.

The third strategy uses the development of major regional programs and projects to increase interaction among staff from many agencies. This strategy was cited as useful in those areas studied where ITS already had been deployed in a piecemeal manner. Finally, the last strategy identifies the unique role that MPO staff have assumed in improving communications and coordination between agencies that are planning ITS projects.

Education

Education can improve coordination across jurisdictions and modes in several ways, including increasing awareness of ITS products and services, reducing tensions between agencies representing different modes, and getting planners and operations staff to understand each other's responsibilities and terminology. Many interviewees stated that there are no real opponents to ITS, but that a lack of awareness of the products and services and their benefits hinders the routine consideration of ITS technologies in a region's planning and deployment processes. In addition, tensions between modal agencies and the reluctance of planners and operations staff to talk to one another can inhibit ITS planning and deployment. MPO staffs were cited as the best suited to educate regional stakeholders. State DOT staff and, in a few cases, transit staff also willingly assumed this responsibility.

Many MPO staff educate stakeholders on regional ITS needs as part of the regional transportation plan education. In Albany, the process to create *New Visions*, the regional transportation plan, brought in many anti-road groups. The MPO staff used this opportunity to educate members of these groups on the benefits of ITS. As a result, these groups were more willing to support road expansion and improvement projects that were mitigated through greater transit service integration and expansion made possible with ITS applications.

Other MPOs hold meetings or conduct presentations exclusively to educate stakeholders on ITS needs. The Chicago MPO has sponsored workshops and stakeholder meetings on ITS. These meetings have involved representatives from the local transit agencies, the state DOT, and local communities. At the meetings, staff from the Illinois DOT, other deploying agencies, and the MPO discussed the ITS deployment process. These sessions enabled the MPO staff to receive input as to what these stakeholders wanted from ITS. The outreach meetings increased overall ITS awareness and helped all agencies rationalize why they deploy ITS. These initial meetings helped set the stage for the creation of the Advanced Technologies Task Force. In Miami, town meetings have been held to increase the knowledge base of how ITS was to be used to solve transportation problems. Additional town meetings are planned that will target specific agencies and organizations for maximum distribution of information.

Scanning reviews were also cited as useful because participants learn to think about how to use the technologies, instead of learning only about the technologies themselves. In Dallas, Texas DOT staff wanted to learn about various applications of ITS technologies. Staff attended scanning reviews that provided a broad perspective of ITS, which allowed the staff to focus, not on the technology, but on the need, the user, and the value the technology can provide. Including both elected officials and technical staff enhanced the discussions occurring on the scanning reviews.

Committees

Creating an ITS committee that operates either within or outside of the MPO structure is a common and effective strategy for improving communications on transportation needs and ITS project concepts among transportation agencies, jurisdictions, and other stakeholders. Most interviewees stated that the value of interfacing between member agencies provided by participating on an ITS committee should not be understated. Initially, participating on ITS committees provides staff members more opportunities for communication than for actual coordination and integration of projects. However, preliminary coordination between stakeholders does occur at the ITS committees for individual projects. Many times, improved communications between committee members leads to collaboration and extensive coordination outside of the committee. Finally, many interviewees emphasized that committees bring operations and planning staff together, improving communication between these two distinct groups; and thus, the likelihood that ITS products and services will be successfully planned, deployed, and integrated.

Interviewees collectively stated that each agency's meaningful and effective assignment of personnel to an ITS committee is important. Qualified staff who are knowledgeable about their individual organizations should represent the agencies and jurisdictions. These individuals can bring useful information to the committee, and can effectively convey information back to their agency. Getting the most qualified representatives involved in the committee may require securing the commitment of the top management of member organizations. If ITS is not a priority, then a less knowledgeable staff person may be sent to the committee, therefore reducing the effectiveness of the committee.

A number of the transportation officials stressed that the goals and objectives of an ITS committee should be clearly defined, preferably during the creation of the committee. Many interviewees stated that ITS committees should provide a forum for improving communications and interaction among agencies. Such a committee would also enhance regional transportation planning. Others described committees that would focus on specific projects and address substantive coordination issues regarding actual and planned projects deploying advanced technologies. Some officials thought that improving communications was a valuable role for the committee and project coordination was best left between agencies, outside of the committee.

Chicago

Staff from the Chicago Area Transportation Study created and now lead the Advanced Technologies Task Force. The Task Force coordinates ITS activities generated as part of the *Northeastern Illinois Strategic Early Deployment Plan*. This effort covers only about five percent (\$5 million) of all the money used for ITS deployments in the metropolitan area. The majority of ITS projects are conceived, developed, and coordinated through the Gary-Chicago-Milwaukee Priority Corridor. Nevertheless, the Task Force provides a forum for staff from different agencies and jurisdictions to talk to one another, learn about different agencies' projects, including those occurring within the GCM Priority Corridor, and develop contacts for each project. In the past, agency staff coordinated with one another through individual one-on-one relationships. The Advanced Technologies Task Force maintains a table of ongoing

activities and a member list of contacts. The list of contacts directs agency staff to individuals from other agencies with common interests, whose introductions may have been made only by accident before the Task Force existed.

The Advanced Technologies Task Force brings together operations staff of transportation providers where only planning staff had traditionally participated. The Task Force has evolved from an educational committee to a planning body and is now targeting specific short and mid-term deployments and creating a regional architecture. This wide scope would not be possible without the involvement of planners, engineers, and operations professionals participating on the committee and receiving support from their agency administrators. The Task Force also includes organizations that would not normally be involved in the metropolitan planning process, such as representatives for the suburban mayors, the Center for Neighborhood Technology, the American Automobile Association, the University of Illinois, and Argonne National Laboratory.

The GCM Corridor is focused on the Interstate network and major transit, while the Advanced Technologies Task Force is focused on local primary and feeder routes. Task Force members are developing guidelines for transit signal priority. As part of this effort, DuPage Council of Mayors' staff, who are represented on the Task Force, have expanded their role in two demonstration corridors, which will have coordinated signals across jurisdictional boundaries and may also include transit priority.

Washington, D.C.

The Washington area MPO created an ITS Task Force in January 1997 to examine ITS products and services that can address transportation problems in the metropolitan area. The Task Force, funded by the Virginia Department of Transportation, was created as a result of a Virginia DOT study on how to make the Washington, D.C., region an ITS showcase for the nation. The study listed specific projects for the region and included an assessment of interjurisdictional and institutional issues. MPO staff sat on the Virginia DOT committees that were responsible for planning and interjurisdictional issues, which created much discussion within the MPO as to its role in ITS coordination.

ITS Task Force members developed a list of ITS focus areas in July 1997. A Traffic Operations and Signal Subcommittee has since been created; this represents a new type of committee for the MPO because it addresses operations issues. Work groups have also been formed, including the Electronic Payment Systems Work Group and the Data and Planning Work Group. The Data and Planning Work Group members review the use of data as a resource for planning. Since they were created so recently, no ITS products or services have been developed yet as a result of the ITS Task Force or any workgroups.

Los Angeles

Within any given county in the Los Angeles Metropolitan Area, it is difficult to manage across jurisdictions and across the road networks of Caltrans and the various municipalities. In Los Angeles County alone, 88 cities operate their own traffic signals. Each city has different funding capabilities and some cities use more advanced technologies than others. To facilitate better coordination throughout Los Angeles County, state legislation has been passed requiring that newly installed Caltrans signals be able to communicate with adjacent signals. To further

improve the coordination of traffic signals across jurisdictional boundaries, staff at the Los Angeles County Metropolitan Transportation Authority started the Signal Support Group.

Staff from the Signal Support Group helped to build consensus among jurisdictions through the Traffic Signal Management Program that will run from 1995 through 2002. As part of the program, eight local traffic forums were created, each composed of 10 to 30 cities grouped by arterials, to coordinate signal synchronization and share traffic concerns. Members of each forum were provided with seed money by the Los Angeles County Metropolitan Transportation Authority for feasibility studies to coordinate their arterials. Each forum has developed its own ten-year plan. Currently, over \$250 million has been allocated for signal synchronization and preparation for future ITS deployments. As signals are upgraded, forum members look to more advanced technologies, although no forum is fully moving toward ITS. The Signal Support Group staff conduct meetings, help identify project needs, and provide seed money for projects and technical assistance. They also provide administrative assistance to get projects approved and help build consensus among jurisdictions.

Miami

The Miami MPO's Transportation Planning Council passed a resolution in January 1995 to create the ITS Coordinating Committee. The Committee provides a forum for all agencies and organizations to update one another on ITS activities and to identify opportunities for coordination. Coordination can still occur outside of the ITS Committee, for example between highways and transit, or through the Committee, but all organizations will bring their ideas to the Committee. Several initiatives have been developed through the ITS Committee: a fiber optics study, an interactive kiosk study, the *Dade County ITS Plan* and ITS Plan Update, and an application for federal model deployment initiative funds.

To form the ITS Coordinating Committee, now called the ITS Standing Committee, the MPO staff identified people at high levels in each organization who would be familiar with the ITS activities within their individual organizations and who had some decision-making authority. Representatives from the Miami-Dade MPO, Florida DOT, Florida Turnpike Authority, Miami-Dade Expressway Authority, League of Cities, Miami-Dade County Public Works Department, Miami-Dade County Information Technology Department, Miami-Dade County Planning Department, Miami-Dade Transit Agency, Tri-County Commuter Rail, Florida International University, and selected consultants are represented on the ITS Coordinating Committee.

Interviewees gave credit to the Miami MPO Director and staff for bringing organizations together to share their planned ITS activities with one another. Interviewees stated that the interaction of Committee members has led to a breakdown of agencies' parochial interests. Members discuss which ITS technologies would be useful countywide and have become knowledgeable about the needs of other agencies. Differing opinions and priorities still exist among agencies, but members are now "on the same page," talk with one another about project ideas, and seek to address everyone's needs. Information available within agencies has also improved as Committee members bring relevant information back to their individual agencies after ITS Committee meetings.

A representative of the Miami-Dade County Public Works Department stated that ITS Committee members are conceptualizing projects on a regional nature more than before the ITS Committee was established. For example, the electronic toll collection project for the Florida Turnpike is being planned on a more regional scale. In the past the focus would have been more location-specific; but now, Turnpike officials are using the ITS Committee to discuss compatibility issues with the other toll collection agencies in the region, including the Miami-Dade Expressway Authority and the Miami-Dade County Public Works Department. Through the Committee, it was learned that the Miami-Dade County Public Works Department and the Florida Turnpike were using different transponders for electronic toll collection. The two organizations were asked to explore the possibility of using similar technology so automobile drivers would only need to carry one type of transponder. Although these organizations continue to use separate technologies, largely due to the earlier deployment of the Public Works' system, their administrators have agreed to integrate their technologies at a later date after the Turnpike's SunPass system performance has been adequately tested.

Also, the Florida DOT's traffic operations center in Miami-Dade County has the ability to link up to the traffic control centers for Dade, Broward, and Palm Beach Counties. It was acknowledged that this may not have been done before the Committee existed.

The most complex project being handled by the ITS Committee is the fiber optic network. The Miami-Dade County traffic signal system dates back to the 1970's and desperately needs to be updated. Before the ITS Committee, the Miami-Dade County Public Works Department may have continued to operate the signals using a utility company's lines. This is expensive and does not lend itself to expansion and data sharing. A fiber optics study was completed through the ITS Committee. The plan uses what is already completed, a fiber optic loop, and envisions what the new system should look like without relying on the utility company's lines. Staff from the Public Works Department stated that new ideas for operating the fiber optic system were generated through the ITS Committee and the completion of the fiber optics study. Before the ITS Committee existed, the Public Works staff coordinated with other agencies at the project level, but rarely discussed projects on a regional level. The ITS Committee has enabled Public Works staff to open the communication channels and discuss both countywide and regional impacts of projects such as the traveler information network and the fiber optics study with other agency personnel within Miami-Dade County and with their counterparts in the other south Florida counties.

The fiber optics study identified several technical and coordination issues that needed to be resolved. For example, jurisdictional issues relating to the installation of the fiber optic cable networks arose between the Miami-Dade County Information Technology Department and the Florida DOT. The Committee members identified where there were duplicative services planned and where agencies could share the communication lines. The ITS Committee members also improved coordination in other ways. They approached the Information Technology Department Director to request that the county's fiber optic network be used to support a planned advanced traveler information system and other county needs. The network will enable Florida DOT freeway operations systems to communicate between their traffic operations center and field sites and the Miami-Dade Transit Agency to locate transit vehicles and maintain kiosks. It will also permit the school board to transmit data between schools and the court system to communicate

through teleconferencing so that prisoners do not have to be physically transferred for court appointments.

In addition to improving communications and coordination, participating on the ITS Committee has helped members representing the area's agencies in other ways. Staff from the Miami-Dade County's Traffic Signal Operations office, out of the Public Works Department, now speak more frequently with staff from the transit agencies than before the ITS Committee existed. The Information Technology Department staff, who are responsible for much of the fiber installed throughout the county, have improved their understanding of projects other agencies are planning and the type of data and communication requirements of each agency. Participating on the Committee has helped a public education consultant, hired by the Committee to create a public information campaign, and university staff, who are developing an education program on ITS, to learn what is happening regionally. Finally, before the Committee was formed, Turnpike staff met quarterly with only the Florida DOT Districts; the contacts stopped there. Because the Turnpike had only one ITS project, there was no need to coordinate with agencies outside of the Florida DOT. Now, with increased ITS planning by more agencies, the Turnpike staff have found the enhanced interaction through the ITS Committee useful.

Some members of the ITS Committee formed the Advanced Traveler Information Systems subcommittee to coordinate specific ITS projects that will improve traveler information across Miami-Dade, Broward, and Palm Beach Counties. The counties are each represented by their MPO. Other transportation operators participate on the subcommittee, including the seaport and airport authorities. Every agency that had projects that could contribute data to the advanced traveler information system project was contacted. Initially, staff-level people have participated; management will be included as needed. Some members at the staff level had to be educated on the importance of thinking regionally. The participation of representatives from all three counties is needed in order to make the market large enough to attract private investment. Officials from the three counties have taken an important first step toward coordinating with one another. The Miami-Dade County MPO acts as a liaison to the other two MPOs and their respective counties for this new regional effort.

Regional Programs

The Intermodal Surface Transportation Efficiency Act of 1991 set aside federal funds for four Priority Corridors to promote the deployment and integration of ITS products and services. Three metropolitan areas reviewed for this study, Chicago, Milwaukee, and Los Angeles, were each designated within a Priority Corridor. Communications and coordination channels in the form of extensive committee structures operate within each Priority Corridor, bringing all stakeholders together to solve identified transportation problems with ITS solutions. Although not a recipient of Priority Corridor funds, the transportation community in the Dallas-Fort Worth Metropolitan Area formed a similar committee structure. As a model deployment initiative designee, the Seattle Metropolitan Area has benefited from the coordinating and technical committees formed for that initiative.

In the areas reviewed, more coordination occurs within the committees of the Priority Corridors than in the previously mentioned ITS committees. Some interviewees believed that creating a

major regional program of ITS projects is a useful strategy for any region. It provides a forum for agencies across broadly defined regions to communicate, coordinate, and organize formal data-sharing practices. This will become more important in the future as the information is increasingly used to improve operations and to identify benefits in the face of increasing competition with capital projects. Participants begin to think regionally and include groups not traditionally targeted for transportation planning, such as representatives of airports, seaports, and trucking interests.

Much of the activity at the Priority Corridor committee meetings is centered on creating a regional architecture using the National ITS Architecture. Going through the exercise of creating an architecture will encourage coordination as important stakeholders and integration opportunities are identified. Interviewees from two areas stated that the complexity of the National ITS Architecture is compounded by the fact that it has been difficult to get the same people to attend committee meetings. Therefore, at every meeting, members must become familiar with information previously presented. This, at times makes it difficult to educate a stable regional group of transportation professional.

Based on firsthand knowledge, some interviewees cautioned that this strategy of creating regional programs of ITS projects could be a dangerous and potentially wasteful strategy for areas with less mature ITS planning processes. The region as a whole could move too quickly in the wrong direction with a new program. Instead, officials should start with small ITS projects in order to learn from them and incrementally work up to the point of developing a large program. In fact, this is what has occurred in the Chicago, Los Angeles, and Dallas-Fort Worth Metropolitan Areas, where ITS products and services were deployed in small projects, and then major programs were developed bringing all of the deployments together.

Chicago

Most of the ITS coordination that has occurred throughout the Chicago Metropolitan Area has occurred primarily through the GCM Priority Corridor. The Corridor covers a region twice the area of the Chicago Metropolitan Area. At first, participants on the GCM Corridor committees focused only on expressways. More recently, the GCM Project Managers also focused on Chicago's arterials and the interaction of these arterials with the Illinois DOT's expressways. More local ITS planning and deployment efforts are included in the *Northeastern Illinois Strategic Early Deployment Plan* and are coordinated through the Advanced Technologies Task Force at the Chicago MPO. Staff from the Chicago MPO, Illinois DOT, Regional Transportation Authority, Chicago Transit Authority, and Chicago DOT participate on both the GCM Priority Corridor committee and the MPO's Advanced Technologies Task Force. While both the GCM program and the *Strategic Early Deployment Plan* have created vast opportunities for communication and coordination regarding ITS for the transportation professionals in and around the Chicago Metropolitan Area, an effort is made not to duplicate the objectives and work of the two efforts.

The GCM Priority Corridor members are structured into three levels of committees. At the policy-making level is the Executive Committee composed of the Secretaries of Transportation from the three member states, Illinois, Indiana, and Wisconsin. The top management-level Coordinating Committee has a Chief ITS Engineer from each state and one Federal Highway

Administration representative from each of the division offices. At the staff level, the Deployment Committee has 25 members; staff from the three MPOs within the Priority Corridor are included on this technical committee. The GCM Deployment Committee also includes all major transit operators, toll authorities, principal cities, and primary academic and transportation research organizations.

A regional architecture is being developed through the GCM Committee. The National ITS Architecture served as a model for the regional architecture. From the guidance obtained from the GCM Committee members' effort, the Chicago area's Advanced Technologies Task Force members are now discussing how to incorporate the regional architecture at the project level, perhaps in the form of a checklist.

The Chicago Transit Authority is one agency in the metropolitan area heavily involved in the regional architecture effort. There have been discussions on how highways and transit officials can coordinate and benefit from each other's technologies. For example, Illinois DOT's expressways have many sensors but arterials are without sensors. Buses could act as probes on arterials for estimating speeds and congestion, supplement highway loop detectors, and provide arterial information. Using Illinois DOT's vehicle message signs, highway travelers can receive estimated comparative travel time by car and by transit. Both Illinois DOT and Chicago Transit Authority variable message signs can display highway congestion and the availability of parking spaces at specific Transit Authority lots and also display suggestions that drivers board transit to get downtown faster. In addition, information kiosks can provide comparative traveler information. Although still preliminary, these discussions between the Chicago Transit Authority and the Illinois DOT staffs have occurred as a direct result of the GCM Priority Corridor program.

Dallas-Fort Worth

While the Dallas-Fort Worth Metropolitan Area has not been designated as a Priority Corridor site, a similar type of effort is underway that brings agencies together from across the region to plan for ITS. The Dallas-Fort Worth Metropolitan Area is composed of many jurisdictions and transportation planning and operations are not centralized. In keeping with the diversity of thought regarding transportation needs in the Dallas-Fort Worth area, many ITS activities have been planned or deployed independently of one another.

In May 1998, a memorandum of understanding was signed by the Chief Executives from seven of the regional transportation agencies in which they agreed to work together to develop a regional ITS program. This was an effort to prioritize regional needs and focus regional resources to their best use. Support from upper management drove the creation of the new Regional ITS Steering Committee, composed of representatives from all major transportation agencies and jurisdictions with populations or employment of at least 50,000. Together, with assistance from the Texas Transportation Institute and support contractors, the committee members will develop a regional and comprehensive ITS program. To maintain a regional perspective and avoid any appearances that the Committee may favor any one operating agency, the management staff from the Dallas-Fort Worth MPO has agreed to chair the Regional ITS Steering Committee.

Broad steps for a regional program have been outlined to date. Several ITS plans have already been created by different operating agencies. The ITS Committee members will be responsible for reviewing each plan, assessing needs for sharing data, and the communications required to integrate technologies. The National ITS Architecture will be used to determine which organizations need to share data with one another. This information will be used to improve the interoperability of each plan. The agency responsible for any given plan will update it as needed. The final product will contain all of the ITS plans and an Executive Summary complete with roadmaps and a timeline defining each agency's responsibilities. Agreements among agencies and jurisdictions will be created for data sharing. Committee members also hope to fill in geographic holes and linkages now that ITS will be planned on a more regional level instead of in a project-by-project fashion.

Los Angeles

The Southern California Priority Corridor was created to address the technical coordination of ITS across seven counties. ITS had already been deployed for many years but had not been coordinated or integrated across the region. Now, numerous agencies and jurisdictions communicate and coordinate with one another through the Priority Corridor committee structure.

Priority Corridor member agencies and jurisdictions are represented by mid and senior management from both technical and policy areas. The Steering Committee oversees the network of all Priority Corridor committees. Steering Committee members represent a large number of agencies, including the six county transportation commissions (Los Angeles, Orange, Riverside, San Bernardino, San Diego, and Ventura Counties), the Los Angeles area MPO, and the San Diego area MPO. In addition, Steering Committee members represent the four Caltrans Districts in Southern California, the South Coast Air Quality Management District, Federal Highway Administration, Federal Transit Administration, the Southern California Trucking Association, and the California Highway Patrol.

The Steering Committee oversees four geographically defined subgroups composed of seven counties: (1) Los Angeles and Ventura Counties; (2) Orange County; (3) Riverside and San Bernardino Counties, and (4) San Diego and Imperial Counties. Membership for each subgroup is composed of representatives of transportation agencies within the subgroup area. Each subgroup has an advisory group, a mission statement that has been signed off by a high level official, and a subregional plan. The subregional plans are rolled up into one 20-year long-range plan. The four regional teams help the Steering Committee implement activities at the local level.

Technical groups are created by and report to the Steering Committee. Some members of technical groups work on adapting the regional architecture to conform to the National ITS Architecture. A transit subcommittee was recently created to better address transit issues. Also, an outreach subcommittee develops public relations materials for elected officials, cities, counties, transit agencies, the private sector, and the general public.

There are four goals of the Southern California Priority Corridor:

1. Bring systems up to a specified baseline.

2. Get transportation operators to share data and information to operate their own systems better.
3. Complete joint plans between agencies for improved operations such as responding to an incident or special event.
4. Conduct day-to-day congestion management.

To reach these goals, members of the Priority Corridor are using the National ITS Architecture to create a regional architecture, which will serve to further improve coordination between agencies and help integrate different systems. Initially, the regional architecture is being applied to a compilation of several projects called the Showcase. The Showcase projects traverse several jurisdictions, but their systems will be linked. Defining a regional architecture encourages coordination as committee members identify opportunities for ITS integration and sort out the associated institutional issues. Further, the actual integration of these systems will show transportation professionals that benefits can be derived from a project in multiple localities, which may also encourage staff from different agencies to work with one another.

There are many perspectives of the usefulness of the Priority Corridor committees. Most interviewees stated that the Priority Corridor effort improves regional coordination and accelerates involvement in ITS among agencies. In addition, it provides a forum to discuss institutional issues and brings operations and planning people together to discuss funding and specific projects. Representatives to the Priority Corridor committees reported that with their involvement in the committees they have begun to think regionally and ask practical questions, such as, "What data will I get? Do I have to share it? Should we sell or give away data?"

Officials from the Southern California Association of Governments realize the importance of institutions to work with one another in order to integrate ITS systems, especially in an area with so many jurisdictions. The MPO staff see the benefits of the Priority Corridor largely in the opportunity to improve institutional cooperation and integration, resolve border issues, and to build consensus.

Members from county-level agencies and local jurisdictions are more focused on deploying ITS within their individual jurisdictions than with building a regional consensus. In contrast, the California DOT and the MPO operate regionally and rely heavily on consensus building. Because the initial effort of the Priority Corridor Steering Committee focused on consensus building, it has taken a long time to actually implement ITS products and services. Therefore, some county-level staff feel that while ITS products and services should be carefully considered, a balance should be reached between deploying a project expeditiously and deploying it with full agreement. The local representatives emphasized that in an area with as many independent jurisdictions and agencies as Southern California, unanimous agreement is almost an improbability.

Despite the differences of opinion on what the Priority Corridor priorities should be, most county-level staff agreed that participating on the Priority Corridor committees raised the awareness of ITS to a variety of agencies and organizations at the county level. Many representatives of these entities first got involved with ITS through the Priority Corridor committees. In general, staff at the county level believe that the Priority Corridor committees are

useful for encouraging agencies to think regionally about ITS and for identifying corridors in which ITS technologies could be applied.

MPO staff

MPO staff typically build relationships with staff from the metropolitan area's operating agencies. This puts the MPO staff in a useful role to help different agency staff coordinate with one another on specific ITS projects. Interviewees in both planning and operations functions said that the planning discipline has a natural propensity to push change and adapt to newer systems. The MPO is generally seen as an impartial third party with a strong regional perspective. In fact, many transportation officials espoused that it is up to the MPOs to create a regional vision for ITS applications.

Albany

Staff from the Capital District Transportation Committee, the area's MPO, act as mediators to resolve traffic signal priority issues. Traffic engineers with the City of Albany are concerned that traffic signal priority will compromise traffic flow and present safety hazards. The Albany Police Chief would like to reduce the response time of emergency services by granting traffic signal priority to emergency vehicles. The MPO staff has stepped up to broker this issue. They have proposed an approach that accommodates both concerns by enabling signal priority during specified critical periods.

Denver

The Denver Regional Council of Governments, the MPO for the Denver Metropolitan Area, is responsible for creating the Traffic Signal System Improvement Program. This program brings communities in the Denver Metropolitan Area together to coordinate their signals across jurisdictional lines. The MPO staff oversee funding, provide technical assistance to the traffic signal staff of local governments, and help coordinate signal systems across jurisdictional boundaries. MPO staff prepare traffic signal timing and coordination plans that cross jurisdictional and operating agency boundaries that can include signals operated by either the Colorado DOT or municipalities.

Milwaukee

The staff of the Southeastern Wisconsin Regional Planning Commission, the MPO for the Milwaukee Metropolitan Area, is helping to mitigate some institutional barriers that have arisen as public works and public safety staffs have attempted to improve incident response. Staffs from the Milwaukee County Sheriff's office and the Wisconsin DOT have differing opinions on managing incidents, such as how much of the accident investigation should be completed before vehicles are removed from the roadway and when other vehicle checks should be conducted. The MPO is aiding in resolving these issues by working with these stakeholders to develop appropriate incident response scenarios which will reduce the length of time needed to remove vehicles and the number of cars that have to remain in place during the accident investigation.

Dallas-Fort Worth

The North Texas Council of Government's MPO staff began ITS planning four years ago. Up to that time, many scattered and competing ITS projects existed within the region. Initially, the

Texas DOT District Engineers from Dallas and Fort Worth asked the MPO Director and his staff to help the Texas DOT Districts decide how to organize their traffic control centers. As part of this review, the MPO staff worked with the Texas DOT staff to determine the location of the center or centers, if each District should have a center or they should share one, and the type of communications network that should be developed between the centers and the ITS field equipment. It was decided that each District would develop their own traffic control center. The MPO has been meeting with both Districts for the past two years to develop a communications strategy.

Officials from the local governments have joined with the Texas DOT in recognizing that they need to coordinate with one another regarding ITS deployments. Both of the Texas DOT District Engineers have also requested that the MPO staff help bring the stakeholders together, coordinate, and provide leadership. The MPO staff have been called upon for concept development, funding, and developing regional policies for the deployment of ITS products and services throughout the Dallas-Fort Worth Metropolitan Area.

3.2.3 Strategies to Improve Communication and Coordination Within Agencies

It is important for department staff within the same agency to coordinate ITS and capital projects early in the project planning stage. This coordination and communication may occur and be enhanced within an agency in three ways. First, the creation of internal ITS committees of knowledgeable staff representing different functions, such as planning, engineering, and operations, can improve and enhance communication and coordination. Second, informal or scheduled presentations to key department representatives on the status of ITS plans and deployments can aid in internal coordination and communication. Third, and probably the most lasting, is the creation of standard operating practices that require document checks or project checklists to ensure that advanced technologies have been considered for any new project.

There are many benefits from internal coordination. Agency staff are able to design for later ITS infrastructure installation when designing capital projects. In addition, precautions can be taken to not destroy installed ITS technology during reconstruction of capital infrastructure. Expensive mistakes can be made, for example, if fiber optic cable installed along a highway is damaged during highway reconstruction because construction crews were not aware of the existence or location of the cable.

Chicago

Since 1996, Chicago DOT Commissioner Walker has been providing ITS education opportunities for his staff. The Chicago DOT has hosted education sessions on ITS using Public Technologies, Inc. and has invited people from other metropolitan areas to discuss their ITS deployments. The Chicago DOT Commissioner has also invited members from the MPO's Advanced Technologies Task Force to these training sessions, which are primarily targeted to the Chicago DOT's high-level administrators and managers. In addition to the training sessions, the City of Chicago has an internal task force of City department heads that discuss potential ITS deployments. This task force, called the ADVANTAGE-21 Task Force, is developing its own ITS plan using the *Northeastern Illinois Strategic Early Deployment Plan* as its model.

Dallas-Fort Worth

Members of an ITS team in the Traffic Engineering Department of the Texas DOT Fort Worth District review traditional capital projects and flag those that could include ITS technologies. Team members then work directly with the Design Engineer of the Planning and Engineering Department to include ITS in the flagged projects. This internal project review process occurs as part of the TIP process initiated by the MPO's call for projects. In addition, steps are taken to avoid destroying installed fiber optic cables when reconstructing roadways by marking the cable in the field and checking reconstruction projects against the Fort Worth District's ITS Plan. As additional safety checks, both the Utility Department and the Permit Department also maintain plans that show where the fiber lines are located. While there is no formalized procedure for internal review, the practice of continuously conducting this routine by the Fort Worth District's ITS team has conditioned other offices to be aware of ITS issues.

Los Angeles

Caltrans staff responsible for ITS projects routinely coordinate with those responsible for capital projects so that capital improvements to roadways do not interfere with the fiber optic cables and other technologies associated with ITS projects. Coordination efforts began in the early 1990s with the planning for a massive expansion of the advanced traffic management system. Each year, the Caltrans ITS Division staff presented the advanced traffic management system project to the Caltrans Planning and Design Divisions at managerial meetings attended by senior and mid-managers. The intent was to coordinate the traffic management system projects with planned capital projects. Despite this effort, only a few capital projects were sent to the ITS Division for review. After running into several potentially costly project conflicts, the Planning and Design Divisions now check weekly with the ITS Division on proposed projects to identify possible conflicts. These reviews help them to determine whether a project should be redesigned and alert project designers to take special precautions for areas that are already instrumented with ITS technology. For example, in bridge-widening projects, bridge railings are designed to accommodate the installation of equipment for advanced traffic management systems at a later time.

3.3 COLLECTION OF DATA AND USE OF INFORMATION

The benefits from ITS are greater than those accrued from the TV monitors at a transportation, traffic, or transit control center; from coordinated traffic signals; or from the existence of an electronic toll collection system. Greater benefits are attained from gathering data and useable information generated from the advanced systems and applying that data to manipulate the transportation system in order to maximize the system throughput through better planning or improved operations. Maximizing the system includes being able to accurately model traffic conditions and plan for these conditions: using data to reduce a customer's wait for transit services; being able to electronically process a driver's electronic toll collection card which encourages others to use this service; and identifying, responding to, and clearing incidents to avoid extended congestion.

Reliable data are important inputs into regional transportation project planning and into transportation planning system assessment. Although gathering data generated by ITS technologies is not yet widespread, collecting good data, sharing the data, and turning the data into useful information speeds the incorporation of ITS solutions into the transportation planning process. These data can be used to estimate the benefits and costs of ITS projects before and after deployment, estimate operational costs of ITS systems, assess the operational health of the transportation system, and improve the design of future systems.

Transportation professionals from areas just beginning to develop ITS products and services need pre-deployment information to make decisions about the systems that will meet their needs. Pre-deployment information can include needs analyses and surveys from other areas that have deployed ITS. Professionals from areas with more mature ITS programs need post-deployment information, or operational data, from their own area in order to evaluate their projects and the transportation system as a whole. Data used for planning purposes will be more generalized and based on longer time frames, while data used for operations purposes will be more detailed and, if possible, in real-time. The purpose can greatly effect what data are needed. The data used for ITS-related purposes, planning or operational, are generated from ITS equipment in the field and from other “traditional” field equipment, simulated through modeling, or estimated based on information from other ITS deployments.

Section 3.3 is divided into two subsections:

- ❖ Strategies to Collect Data and Use Information for Planning Purposes
- ❖ Strategies to Collect Data and Use Information for Operational Purposes.

In this study, operational data are differentiated from planning data based on the use and age of the data. Operational data are used to assess the status of the current transportation system and make ongoing modifications to improve the system. These data are being used day-to-day (or within a relatively short time period) by personnel with direct control of transportation system operations. Data to be used for planning are needed for a wider range of purposes, from project development and impact assessment to system evaluation and re-engineering. Transportation officials initially need benefit and cost data when developing a project. This information is critical in obtaining political and funding approval. Planning data can also be used to conduct project evaluations in which benefits are calculated after deployment. Planning data are necessary to measure the operational costs of proposed ITS systems and those already deployed and used to improve the design of future systems. A consideration for all of the data falling within the long-range planning realm is how to accommodate the long-term storage of the short-term operations data and information generated by the ITS technologies.

A few interviewees were cautious about the amount of data that can potentially be gathered. Agency staff should think carefully about the data they need to be sure that resources are used wisely. Some interviewees noted that data collection and analysis can be costly in staff or consultant time, installation and maintenance of collection equipment, and computer resources required to store, analyze, and archive the data. Agencies need to understand how much data can be generated, the audiences to whom the data will be targeting, how to manipulate the data, and how much storage space will be required.

Transportation data gathering activities are largely in the planning stages in the metropolitan areas studied. Many interviewees stated that it is too early to gather data since their ITS systems are not yet complete. Most of the interviewees acknowledged that reliance on the data and information will become increasingly more important. While an extensive amount of data have not been collected, there have been some notable data collection and use activities occurring in the metropolitan areas. Some of these activities have included data analysis for project and system-wide evaluations.

3.3.1 Strategies to Collect Data and Use Information for Planning Purposes

Officials from a majority of the ten metropolitan areas studied affirmed that there is a great deal of ITS operational data being generated from ITS deployments in their metropolitan area but that its applications outside of any agency that has gathered that data are minimal. Instead, ITS activity is currently centered on planning and deploying ITS systems and not fully discussing how to apply data once the systems are operational.

There are many unresolved planning issues regarding the collection and use of ITS-related data and information that need to be addressed. A data specialist noted that the resources required to turn data into useful information will be greater than the resources needed to collect and share the data. Currently, one of the main planning uses of ITS-related data is to justify the selection of specific technologies, although some of the agencies within the areas reviewed are planning how to collect, share, and analyze the data. Representatives from a number of the areas believe that the MPO is a good fit for coordinating the data archiving and analysis. In many areas, the MPO planning staff are already seen as the local experts in data collection and manipulation.

Los Angeles

Caltrans staff use operational data they currently gather through their traffic management and control centers located throughout Southern California to calibrate the Department's transportation model and for special analyses. Staff from the Los Angeles MPO use the data to develop the regional transportation plan and TIP. Southern California Association of Governments staff also gather data through travel surveys. Interviewees espoused that ITS technologies will eventually provide detailed data for more robust analyses. For example, the MPO staff could better analyze the effectiveness of transportation control measures on improving air quality if they knew the breakdown of trips by vehicle type and time of day. The County Transportation Commissions and Southern California Association of Governments staff are planning to use the traffic management center data to follow patterns of congestion, update models, and examine travel by vehicle type. Caltrans staff plan to start with only a few types and levels of data and geographic areas to be analyzed and build on what is learned.

Interviewees stated that limited benefit-cost analyses on ITS projects have been completed due to the high expense of data collection and analysis. However, the Southern California Priority Corridor Showcase program has a built-in evaluation process as projects are implemented. Each Showcase project is evaluated individually. This is being funded with ten percent of the total program budget. Caltrans staff have the primary responsibility to keep the project data collection up-to-date.

To estimate the revenue benefits of ITS, members of the public-private Southern California Economic Partnership commissioned the creation of a revenue-generation business model for the advanced traveler information system that is being implemented for the Orange County Transportation Authority. Estimates from the model indicate that the traveler information system could generate \$20 million in revenues for the private sector. Statewide, the model estimates that \$243 million in revenues will be generated for the private sector by 2010. They can also use the model to show how the private sector can share \$28 million per year with public agencies for managing the information.

Caltrans and other organizations will not receive the full analytical benefits offered from operational data applied to planning purposes until the data are available over a long period of time through storage in the computer system. The MPO and ITS community in Southern California are interested in using ITS data for analytical purposes, but have not seriously considered collecting and storing the data themselves due to the lack of staff and financial resources. Caltrans, through the Southern California Priority Corridor, is taking the lead to plan for the collection and storage of data generated by the traffic control centers. As part of this effort, the participating agencies are discussing how to make use of all the disorganized data, how to archive data, and what key elements of the data should be archived. Presently, the MPO management are interested in using tools that are less technologically intensive, such as aerial photography to supplement gaps in other collection methods. The MPO staff is planning on using supplemental or anecdotal data to include ITS elements within the next regional transportation plan.

Miami

Data gathering activities are in the planning stages in the Miami Metropolitan Area. Florida DOT staff plan to gather real-time data from ramp meters and loop detectors that will be installed on I-95 as part of the Florida DOT's regional Southeast Florida Intelligent Corridor System program. The data will be compared with Florida DOT projections and be used to refine transportation models. Florida DOT staff, working with the Miami MPO, are also identifying data needs in the Miami Metropolitan Area. Florida DOT staff would like to provide any organization in the area with data that can be used to improve local transportation planning. As part of this effort, Florida DOT staff want to establish system compatibility between the regional Intelligent Corridor System and the individual transportation systems of Miami-Dade, Broward, and Palm Beach Counties to ensure data-sharing capabilities.

Some project evaluations have been completed. Florida DOT provided operations data from high occupancy vehicle lanes on I-95 to the Miami MPO for the CMS study. The data showed that high occupancy vehicle lanes reduce driving time. Florida DOT staff have completed some ITS project and system evaluations without using operational data. Florida DOT staff have had to justify ITS-related projects such as fiber optic lines. Many intangible benefits are associated with these projects that are difficult to quantify. Instead, staff qualify the benefits to the maximum extent possible on the basis of moving traffic and encouraging modal shifts over the next ten years. A system-wide benefit-cost analysis for the Intelligent Corridor System program was completed whereby congestion and incident costs were identified over a three-county region. This effort was based on national experience and expertise, not engineering judgment.

The benefit-cost ratio for the Intelligent Corridor System program was projected to be 3:1, much more conservative than the national results showing a ratio of 25:1.

Like Florida DOT staff, the Miami-Dade MPO staff are aware of the need to collect data in the future. In the *Dade County ITS Plan*, a system is proposed to track projects and measure their benefits and costs. The MPO staff currently use the “Florida Standard Transportation Model for ITS” to compare travel speeds from projects with and without ITS technologies. The MPO staff also measure benefits as part of project studies. However, performance measurements have not been completed because most projects are still being deployed.

Dallas-Fort Worth

Data will be available from ITS technologies once the planned traffic control centers begin operating. In the meantime, some data are gathered through more traditional channels. The Texas DOT, along with the local police departments, use one-page incident crew reports to evaluate incident response. The reports help track information such as when the incident was reported, response time, and queue lengths. This information improves incident response planning. For example, planners can determine whether they should continue using shoulders as lanes for some freeways or leave them open for emergency service access.

The Texas Transportation Institute staff are assessing the usefulness of cellular phones and closed circuit television cameras for incident detection for the Dallas-Fort Worth Metropolitan Area. Institute staff are also evaluating the use and effectiveness of high occupancy vehicle lanes using data gathered by the Texas Transportation Institute and the Texas DOT staffs. Most benefit information for ITS transit projects is currently gathered through literature searches, not directly from field research.

Seattle

Data sharing is currently in the planning stage in the Seattle Metropolitan Area. The goal of Washington State DOT staff is for all agencies in the region to be capable of sharing data with one another. Development of an ITS data-sharing network is underway, the backbone of which is accessible via the Internet. The University of Washington is developing a toolkit that will instruct agencies how to include their data on the ITS backbone. This arrangement will allow organizations to share data over the Internet and public and private application developers can use the toolkit to build applications for the data.

ITS freeway data are currently available to researchers using transportation data acquisition display technology. The data are currently in 20-second increments, too detailed for planners, and therefore, of limited use to planners. During the next phase of the data display research project, an interface will be built so planners can manipulate the 20-second data into a more generalized and useful format.

Computer models are used to complete system and project-level analyses for ITS products and services. The computer model NETSIM is used to evaluate the benefits of freeway management systems by estimating the reduction in freeway delays due to ramp metering. Planning models are used to estimate the benefit of diverting traffic to city streets using ramp meters. A Washington State DOT consultant utilizes the Integration simulation model to estimate I-5

Corridor project performance with and without ITS and to model some Smart Trek Model Deployment Initiative projects.

A working group composed of members from the public and private sector is now addressing the ITS project evaluation for the Smart Trek Model Deployment Initiative. Members have developed a list of evaluation criteria, largely focused on customer satisfaction. They have learned that it will be difficult to quantify customer satisfaction. For example, vehicle-miles of travel may not change as a result of Smart Trek, but people's choices of when to travel and by which mode may increase. It is tricky to assign a quantitative value to increased choices. The data generated and the analysis conducted from the Smart Trek project will be instrumental in determining which ITS projects are to be continued and expanded to other parts of the metropolitan area after the initial five-year Model Deployment Initiative funding commitment period. In addition to the Smart Trek evaluation, the Washington State DOT staff are collecting safety and speed data to evaluate the TravelAid project and determine if vehicle operators will obey variable speed limits.

The Puget Sound Regional Council, the Seattle MPO, has been involved in evaluations for the Model Deployment Initiative and non-Model Deployment Initiative projects. One project evaluation outside the Smart Trek initiative is an ongoing 10-year survey of 2,000 households and their changing travel patterns resulting from advanced traveler information systems. In addition, as part of the CMS program, the staff at the Regional Council will monitor the effectiveness of corridor projects, including ITS projects. MPO officials noted that although the MPO had been peripherally involved in ITS through the household survey for over a decade, it was the Smart Trek initiative and subsequent evaluations that were instrumental in bringing the MPO and its staff into the ITS team in the Seattle Metropolitan Area. The new evaluation responsibilities enabled the planners to understand the necessity to mainstream ITS and ITS-type projects within its planning process, including the regional planning documents.

Chicago

In the Chicago Metropolitan Area, there are three driving forces to initiate a formalized method of data collection, data sharing, and standardized data analysis: (1) the opening of an information clearinghouse, (2) the large scale planning for the data being generated and to be generated, and (3) the creation of an analytical tool for ITS. The first is the Corridor Traveler Information Center and Gateway operations, a Gary-Chicago-Milwaukee Priority Corridor project being managed by the Illinois DOT. The Corridor Traveler Information Center is the gathering point for multi-region transportation data requiring that these data must be managed in some orderly fashion. The second force is the development of the *Northeastern Illinois Strategic Early Deployment Plan*. As part of this effort, the participating agencies are discussing how to make use of all the disorganized data, what key elements of the data should be archived, and how to archive data. The final initiative that is increasing the data discussions in the Chicago Metropolitan Area is the involvement of some of the area's transportation officials in the national effort to develop an ITS analysis tool known as the ITS Deployment Analysis System.

Pre-deployment information on ITS project proposals is developed with cooperation from the sponsoring agency and the Chicago Area Transportation Study. The Chicago MPO staff are not yet estimating benefits and costs for projects and are currently relying on data available from

other areas for their project analyses. In the last round of air quality conformity assessment, the MPO did a special analysis for I-Pass, the electronic toll collection system for Illinois. As part of the *Strategic Deployment Plan*, a consultant will measure some benefits from current traffic engineering data, such as savings to the traveler, delays, and reduced emissions. In addition, the consultant will further analyze I-Pass impacts, such as traffic volumes and emissions, queue lengths, average processing times, and delays.

Much of the analysis conducted by the Chicago Area Transportation Study and the consultants is to assess the impacts of projects funded under the Congestion Mitigation and Air Quality Improvement Program or other projects that are part of the congestion management system program. Although the CMS has an arterial orientation, the Chicago MPO is planning to use data from the Illinois DOT's Traffic Systems Center for the CMS analysis if a corridor has an expressway within its parameter. MPO staff gather signal system data as part of its CMS analysis. Traffic engineers remarked that conducting the signal analysis for the CMS to determine delays and travel times has proven to be a complex effort. The signal systems were designed for signal operation and not for providing data. One interviewee stated that if data gathering activities had been a part of the initial signal system development, then the system could have been designed to provide data in the form that the MPO staff need.

In addition to their use in modeling for congestion and air quality analysis, data are being used to evaluate the performance of some ITS test projects in the area. The Illinois DOT is the primary agency that has conducted these project evaluations, as well as surveys and before-and-after studies. The Illinois DOT has conducted evaluations for the ADVANCE dynamic route guidance project and various warning technologies used at at-grade railroad crossings. Currently, they are evaluating automated clearance technologies at truck weigh stations. While the Illinois DOT's ITS staff still conduct quantitative evaluations when appropriate, they have found that qualitative analysis using anecdotal data for project evaluation is more cost effective and many times just as useful. Illinois DOT officials found that they spent a significant amount of staff and financial resources to quantify benefits for the ADVANCE project. Less effort has been expended to evaluate subsequent projects because the gains in knowledge gleaned from the evaluation did not appear to justify the resources spent for the ADVANCE project evaluation.

Data from the evaluations have been made available to other agencies. The Illinois DOT and the project evaluator have made the ADVANCE project data available on the Internet. The parties took great care to explain the context of the data collection and the different data sources to prevent its misuse by parties accessing the information from the Internet. Data being collected for the automated clearance at truck weigh stations evaluation includes fuel usage, brake pad wear, improved level of deliveries, truck delays, commercial vehicle backups/queuing, trucker bypass, overall savings to truckers, and improved safety.

Currently, the Chicago Area Transportation Study does not gather any ITS-related data. The MPO receives traffic count data for the road networks from the Illinois DOT, the Illinois State Toll Highway Authority, the counties, and the municipalities. The Toll Authority did not originally intend to collect travel time data, but through the I-Pass revenue recording system, these data are easily provided. The tollway is now a very cooperative partner with the Chicago MPO in data collection.

The Chicago Area Transportation Study makes extensive use of the Illinois DOT's Traffic Systems Center data. It is used in validating models (hourly variation data, vehicle-miles of travel comparisons, seasonal variation data, etc.), descriptive analysis, and operational analysis (accident rates, sampling designs, planning for high occupancy vehicle lanes, etc.). The Traffic Systems Center data are a major input into the Chicago area *Travel Atlas* developed by the MPO. The *Travel Atlas* includes a series of maps of the region's expressway system displaying various transportation data. Information in the *Travel Atlas* developed from the Traffic Systems Center data include the average annual daily traffic, ramp volumes, monthly seasonal factors, day-of-week traffic variations, holiday travel rates, hourly variation of traffic, travel times, and speeds for the region's expressways.

It is the potential use of the data being generated and to be generated from the ITS technologies that makes the Chicago area unique. While only a small amount of ITS data is being used in the planning and operations of the metropolitan transportation system, there is a great amount of activity in planning how to utilize this data. While the Illinois DOT staff plays a large role in data gathering, the Chicago MPO staff has taken the lead in the planning for the system-wide coordination efforts for collecting ITS data.

The combination of the Traffic Systems Center and Corridor Traveler Information Center operations represents a complex and large ITS database development problem. In the future, the Illinois DOT will seek another entity, such as the MPO, a research lab, or a university, to archive the data for a longer period of time. Both the Chicago MPO and Argonne National Laboratory, a research agency, have expressed interested in archiving and packaging the data for the Gateway project. Illinois DOT officials see their agency roles as a user and provider, maintaining the function of gathering data for day-to-day operations at Illinois DOT.

To understand the data requirements, officials from the Chicago Area Transportation Study are already leading a data task force for the *Northeastern Illinois Strategic Early Deployment Plan* and are heavily involved in the Federal Highway Administration's ITS Deployment Analysis System efforts. The MPO-led task force composed of academic and research participants are developing a process and network in which transportation agencies in the region may share transportation data gathered by ITS equipment. Based on past experience, the transportation agencies in the region have found that if useful data are to come out of ITS components, it should not be an afterthought, but part of the system design. The ITS Deployment Analysis System project is being developed as a tool to assist MPO staffs in effectively incorporating ITS deployments into their regional transportation planning process through examining ways to build upon existing modeling capabilities to model ITS better and ultimately provide better deployments. Even though there will be an extensive amount of data generated from the technologies, a MPO official feels that a new archival system will be providing supplemental data and not completely replacing other data collection methods.

3.3.2 Strategies to Collect Data and Use Information for Operational Purposes

Operational data are characterized as data used daily or on an ongoing basis to adjust transportation systems or to provide real-time information to operators or customers of the system. These data allow the immediate response to an activity or incident. Effective collection and use of operational data does not require planners, only operational staff, including dispatchers and technicians, that can control or coordinate multiple systems (e.g., traffic signal timing adjustments to accommodate spillover of traffic onto local streets during an incident).

One interviewee stated that, in the future, the transportation professional will need to generate performance measures to assess the real-time operational health of the transportation system. From the operations end, these measures will help define the data that should be gathered. In addition, benefits displayed as a result of the generation and analysis of operational data can be instrumental in gaining support for further funding of operational projects, tying operations data to the transportation planning process and project approval stage.

Los Angeles

About 60 percent of congestion in the Los Angeles Metropolitan Area is due to incidents. Caltrans staff want to improve operations by continuously monitoring the transportation system and isolating incidents using operational data that are gathered on a regular basis. The extensive freeway network makes this a challenging task.

Caltrans staff currently gather data from traffic management control centers in Los Angeles, Orange, and San Diego Counties. The Los Angeles Center also gathers data from Ventura County. That center provides Caltrans District 7 staff with 13 months of ongoing operational data, but the data are not easily accessible with the current system. The data are available in 30-second, five-minute, ten-minute, 15-minute, and one-hour intervals for individual locations, but are not summarized. New systems are being installed in the centers that will provide easier access to the 13 months of operational data. Each field device will provide data every 30 seconds, and new software in the traffic management center will summarize the data. This will allow staff to better monitor system performance, volumes, and speeds.

Dallas-Fort Worth

Many interviewees in the Dallas-Fort Worth Metropolitan Area stated that gathering data was an important activity to improve operations and evaluate projects. These individuals emphasized that more operational data will be gathered once the traffic operations centers are completed in the Dallas and Fort Worth areas. A number of the transportation officials noted that it is difficult to fully determine the operating data needs before the centers are operating and fully staffed.

Chicago

Operational data have been in use for over three decades in the Chicago Metropolitan Area; however, the sharing of the operational data is just now taking off, in large part due to the influence of the Gary-Chicago-Milwaukee Priority Corridor program. For the past 35 years, the Illinois DOT Traffic Systems Center has used operational data collected from loop detectors installed along the expressways. Today there are 2,250 detectors providing occupancy rate counts in 20-second intervals. From the occupancy rate data, the Traffic Systems Center staff

computes speed, travel times, and traffic counts, and update any messages on the variable message sign network. If the Traffic Systems Center operators suspect an incident, they can notify the Illinois DOT District 1 Communication Center directly to dispatch the Emergency Traffic Patrol or use a leased phone line data feed, which is normally updated with congestion information every five minutes. The District 1 Communication Center likewise uses this information to automatically update their highway advisory radios. In addition to incident notification, the Illinois DOT District uses information from the Traffic Systems Center for a variety of its operations. These operation functions include estimating average speeds and counts over a day to determine when to close lanes for construction or to determine the best time to switch the reversible lanes on the Kennedy Expressway.

A new Traffic Systems Center computer system is consistent with the National ITS Architecture and scheduled to come on-line by early 2000. It will be able to manipulate and analyze a greater volume of data automatically and house the data in a user-friendly database. In addition to its current use, the data will be available to the Illinois DOT District Traffic Department for analyzing traffic flow to improve design and operations. Illinois DOT staff will be able to redesign bottlenecks, refine lane closures, or remove contractors from roadways early if traffic reaches a certain threshold. Real-time accident data will be fed to the Traffic Systems Center as accidents occur, as well as real-time information on the tollway and a portion of an Indiana DOT expressway that connects with the Illinois DOT system.

The Traffic Systems Center data, sent to the Corridor Traveler Information Center through dedicated lines, is only one of the seven information sources that currently feed into the Corridor Traveler Information Center. The GCM Deployment Committee is looking into using automatic vehicle location data from emergency vehicles to determine incident locations, times of incidents, and clearance times. This information will also be provided as an input into the Corridor Traveler Information Center database. The Corridor Traveler Information Center and Gateway plans call for the incorporation of signal system data if available from the local sources. Through the Chicago MPO and the local agencies, some traffic signal data are already being shared. Because they are initiating regional signal coordination plans, the MPO staff are also interested in the coordination of the traffic signal data.

The intent of the data pipeline, detailed in the *Northeast Illinois Deployment Plan*, is to provide a process and network in which transportation agencies in the region may share transportation data gathered by the ITS equipment. A recent eight-hour power outage at the Traffic Systems Center allowed the operating agencies to test “simulated” data against real-time data to find out how good the simulations were (“truth in data”) compared to the information generated by the ITS field equipment. A data manager at the Chicago Area Transportation Study reported that this was a good learning experience.

The Regional Transportation Authority is examining its role as a clearinghouse for schedule information from its three Service Boards through a new Itinerary Planning System. The Regional Transportation Authority is also working with the Illinois DOT to determine how the service data will be provided directly to the Gateway Regional Multimodal Traveler Information Center and how data from the Corridor Traveler Information Center will be provided directly to

the transit dispatch terminals. The Illinois DOT does currently share incident and weather directly with the area's public transportation Service Boards.

In **summary**, interviewees suggested that transportation professionals will have different data requirements depending on the extent to which ITS is deployed. In those areas just beginning to develop ITS products and services, the professionals need pre-deployment information to make decisions about the systems that will meet their needs. Pre-deployment information can include a needs analysis and quantitative surveys of ITS deployments from other areas. In areas with more mature ITS programs, the professionals need post-deployment information, or operational data, in order to evaluate their projects and the system as a whole. In addition, it is important to provide data to the private sector to encourage private sector investment. With access to the data, information service providers can package and sell travel data to other companies that use it to inform the public of traveling conditions.

The transportation officials interviewed maintained that there needs to be clearly defined roles for collecting and archiving data. However, because of the large amount and variable use of the data, agency administrators and managers feel it is important to keep the operations functions and operational data separate from archiving functions and planning data. The activities in the Chicago Metropolitan Area demonstrate the complex tasks involved in keeping these functions separate and defining clear data responsibilities. The Chicago Area Transportation Study staff have initiated the use of ITS planning data and are leading the efforts to determine data needs, how to share the network, and how to maintain the historic data (the archives). The Illinois DOT staff have likewise led the efforts to utilize operational data.

4. SUMMARY

This chapter addresses what transportation officials in the ten metropolitan areas are doing that are having positive impacts on deploying ITS products and services and mainstreaming ITS solutions in the transportation planning process. These efforts are tied to a list of strategies that have been used in these ten metropolitan areas. Although the involvement of a number of agencies in the metropolitan areas was examined, the focus of this report was on mainstreaming ITS into the metropolitan transportation planning process, which is primarily a MPO function. Therefore, the role of the MPO in ITS activities is also discussed.

The fourth section identifies how the examples from the ten metropolitan areas are applicable to other metropolitan areas. It is widely recognized that there is no one MPO structure or single model of the metropolitan transportation planning process. However, there are lessons that can be learned from those areas that have already struggled to develop ITS plans, to include ITS projects within traditional planning documents, to deploy and operate ITS components, and to link individual ITS components into a multi-jurisdictional network. The transportation professionals in these ten metropolitan areas have already experienced many of these actions and do have successes to emulate.

4.1 MAINSTREAMING AND DEPLOYING ITS: WHAT WORKS IN THE TEN METROPOLITAN AREAS

ITS are being deployed at one level or another at all of the metropolitan areas reviewed. ITS products and services are even being considered in varying degrees within the transportation planning process of all ten areas. This section briefly examines the factors or activities that aid in planning and deploying ITS in each of the metropolitan areas.

In general, coordinated regional projects and coordinating committees have proven most successful in the areas. The ability to learn from small-scale deployments and demonstrations have also led to the support for larger ITS projects within the planning process. In addition, modifying the transportation improvement program (TIP) project selection criteria to accommodate more multi-jurisdictional and multi-modal project proposals and educating elected officials and other policy makers on the applications and benefits of ITS were also cited by several officials as enabling them to mainstream and deploy ITS.

Chicago

There are at least five key factors leading to increased coordination and mainstreaming of ITS in the Chicago Metropolitan Area:

- Gary-Chicago-Milwaukee ITS Priority Corridor
- Chicago Area Transportation Study's Advanced Technologies Task Force and the *Northeastern Illinois Strategic Early Deployment Plan*
- Regional Transportation Authority's coordination effort with transit

- Commitment of Chicago's Mayor to manage and operate the area's existing transportation system more efficiently and work through the Metropolitan Mayors Caucus
- Involvement of the collar counties through the work of the DuPage Mayors and Managers Conference.

First and foremost, the Gary-Chicago-Milwaukee (GCM) Priority Corridor has been most influential in increasing ITS deployment opportunities, as well as increasing the general awareness of ITS in the region. The GCM Priority Corridor project set up a committee structure to coordinate the ITS technologies throughout the three-state region. Most of the coordination that has occurred throughout the Chicago Metropolitan Area has occurred primarily through GCM Corridor activities.

The Chicago Area Transportation Study has taken the initiative to coordinate ITS within the Chicago Metropolitan Area and close the gap between the GCM regional focus on the expressways and the arterial efforts in the Chicago area. The Chicago MPO management created and leads the Advanced Technologies Task Force, which is the coordinating mechanism for the *Northeastern Illinois Strategic Early Deployment Plan*. The Advanced Technologies Task Force has proven very valuable as a coordination and educational opportunity within the Chicago Metropolitan Area.

The Regional Transportation Authority has recently assumed a leadership role in getting transit deployments jump-started and coordinated among its three public transportation Service Boards. The Authority is also assuming a greater role in ITS planning coordination between the transit agencies, so transit operations can more easily be coordinated with the activities of other local agencies when necessary; for example, with traffic signal priority for transit.

At the municipal level, Mayor Daley of Chicago has made a commitment to think regionally about adding more capacity to the existing system through improved operations and management. The Mayor has initiated the Metropolitan Mayors Caucus to examine improved operations and management of the existing system. The Caucus has been one forum that has been successful in getting operating agencies and jurisdictions to talk to one another. This new interaction has initiated new ideas for ITS integration among the City of Chicago and other jurisdictions.

The counties and other local jurisdictions surrounding the inner city are now becoming involved in ITS planning, coordination, and deployment. The DuPage Mayors and Managers Conference is considering ITS technologies as part of its strategic plan. Officials in DuPage County have proven to be the most innovative among the local jurisdictions. The Conference's staff have assumed an ITS coordination role for all of the suburban counties and municipalities in the entire Chicago Metropolitan Area.

Dallas-Fort Worth

There are four key factors that have contributed to increased coordination and mainstreaming of ITS in the Dallas Metropolitan Area:

- Support for ITS deployments, coordination, and integration from the administrators of seven influential state and regional transportation agencies
- Creation of committees to target coordination and integration
- Taking the opportunity to learn from previous ITS deployments
- Trust by representatives of the area agencies in the responsibilities and performance of the MPO staff that enable them to mainstream ITS and coordinate the area's ITS efforts.

In the Dallas-Fort Worth Metropolitan Area, the top managers from the Texas DOT, the MPO, the transit agencies, the North Texas Tollway Authority, and the Dallas Regional Mobility Coalition have provided strong leadership and support that has elevated ITS throughout the region. This advocacy from management has been the most beneficial factor in getting organizations to begin coordinating with one another.

For coordination, committees at the technical and policy levels have been formed. Area officials maintained that a contributing factor to the success of the committees is that they have defined purposes. The committees last only as long as they are needed and sometimes form into new committees to meet newly defined ITS needs. This coordination has grown from traffic management teams, to an ad hoc Advanced Transportation Management Task Force that created supplemental selection criteria for TIP projects, to a newly formed Regional Comprehensive ITS Program Steering Committee that will merge the numerous ITS plans developed for specific agencies into a Dallas-Fort Worth Regional ITS Plan.

Through the years, managers of each agency and jurisdiction have planned and deployed ITS separately. As a result, there are now an assortment of ITS agency plans and small-scale deployments. Many officials of the transportation agencies involved with ITS intentionally did not seek to deploy large ITS projects until they knew more about these new technologies. Both the Texas DOT Dallas and Fort Worth Districts have small interim traffic management centers. The management of both districts wanted to forego the large capital expenditure of a permanent transportation operations and management center until they first understood the technologies and communication system options on a small scale. The new Fort Worth District transportation operations center is scheduled to open in late 1999. Likewise, the Dallas Area Rapid Transit has used demonstration projects to determine whether further ITS applications throughout the entire system would be warranted. This has been equally true with the slow expansion of the area's Courtesy Patrol.

At the behest of the Dallas and Fort Worth District Engineers, the North Central Texas Council of Governments, the region's MPO, got involved with ITS planning in 1994. There was recognition that the state and local governments needed help in integrating the many systems spread around the metropolitan area. The MPO was sought to bring the stakeholders together, coordinate, and provide leadership. The MPO is seen as a neutral agency with the resources to assist the jurisdictions and agencies in their needs. MPO management has also taken a position of supporting ITS when there is a proven value added, not just for the sake of deploying technology. The MPO staff has built a legacy over time and are now able to play consensus-building, facilitating, coordinating, and funding roles for ITS in the region. Since 1994, the MPO staff have been able to get three ITS areas recognized in the *1996 Mobility 2020 Regional*

Transportation Plan, led a task force to modify the TIP project selection criteria to aid in the selection of multi-jurisdictional and multimodal projects, and now organize a committee to see the integration of ITS plans and field deployments.

Los Angeles

Coordination between agencies and jurisdictions for ITS planning and deployment is an important element in the Los Angeles Metropolitan Area. ITS has been developed piecemeal over the past fifteen years, mostly with Caltrans leading the way and making many decisions alone. More agencies and jurisdictions are becoming interested in what ITS solutions can do to improve operations on transit and arterials. This forces Caltrans staff and other agency and jurisdiction staff to work with one another if they are to identify funding sources and design the most efficient systems possible to address their transportation concerns. There are several strategies that aid in improving coordination that have worked particularly well in the Los Angeles Metropolitan Area:

- Developing a major program of regional projects through the Southern California Priority Corridor Program and the associated committees
- Developing regional ITS plans through the Priority Corridor program
- Including ITS in the Regional Transportation Plan
- Improving communications among transportation staff within Caltrans

The most important strategy has been the creation of the Southern California Priority Corridor Program. It is through the Priority Corridor's committee structure that agency and jurisdictional representatives can communicate to each other their plans and needs for ITS solutions.

Developing a regional architecture, an important activity that takes place within the context of the committees, encourages cooperation and reaching consensus. Transportation staff and some upper-level managers are beginning to realize the importance of integrating ITS technologies and coordinating with other agencies and jurisdictions. Currently, however, there is nothing forcing them to work with one another and the Priority Corridor products and processes have not been integrated into the metropolitan planning process. The greatest benefit derived thus far has been from building consensus for regional projects, increasing the awareness of ITS among staff from some local jurisdictions, increasing the knowledge of the importance of integration among the MPO's upper management, and more recently, bringing transit into ITS discussions that were before reserved only for highways.

A second important strategy is the development of the four regional ITS Strategic Deployment Plans, created through the Priority Corridor Program. This has forced representatives of the jurisdictions in the defined regions of the metropolitan area to work together as they create the plans and to address, in a limited fashion, border issues across jurisdictions and agencies.

Third, the MPO has included ITS in the Regional Transportation Plan in a general way, and will include it more explicitly in the next plan. Caltrans staff stated that this would be helpful in demonstrating public endorsement and support of ITS solutions. This was lacking in the past and made it difficult to get some ideas accepted.

Fourth, ITS is being mainstreamed within some transportation agencies through the creation of new programs and improved communication between long-standing divisions. Because Southern California has so many agencies and is so expansive in population and area, officials from many of the transportation agencies see mainstreaming efforts within their agencies as a more effective first step rather than mainstreaming ITS through the MPO. Once these agencies understand where ITS fits in their overall operations, it is easier for them to coordinate with the multitude of other state, regional, and local agencies that are also involved with the metropolitan transportation planning process. ITS solutions are considered at Caltrans at the early planning stages through the new Technology and Research Program, where ITS technologies are tested and initially deployed before turning them over to the ITS groups in each Caltrans District. Further along a project's life, divisions within Caltrans routinely coordinate individual projects so that capital improvements to roadways do not interfere with the fiber optic cables and other technologies associated with ITS projects. Mainstreaming within agencies is also evident in the Riverside Transit Agency. At this Transit Agency, staff have now defined their problems as part of their transit plan, and then looked to advanced technologies as possible solutions to solve some of their defined problems.

Miami

There are four key factors that have contributed to increased coordination and mainstreaming of ITS in the Miami-Dade County Metropolitan Area:

- Learn from previous deployments by the Florida DOT and local agencies
- Develop projects on both a regional and local basis
- Created the ITS Standing Committee that involves traditional and non-traditional agencies and organizations
- Target education to both the general public and elected officials.

Primarily the Florida DOT has deployed ITS products and services in Southeastern Florida, since the early 1990s. Because some of these products did not perform as predicted, there was a chilling effect that reduced the political and consumer support for additional ITS deployments. Transportation officials in Miami-Dade County have learned that ITS deployments do not naturally lend themselves to cooperative efforts without an agency leading the coordination and increasing the level of ITS awareness of the key decision makers. With the understanding that ITS activities should be cooperatively pursued, since 1996, there has been an emphasis to plan for proper levels of ITS deployments by state, county, and regional agencies that truly aid to solve the transportation needs.

With the support of the Florida DOT, the MPO has assumed responsibility as the local lead. The Miami-Dade MPO has developed the *1996 Dade County Area-wide ITS Plan* to provide a supplement to the Florida DOT's *1994 Southeast Florida Intelligent Corridor Systems Plan*. The *Dade County ITS Plan* concentrated on tying ITS deployments along the interstates and primary state roads to the local road networks. It was generally recognized that systems must include the municipal and county roads and local transit.

While the MPO Director is a strong supporter of ITS, he recognizes that other agencies and organizations must also support ITS to attain the full network benefits. When initially developing the *Dade County ITS Plan*, the MPO management created the ITS Steering Committee to aid in the creation of the document. Agencies that were included within the ITS Committee went beyond the traditional state, transit, and county transportation agencies. Representatives from the Miami-Dade County Information Technology Department, environmental agencies, the airport and seaports, the tourism bureau, and academia were invited to join the ITS Committee. Representation by these additional agencies, especially the Information Technology Department, has enabled a truly countywide needs assessment to be conducted that takes advantage of other expansion plans from other non-transportation agencies, such as the school board and the county court system. The MPO staff have found that ITS deployments with multiple uses, such as the fiber optics communication network, is much easier for politicians and agency administrators to support.

In addition, the MPO's ITS Standing Committee, as it is now known, provides a forum for all agencies and organizations to update one another on ITS activities and to sometimes identify opportunities for coordination, such as the fiber optics study. The Miami-Dade County ITS Committee is now expanding its vision to develop a tri-county advanced traveler information system program. As a result of this expanded scope, representatives from the Broward and Palm Beach MPOs have been added to the Committee to create a regional vision.

ITS has already been incorporated in the regional transportation plan, and the TIP contains a number of specialized sections of projects that are cross-referenced with traditional TIP sections. But the key transportation officials realize that more is necessary before ITS can be considered mainstreamed in Miami-Dade County's transportation planning process. Although a regional perspective is now being developed and government agencies are now beginning to consider ITS, support from elected officials has been difficult to enlist. Once in a while, an ITS project that is supported by an elected official receives top priority and is funded in the TIP, however there is no countywide direction. Politicians are elected every four years and represent individual districts, resulting in short-term and geographically limited perspectives instead of the countywide perspective necessary for ITS implementation. It is understood that the lack of support from the policy makers can be a serious roadblock to mainstreaming. To overcome this impediment, a section on education and outreach was included as part of the *Dade County ITS Plan*. The outreach and education program will target both the public and elected officials using private marketing consultants as well as the transportation center staff from the local universities. At the same time, top administrators from the Florida DOT and the MPO will continue to educate the area's policy makers.

Other Metropolitan Areas

In addition to the four case study sites, transportation professionals from six other metropolitan areas were contacted to see how they are attempting to mainstream ITS. Because representatives from only two agencies per site were interviewed, there was not as much detail as to what has worked to mainstream ITS in these metropolitan areas. However, the respondents were heavily involved in the ITS planning and implementation activities and were able to provide some

insight into the positive actions they took to mainstream ITS within the transportation planning process.

In the **Albany** Metropolitan Area there is a small core group of ITS experts with technical knowledge that can be brought together when necessary to push for the inclusion of ITS solutions within the long-range plan and TIP. In addition, the Capital District Transportation Committee, the Albany MPO, used the opportunity of updating the *2015 New Visions Long-Range Transportation Plan* to introduce more transportation technologies to the region. Currently, most ITS technology is imbedded within other capital projects or installed by the New York State DOT or New York State Thruway Authority outside of the metropolitan transportation planning process. However, the Capital District Transportation Authority, the regional transit agency, is leading the deployment of the Route 5 Smart Transit Corridor project. This project is bringing together a number of local jurisdictions that have not had a history of cooperatively developing ITS projects. The MPO staff are facilitating the coordination of transit operators, traffic engineers, and police, as well as with representatives of other private and public entities. The MPO management hopes that a successful ITS Corridor project may open more eyes to the value of ITS as one potential solution and make future mainstreaming efforts even easier.

The inclusion of ITS projects into the **Denver** Metropolitan Area's transportation planning process is based on sound analyses, including benefit-cost analyses. The MPO-led Traffic Signal Systems Improvement Program is an excellent representation of a thoroughly analyzed ITS project that has been successfully mainstreamed into the transportation planning process. This is a regional program to coordinate traffic signal systems along primary corridors throughout the MPO's jurisdiction. Area transportation professionals see the implementation of the 1995 Denver Regional Model Deployment Initiative proposal and plan as a great opportunity to apply the National ITS Architecture framework to a planning process and integrate the large number of existing ITS components in the Denver Metropolitan Area.

ITS projects, products, and services have undergone the mainstreaming process over the last 20 years in the **Milwaukee** Metropolitan Area. Advanced transportation technologies were initially included in the *1978 Freeway Management Plan*, the *1988 Traffic Management Systems Plan*, and later in the regional transportation plan. These designated ITS components, including the MONITOR Traffic Operations Center, were deployed beginning in the late 1980s and are continuing to be deployed through the Gary-Chicago-Milwaukee ITS Priority Corridor. With the ITS deployments proceeding at the regional and supra-regional level, there is now greater emphasis on educating the policy makers, especially at the local level, in order to link the highway and transit ITS systems to the local transportation networks. Transportation officials in the Milwaukee area see this new educational role as a fitting role for staff at the Southeastern Wisconsin Regional Planning Commission, who already act as liaison and mediator between the Wisconsin DOT and local governments.

As a result of the Smart Trek Model Deployment Initiative, ITS projects in the **Seattle** Metropolitan Area are now being mainstreamed into the metropolitan transportation planning process. The project selection criteria has been modified so multi-jurisdictional projects will receive higher preference than before the changes were made. The Washington State DOT has

enlisted the services of the Puget Sound Regional Council, the MPO, to educate the policy makers and staffs of the public agencies to consider ITS applications for problem solving. Extensive consumer satisfaction surveying by the MPO will also aid in modifying what ITS deployments are actually needed and will be used.

Mainstreaming ITS in the **Washington, D.C., Metropolitan Area** is being made possible through the work of the committee structure both within the MPO, the National Capital Region Transportation Planning Board, and outside the MPO, with statewide ITS committees being led by the Virginia DOT and the Maryland DOT. The MPO committees, task forces, and subcommittees are being used to ensure that there are compatible systems being deployed throughout the metropolitan area. The MPO's development of a long-range vision for ITS will increase the consideration of advanced technologies to solve transportation problems. The committees sponsored by the state DOTs are instrumental in getting ITS projects for their states into the TIP. Finally, in the Washington, D.C., Metropolitan Area, there is a heavy reliance on ITS advocates to push for the implementation of ITS which indirectly leads to the inclusion of ITS within the Transportation Planning Board's transportation planning documents.

There is a small number of ITS projects currently being deployed in **Winston-Salem Metropolitan Area**, because, as transportation officials noted, they are careful to apply only those ITS components that are compatible with the size and needs of this medium-sized metropolitan area. The transportation agencies in this area are utilizing experts from academia, outside consultants, and the North Carolina DOT to educate the policy makers and administrators on ITS deployments and to slowly integrate these new systems within the traditional transportation network.

4.2 STRATEGIES USED TO MAINSTREAM ITS

Interviewees representing transportation agencies from the ten metropolitan areas initially provided a long and varied list of strategies they used to increase opportunities for ITS deployments in their region. The list of strategies was then organized and presented to the interviewees at each of the four case study sites. The interviewees reviewed the list and selected the strategies they believed are the most effective strategies on which they would expend resources. Some of the respondents learned from their experiences and ranked some strategies that they had not attempted over other strategies that they or others in their agency or region had applied, but had minimum success using. While all of the strategies were deemed worthwhile, because of the limited resources that plague most regions and their transportation agencies, it was essential to have the transportation officials narrow the list to the highest priority strategies, which they felt should be emulated by other metropolitan areas.

Table 3 shows the consensus rankings of the strategies from each of the ten metropolitan areas. The initial phone interviews with transportation officials provided the background detail to rank the effectiveness of the mainstreaming strategies for each of the six metropolitan areas not visited. Because of the larger number of agencies contacted and the opportunity to probe for greater detail about these strategies at the four case study sites, rankings for Chicago, Dallas-Fort Worth, Los Angeles, and Miami were given twice the weight as the rankings provided by the

other six metropolitan areas. In addition, because some respondents did not differentiate whether the committees or task forces should be led by the MPO or by another agency, and some said the sponsor made no difference, the two strategies promoting committees were merged into one.

It was clear from the officials interviewed that the results of executing these strategies are to achieve the three conditions that aid in mainstreaming ITS within the metropolitan planning process. These three conditions are: (1) the endorsement of ITS by key officials, (2) the improvement in communication and coordination among key officials and agencies, and (3) the efficient and effective collection of data and use of information. Most agency officials felt that strategies that increased communication and coordination were the most important, followed by those that lead to endorsement of ITS solutions. A majority of interviewees believed that the full benefits of the collection, management, and use of data would not come to fruition until the ITS deployment needs were conceived or even until the equipment was in operation for a period. At that time, parties could see what data could actually be generated and translated into useful information.

As noted in Chapter 1, a number of the 17 strategies listed in Table 3 could be used to generate more than one of the three conditions stated as being instrumental in mainstreaming ITS in the metropolitan planning process. Chapter 3 detailed how each strategy may produce a specific condition. From the analysis of their responses, we can conclude that the interviewees in the ten metropolitan areas recommend seven strategies as the most effective strategies for transportation officials in other metropolitan areas to follow to achieve one or more conditions which aid in mainstreaming ITS. Whether these strategies are being utilized within or outside the MPO structure, they have been the most instrumental in moving ITS projects to the forefront of regional transportation planning processes:

1. Educate elected officials and agency administrators in ITS
2. Create and use a committee or task force that fosters ITS discussions and opens communications
3. Develop an ITS plan
4. Develop regional ITS programs and projects
5. Reference ITS in regional transportation plans
6. Educate other prime stakeholders (beyond the traditional transportation agencies) about ITS
7. Make use of ITS advocates in the region to promote ITS applications.

The education of elected officials and other policy makers regarding ITS was selected as the top strategy to aid in mainstreaming ITS. This is understandable when considering that the metropolitan transportation planning process is heavily weighed to input and proposals from agencies, thereby requiring awareness and support from the politicians and upper-level agency administrators. Coincidentally, of the 17 strategies, only the strategy of educating the general public was given a low priority status. While still a worthwhile action, this strategy was not deemed as one of the most effective methods to mainstream ITS, especially for those areas just beginning their ITS planning and deployment efforts. Except for the need to go through the general public to build political support in the Miami Metropolitan Area, representatives from

most of the areas see this strategy being used after ITS products and services are implemented, not during the project planning period. The first priority is to get the top officials aware of ITS.

Second to educating decision and policy makers, the use of committees or other forums to open communication about ITS has proven to be highly effective. Interestingly, transit officials felt that there were better strategies and rated the use of committees as only a medium priority. This may also indicate that the transit agencies are not adequately represented on these regional committees or issues discussed at these meetings are more relative to the highway system.

Transit representatives almost unanimously endorsed the creation of ITS plans as one of their top priorities that would lead to ITS mainstreaming. Officials from other areas agreed with transit and made this the third highest ranked strategy. However, interviewees cautioned that ITS plans developed by the state DOTs without the input of local agencies and the MPO may actually have an opposite effect and create opposition to placing these unilaterally-developed projects within the TIP and other metropolitan plans.

Most areas have developed some ITS projects that encompass a number of agencies and a wide area or principal corridor. Developing ITS projects that are regional in scope or large ITS projects that include multiple jurisdictions, modes, or agencies was also considered an important strategy. These projects have tended to increase the level of coordination and communication among agencies within the region. But just like ITS plans, regional projects that are not joint efforts or coordinated with existing operations of other agencies do not merit a high priority ranking.

Rounding out the highest recommended strategies to mainstream ITS were referencing ITS in the regional transportation plan, educating and involving non-traditional stakeholders, and using regional ITS advocates to both build support in the region and provide technical direction. Surprisingly, MPO managers saw these strategies as lower priorities than their staff. In particular, the MPO administrators want education to primarily target upper management and politicians.

Table 4 shows the highest recommended strategies that representatives from each agency type believed would lead to mainstreaming ITS within the metropolitan planning process. Of the 17 strategies, five strategies were not rated as the highest recommended strategies by any of the agency types and, therefore, are not included within the table. The traditional agencies involved with planning and operating the transportation system were included in this summary table. These agencies include MPOs, state DOTs, transit agencies, municipal and county governments, and tollway and turnpike authorities. In addition, representatives from many of the traditional agencies and from non-traditional organizations, such as airports and academia, who were on regional committees, were also given the opportunity to reach consensus on the actions that they would highly recommend.

Table 3. Assessment of Strategies to Mainstream ITS by Metropolitan Area

Consensus of Areas	Strategies										
	Used to Increase ITS Awareness, Increase ITS Deployments, and Integrate ITS Activities Within the Transportation Planning Process										
		Albany, NY	Chicago, IL	Dallas-Fort Worth, TX	Denver, CO	Los Angeles, CA	Miami, FL	Milwaukee, WI	Seattle, WA	Washington, D.C.	Winston-Salem, NC
1	H	Educate elected officials, top management of area transportation providers	M	H	H	M	H	H	H	H	M
2	H	Use or create MPO or non-MPO Committees/Task Forces	M	H	H	M	H	H	M	H	M
3	H	Develop ITS plans	M	H	H	M	H	H	M	M	M
3	H	Develop regional ITS projects and programs	M	H	H	H	M	H	H	M	M
5	H	Include ITS, or a reference to ITS, in the Regional Transportation Plan	M	H	H	M	H	M	H	M	M
5	H	Educate other stakeholders (emergency response services, trucking)	H	H	H	M	H	M	M	M	H
5	H	Use ITS advocates in the region (at the MPO and other agencies)	H	H	M	M	M	H	H	M	H
8	M	Conduct field trips for upper management (scanning reviews)	-	M	H	M	H	M	M	-	-
9	M	Include ITS projects in the TIP	M	M	H	M	H	M	M	M	M
10	M	Use peer-to-peer networking (experts outside the metropolitan area)	-	-	M	-	M	H	-	-	M
11	M	Educate MPO staff	M	M	H	M	M	M	M	M	M
12	M	Utilize the National ITS Architecture or developing a regional architecture	M	-	H	M	M	M	M	M	L
13	M	Include ITS in other MPO planning documents (CMS, MIS, etc.)	-	M	M	M	H	M	M	M	L
14	M	Determine data collection needs	M	M	M	M	H	M	M	M	L
15	M	Use data for planning and operations improvements (applying the data)	L	M	M	L	H	M	M	H	L
16	M	Involve academia	-	-	-	-	-	M	-	-	-
17	L	Educate general public	L	M	M	L	L	M	L	M	L
Ratings of Strategies:			“-” No response provided								
H – High Priority. Most effective strategy. Interviewees recommend spending time and funds on this strategy.											
M – Medium Priority. This strategy is recommended if the agency or region has time and funds.											
L – Low Priority. This strategy is not recommended for areas just initiating ITS efforts due to time or funds.											
<i>Source of Ratings: Interviews with transportation agency representatives conducted March-April 1998 (phone interviews) and July-September 1998 (site visits)</i>											

MPO staffs recognize that mainstreaming ITS within the planning process requires that ITS be incorporated within the MPO planning documents, activities, and committees. Overall, the MPO representatives applied a high priority to six strategies: (1) using committees, (2) including ITS in the regional transportation plan, (3) using regional ITS advocates, (4) conducting scanning reviews, (5) using outside ITS experts, and (6) educating MPO staff on ITS. Analysis of these priorities shows that MPO staffs recognize that achieving the endorsement of ITS, one mainstreaming condition, is only partially gained through the placement of ITS within the regional transportation plan. A policy endorsement in the traditional transportation planning document is seen as only the first step in mainstreaming and will require additional input from other agencies to maintain long-term endorsements, one focus of an ITS or related committee. The MPO staffs are now being called upon to discuss the technical merits of various ITS technologies. There is a realization among MPO staffs that they need additional technical resources to intelligently discuss ITS applications as well as the development of ITS plans and regional architectures. Visiting various deployment sites has increased awareness and knowledge. MPO staffs have also requested the assistance of outside experts through the national peer-to-peer network, as well as using the services of local ITS experts within the region.

Table 4. Assessment of Strategies to Mainstream ITS by Agency Type

Strategies to Mainstream and Deploy ITS (X = highest recommended strategy)	MPOs	State DOTs	Transit	Local Government	Tollways & Turnpikes	Regional Committees
Use or create MPO or non-MPO Committees/Task Forces	X	X		X	X	X
Educate elected officials, top management of area transportation providers		X	X	X		X
Develop ITS plans		X	X	X		X
Conduct field trips for upper management (scanning reviews)	X		X		X	X
Use ITS advocates in the region (at the MPO and other agencies)	X		X		X	
Develop regional ITS projects and programs		X				X
Include ITS, or a reference to ITS, in the Regional Transportation Plan	X	X				
Educate other stakeholders (emergency response services, trucking)			X			X
Use peer-to-peer networking (experts outside metropolitan area)	X			X		
Educate MPO staff	X					
Utilize the National ITS Architecture or developing a regional architecture			X			
Involve academia						X

The state DOT officials placed a high priority on five strategies: (1) educating officials, (2) using committees, (3) developing ITS plans, (4) initiating regional ITS projects, and (5) referencing ITS in the regional transportation plan. Of all the transportation agencies included within this study, the state DOTs are most involved with the planning, deploying, and operating functions. Historically, a number of early ITS installations were solely state DOT initiatives. Because of

the state DOTs' extensive involvement with ITS activities, management and staff from these state agencies are very influential in the selection of strategies to be used to mainstream ITS products and services within the transportation planning process. A positive aspect of the top strategies recommended by the state DOT officials is the recognition that other agencies need to be included in the development of ITS plans and projects, and that committees should be used for the coordination of these plans and projects with other agencies.

Representatives from nine public transportation agencies assigned a high ranking to six strategies: (1) educating officials, (2) developing ITS plans, (3) educating other stakeholders, (4) using regional ITS advocates, (5) conducting scanning reviews, and (6) creating a regional architecture by applying the National ITS Architecture. As noted, there was some concern expressed by transit representatives that transit ITS projects are still not equally considered with other modes. Creating a regional architecture would cause other agencies to consider regional benefits gained from the integration of all systems, including transit, giving the transit agencies more equality in the ITS network. Representatives from a number of agencies, including transit representatives, liked scanning reviews, but most felt that elected officials and state DOT staff had the first opportunities to be involved with these educational visits, limiting the opportunity for involvement by transit officials and representatives from local governments.

Local government officials recommended that metropolitan areas focus on four strategies: (1) educating elected officials and agency administrators, (2) using committees to move ITS forward, (3) developing ITS plans, and (4) using outside ITS experts. These participants see the value of an ITS plan in that it enables the local governments to see how improvements on the local road networks fit with highway and transit deployments and within the regional context.

Because they have a dedicated revenue stream and their roadways have limited access, the turnpike and tollway authorities are usually independent transportation agencies within any area. These agencies are just now becoming involved with the metropolitan planning process. Turnpike officials agreed that they valued (1) the use of the committee structure to become more aware of regional ITS applications and how their systems could be integrated with the communication and transportation networks of other metropolitan agencies. These individuals also highlighted (2) the need for continued scanning reviews, and (3) the need for ITS advocates to be vocal and active in an area to ensure that mainstreaming activities are initiated and continue.

The study team was fortunate to attend three regional ITS committee meetings and interview representatives from two other regional transportation committees. The committee members were asked about the value of the committee to the region and their agencies and to discuss how best to mainstream ITS. Not surprisingly, the use of committees was one of the top priorities. In addition to (1) committees: (2) educating elected officials and top management, (3) developing ITS plans, (4) creating regional ITS projects, (5) educating other stakeholders, (6) conducting scanning reviews, and (7) involving academia were also top recommendations from committee members. The strategies to use committees and involve academia appear to be logically linked. In many areas, it is through the committees that the transportation and marketing experts from the local universities are first introduced to the transportation professionals.

4.3 ROLE OF THE MPO IN THE ITS EFFORTS OF THE METROPOLITAN AREAS

Initially, the study team focused on the MPO's role in mainstreaming ITS into the metropolitan transportation planning process. The team speculated that an MPO might include ITS in its planning documents, provide a forum to coordinate ITS projects and data across agencies and jurisdictions, prioritize ITS projects for the region, and help compare ITS projects with capital ones. Ideally, the MPO could develop a regional transportation plan with a vision that includes ITS, and then analyze ITS projects to identify those that fit into the vision.

After the visits to four metropolitan areas and discussions with officials from different agencies were completed, it appeared that no single mainstreaming model could apply to all areas. Just as the political and organizational structures and the level of maturity of ITS planning and deployment differ from region to region, so will the strategies to mainstream ITS differ. This includes the role of the MPOs. Often this role depends on the MPO's responsibilities in the allocation of funds and application of these funds to projects, and the MPO staff's level of involvement with transportation operations within the area. Although there are some exceptions, MPOs generally play a supportive role more than a central one for mainstreaming ITS.

The interviewees outlined a number of viable roles for the MPOs in the mainstreaming and deployment of ITS projects, products, and services in a metropolitan area. There was agreement among all transportation officials interviewed that the MPO can have little effect unless the MPO staff members are knowledgeable of ITS. After this is achieved, there is one prominent role that many interviewees thought the MPO should undertake - the role of ITS educator. As part of this role, the MPO would act as a sponsor or facilitator of a committee to discuss transportation issues and advanced technology applications that can respond to some of these issues.

It was generally agreed that the MPOs were not to be the educators or marketers of ITS to the general public unless it was necessary to increase awareness with policy makers, as is the case in Miami-Dade County. Even then, the Miami-Dade County MPO staff are using outside consultants and academia to reach this group, while at the same time trying to directly educate the decision-makers. With the exception of some transportation demand management programs like ridesharing, the MPOs were also not considered the operators or designers of any transportation modes or systems. Because of these limitations, MPO staffs agreed that their involvement with specific ITS projects rely on invitations to participate from the sponsoring agencies.

The **Chicago** Area Transportation Study staff and area officials believe that the MPO plays a constructive role in increasing awareness of ITS within the region. The MPO provides a forum for discussions regarding the planning, development, and integration of ITS and educates the stakeholders and public. This is accomplished through the Advanced Technologies Task Force and support from the Chicago MPO staff. Additionally, the MPO staff see a role in marketing prototype projects that have been successfully applied in the metropolitan area and working with operating agencies to develop regional systems. Lastly, most interviewees believe that the Chicago MPO is the appropriate entity to organize, analyze, and archive the data generated by ITS technologies deployed in the Chicago Metropolitan Area. Chicago Area Transportation

Study staff currently have the technical expertise necessary to manipulate the data, however, their concern is the staff and computer resources required to perform data management, analysis, and archival responsibilities.

Transportation officials in the **Dallas-Fort Worth** Metropolitan Area look to their MPO as filling the roles of ITS facilitator, ITS educator, ITS project funder, and liaison and educator to the local elected officials and municipal administrators. Most of the representatives from the agencies interviewed think the MPO staff should be very involved in ITS projects in the area. The MPO is able to provide a regional context for the projects in an area with many political boundaries and better understand the experiences of the traveling public who care little about jurisdictions they may pass through. Many representatives said that the MPO has been able to recognize the different philosophies of the east (Dallas) and west (Fort Worth) subregions and fuse them into common goals and priorities when working on regional projects. In keeping with this regional context, the MPO has been able to use Congestion Mitigation and Air Quality Improvement Program funds to leverage multi-jurisdictional ITS work. Because local agencies have not seen ITS projects take funds away from their projects, the MPO has been able to avoid conflict while building support for ITS. None of this ITS involvement would be possible without support from the elected officials who highly respect the MPO staff. The staff members have earned the respect not only from their collective knowledge and responsiveness, but also for not overreaching their authority. The MPO is the direct mechanism to the politicians and therefore seen as the only entity fully capable of educating the elected officials regarding ITS and its regional applications.

About five years ago, in the **Los Angeles** Metropolitan Area, the MPO staff took preliminary steps to highlight ITS by including a policy statement in the RTP that provided a regional ITS perspective to transportation agencies and local jurisdictions. Today, the MPO staff, through regular contact with operating agency and local government staff, in part from the Southern California Priority Corridor committees, encourage coordination of ITS projects across agencies and jurisdictional boundaries. In the future, information will be available in the transportation plan on how ITS technologies will be used to respond to transportation needs, and all federally funded and significant ITS projects will be included in the TIP and identified as ITS projects. The MPO staff also are developing a process to ensure that ITS projects are consistent with the regional ITS architecture that is being developed through the Southern California Priority Corridor. In addition to mainstreaming ITS into the traditional planning documents, the MPO will provide services, such as bringing stakeholders together to facilitate project development and implementation or acting as a pass through for funding, to organizations interested in implementing ITS projects. In order to accomplish these goals, ITS has been moved within the MPO organization from the Planning and Policy department to the Southern California Economic Partnership, where there will be a greater focus on ITS solutions.

In **Miami**, representatives from all of the transportation agencies involved in ITS deployment and operations saw the MPO as the centralized lead coordinating agency. Florida DOT officials were among the many that noted the value of the MPO staff to think regionally, yet understand the parochial concerns of the multitude of agencies, elected officials, and citizenry involved. The Miami-Dade MPO staff were applauded for selecting the right mix of participants in all ITS efforts, including the ITS task force, for educating both themselves and other agencies on ITS,

and for the thorough consideration of ITS applications for Miami-Dade County and in the three-county Southeastern Florida region. A couple of area officials noted that the MPO staff have proven to be invaluable in seeking funds to pay for the various ITS projects. Other respondents believed the MPO's information dissemination role to be most important to higher level managers, citing the MPO Director's personal outreach to other agency directors in an effort to reach an economy of scale through sharing common needs, while satisfying each agency's individual missions.

Based on their experiences with their own MPOs, the interviewees from six additional metropolitan areas representing twelve transportation agencies, provided more detail on how the MPOs are performing and what roles they would like the MPOs to perform with regards to ITS development and mainstreaming. The **Albany** MPO's expertise in brokering competing interests by utilizing staff that understand both the highway and transit cultures has proven to be its best asset in mainstreaming ITS. Because the MPO has no formal "turf" or jurisdiction, it is the agency most capable of thinking regionally and providing inter-agency coordination. Interviewees in the Albany area also felt that MPOs could be very useful performing an ITS educational function and making good use of flexible funds for ITS. In **Denver**, the MPO's principal ITS role is to provide communications about ITS in a simplified manner to the locally elected officials, bridge the channels between the design and operations people and planners, and act as a liaison between the Colorado DOT and the large number of local jurisdictions.

Representatives interviewed from the **Milwaukee** Metropolitan Area's transportation agencies noted that the MPO had been involved with advanced transportation technologies for many years and had assumed many varied roles during the agency's length of involvement. The most important MPO roles cited by these interviewees is to educate others, take the lead in determining the appropriate level of ITS deployments for a metropolitan area, make sure ITS is always considered as one of the solutions, and be a liaison between the state and local agencies on certain ITS projects. There was a strong statement by both Milwaukee and Seattle representatives that the MPOs should do more to improve the level of benefit-cost information about ITS applications to aid in pre-deployment modeling and post-deployment evaluations. Officials from the **Seattle** area also see the MPO's role in promoting more regional projects increasing as a result of greater flexible funds now under the control of the MPO. As part of this new regional emphasis that favors many ITS applications, the MPO has an increased responsibility to provide guidance on how ITS projects can be proposed to compete with traditional processes. In addition, the traditional responsibility to lead the ITS education of government agencies will remain with the MPO, but a new responsibility cited may be to verify compliance of ITS projects with the National ITS Architecture.

The pressing current role for the **Washington, D.C.**, MPO is to serve as a forum to resolve interjurisdictional issues and bring operations and planning functions together. An MPO official noted that because projects not only involve up-front capital costs, but also ongoing operations, maintenance, and regional considerations, it is now the MPO's responsibility to provide to its policy board the full investment impacts of projects. In addition to providing expanded information to its governing board, the MPO must also act as an information clearinghouse to keep the local jurisdictions informed of new technologies. A state official would like to see an expanded role from the MPO to include providing technical ITS assistance to local staffs that

will aid in initiating local ITS deployments. In **Winston-Salem**, the MPO's current role with ITS is not as expansive. The MPO staff see themselves as the principal advocate for ITS applications and, therefore, responsible for making sure ITS continues to be considered by the transportation agencies in the area. The MPO staff's first responsibility is to incorporate ITS within the regional transportation plan, then push for greater local applications.

Most of the metropolitan areas reviewed have a great deal of ITS already deployed and the roles outlined are primarily for MPOs in areas with some operational ITS. However, it was generally agreed that the MPO's early and most useful role for ITS mainstreaming is to ensure that area officials are aware and educated about ITS. One interviewee noted that after ITS is mainstreamed, the MPO can be a quiet advocate.

Interviewees repeatedly stated that the value of MPOs within the ITS planning and development process was to provide a "regional view." In addition to its mandated planning responsibilities, it is imperative for the MPO to be included in and tied to the ITS efforts because of the agency's ability to act on behalf of the entire region and resist bias for any single political jurisdiction or agency. In summary, the interviewees generally agreed on a wide range of roles and responsibilities that the MPO should consider in its involvement with the ITS efforts in the metropolitan areas:

- Educator of ITS technologies and processes
- Integrator of ITS within the regional planning documents
- Sponsor of, or a contributing participant on, a multi-jurisdictional and multi-discipline ITS regional committee
- Expert on ways to fund non-traditional ITS projects and how to best utilize flexible funding
- Designer of new TIP project prioritization criteria that aids in the selection of ITS-type projects
- Mediator of conflicts arising from regional project proposals and project deployments
- Developer and refiner of ITS benefit-cost analysis, and creator and modifier of modeling tools to determine impacts from ITS deployments
- Analyst for the data needs for the area
- Liaison to elected officials, local public agency officials, and the private sector
- Facilitator of regional ITS framework and reviewer of National ITS Architecture compliance
- Lead or a contributing participant on regional ITS research and studies.

4.4 APPLICABILITY TO OTHER METROPOLITAN AREAS

The metropolitan areas included in this study are diverse, from the one-county MPO areas of Miami-Dade County in Florida and Forsyth County in North Carolina, to the expansive multi-county MPO areas of Chicago, Denver, and Milwaukee, to the megalopolis that is the Southern California planning region. Even though few metropolitan areas can rival the population and size of the Los Angeles or Chicago Metropolitan Areas, the experiences and successes of the public agencies in these two areas to mainstream ITS into the metropolitan transportation planning process can be applied to other areas of any scale.

One characteristic that varied among the metropolitan areas studied is the level of federal funding for the region's ITS program. While there are few metropolitan areas that have the opportunity to benefit from the federal designation as an ITS Priority Corridor or a Model Deployment Initiative site, transportation officials can learn from the activities involving system integration and architecture development occurring in these designated regions. Transportation officials from a majority of the areas noted that as the systems in their area are deployed and expanded, there will be a greater need to apply the National ITS Architecture on a regional basis.

In spite of the differences in the size of metropolitan areas, federal funding, political composition, and agencies involved, there are some common strategies that transportation operators and jurisdictions use to mainstream ITS within their metropolitan areas. In some cases, mainstreaming is occurring within the transportation agencies first, before they submit their projects to the MPO. Coordination between agencies and jurisdictions takes place through several methods, be it through MPO or non-MPO committees or creating ITS plans. Another important consideration is to obtain support from the elected officials. This may be more important for getting ITS projects deployed than actually for mainstreaming. However, their support is so important that it is considered important to educate them as part of the mainstreaming process.

When asked, the interviewees from the ten metropolitan areas presented a variety of definitions for what mainstreaming ITS into the transportation planning process actually means. The responses produced three levels of mainstreaming. The most advanced mainstreaming level is when ITS solutions are routinely considered and not highlighted in any more detail than other transportation applications. The second level is when ITS needs to be publicized to increase support and bring about regional integration of the individual ITS components. The most basic level is when ITS components are considered, but as a part of larger projects until such time ITS benefits can be proven and ITS projects can be supported as stand-alone initiatives. Where a metropolitan area falls within this mainstreaming matrix is dependent on a number of factors, including the length of time advanced transportation technologies or ITS have been in operations, the level of integration of ITS projects with one another, the knowledge and support from the policy makers, the reputation of the MPO, and the working relationship between the transportation engineers and planners within the metropolitan area.

In the areas where ITS or advanced transportation technologies have been in use for a number of decades and have reached some level of integration, it is expected that ITS projects will naturally be integrated into the traditional project planning process and into regional planning documents.

It is not expected, however, for ITS to be highlighted in an exclusive section in the planning documents. Except for policy statements endorsing ITS in the regional transportation plan, transportation officials believe that setting aside ITS for special recognition would mean that ITS is not routinely considered.

ITS does, however, need to be specifically mentioned in the numerous planning documents in those areas where ITS technologies have been deployed, but in a fragmented fashion and need to be integrated with one another. Respondents from these areas realize that ITS projects, which many times have a regional focus, cannot compete for federal transportation funds when matched against traditional and more politically popular road construction and transit vehicle purchase projects. To overcome this, positive results from ITS deployments need to be heavily advertised and marketed to the parties that influence and determine ITS applications. In most areas, these influential parties are the elected officials and the agency administrators. Dependent on the area, these parties could also include the general public and diverse community, business, and targeted interest groups. The ultimate goal of publicizing and developing criteria to include ITS is that the consideration of ITS products and services as tools to solve transportation problems does become commonplace.

Finally, the respondents said that in areas where there is not an extensive amount of ITS deployed and the policy makers are not familiar with ITS, it may be better to develop ITS slowly and include these products and services within other traditional highway and transit projects. Early attempts to mainstream ITS at a faster rate, including calling for its use in the transportation plan and prioritizing ITS-type projects over conventional projects in the TIP, may actually increase opposition to its applications if the technologies do not have a chance to prove themselves on a demonstration basis.

In **Chicago**, much of the communication regarding ITS occurs outside of the MPO's structure. While most projects still need to go through the MPO and the transportation planning process, communication outside of the planning process has not appeared to be detrimental to any ITS project. Based on the experiences, communication is the first step to any coordinated ITS effort. To ensure that projects are coordinated across jurisdictions or modes, a lead agency for a project in any area, be it the MPO, the state DOT, a transit property, or a municipal agency, should determine if there are any groups or organizations currently existing that bring administrators or staff from various agencies together to facilitate communications.

In the **Dallas-Fort Worth** Metropolitan Area, the transportation officials from the various agencies have seen that the mainstreaming of ITS products and services is a slow process that initially requires a basic knowledge by policy makers before the staff from the individual agencies are comfortable with deploying ITS. The education of staff and officials and deployment of small-scale systems can coincide with the creation of ITS plans. After the learning process from the initial deployments has occurred, it is easier to look at long-term and regional integration of advanced transportation systems. Based on the actions by the transportation officials in this metropolitan area, efforts to mainstream ITS into the planning process should start after individual ITS technologies have been deployed, but before regional ITS technologies are to be deployed. This process includes the insertion of ITS projects within the regional transportation plan, the TIP, and other planning documents. Perhaps the greatest

and most applicable lesson presented by this area's officials is that staff from an MPO should be seen as a valuable resource for ITS and for other transportation issues. If the MPO staff are, among other things, knowledgeable of ITS applications, good listeners, and not prone to force their own agenda on the region, the process to mainstreaming ITS products and services is much more simplified because the agency most attuned to the metropolitan transportation planning process, is also the agency most trusted.

Analysis of the **Los Angeles** Metropolitan Area revealed that there were a number of activities that the area's officials conducted to mainstream ITS products and services that could be transferable to other parts of the country. First, the Southern California officials effectively used task forces to promote ITS and increase stakeholder involvement, including private sector involvement through the Southern California Economic Partnership. Second, the transportation professionals learned that they should not overwhelm the policy makers with technical and complex information about ITS. Instead, policy details should be presented first and specific information about ITS projects be presented at a later meeting. Based on the success in the Los Angeles area, this tactic may aid in providing policy makers with the time needed to become comfortable with an ITS plan or a specific ITS project; therefore, increasing the likelihood of acceptance. A third application gleaned from the experiences of transportation officials from the Los Angeles Metropolitan Area, is that the best way to mainstream a very large multi-jurisdictional program is to organize the project into subregions. This was the experience of the Southern California Priority Corridor and other areas with large deployments and programs may likewise wish to group ITS plans into various subregional plans. This action will enable both the planners and engineers the opportunity to grasp the breadth of the program. Finally, the Los Angeles MPO's standardized project evaluation process may also be a useful practice for other areas to emulate.

In the **Miami-Dade County** Metropolitan Area, the inclusion of a wide variety of key transportation and other public agencies has been pivotal in getting ITS products and services mainstreamed. The Miami-Dade County Information Technology Department is probably the most critical and worthwhile agency that has been added to the ITS discussion and on the ITS Standing Committee in Southeast Florida. With the inclusion of the communications experts from this department, discussions about ITS applications are now being tied to other government functions, including schools and courts. Transportation officials in Miami-Dade County have found that in order to gain the attention of the politicians, it is imperative to expand the scope of ITS projects beyond transportation and make the application as local as possible, without compromising the regional benefits. Other areas can learn by the Miami experience and use as many local and national advocates as possible to increase the knowledge of and support for ITS applications. If necessary, create ITS plans for different levels of operation to demonstrate to policy makers how regional programs and projects can provide positive impacts to each local community.

There are also lessons learned from the other initial six sites that makes their stories applicable to other areas. In **Albany**, transportation officials are hoping the successful deployment of an advanced public transportation systems project will increase the support for ITS among local agencies and, therefore, make future ITS applications easier to mainstream. Officials from other metropolitan areas can see by the Albany example that mainstreaming cannot truly take off

unless there are some viable ITS deployments already in place. In addition, Albany MPO staff saw that ITS projects could not compete with other capital projects regardless how much these advanced technologies were considered. To counteract this, the TIP evaluation criteria was revised to analyze ITS projects under incident conditions. Transportation professionals may wish to examine the Capital District Transportation Committee's project analysis methodology to determine how to compare ITS and traditional transportation projects.

While a number of ITS projects have already been deployed in the **Denver** Metropolitan Area, it is difficult to mainstream ITS products and services without the documentation of their associated benefits and costs. Because there is a requirement within the planning process for supporting quantitative analysis and the benefits of many ITS applications have been difficult to quantify, a number of these ITS deployments now occur outside of the TIP process. Both the Colorado DOT and the Denver MPO have created a series of plans that provide an overall ITS vision for the region, and these plans are currently directing the ITS deployments. An important lesson from this area's activities is that regardless of the channels taken to deploy an ITS project, it is crucial for officials to develop some plan that links these projects undertaken by a variety of agencies into a common vision.

In the **Milwaukee** Metropolitan Area, the "ITS experience" has been ongoing for over two decades. Initially, the officials from the key regional and state transportation agencies sought to get the advanced technologies deployed in the field where they could be assessed. Since that initial period, mainstreaming has been aided by the individual deployments of numerous agencies and in getting the agency officials to arrive at a common vocabulary to discuss these new technologies. Transportation officials have learned that to keep ITS operating and new ITS deployment continuing, beyond the initial deployment stages, a regional view of the transportation agencies must be maintained. Administrators, managers, and staff from the transportation agencies in the Milwaukee area have used ITS plans, development of regional ITS programs, creating ITS committees, educating elected officials on ITS applications and benefits, and a number of other activities to maintain this view so critical to deploying multi-jurisdictional projects.

Just as in many metropolitan areas, the public agencies' experiences in proposing ITS programs and projects for the transportation planning process is still rather new in the **Seattle** Metropolitan Area. Agencies from other metropolitan areas can learn from the one-on-one assistance being given by the Seattle MPO staff to agencies that wish to propose these projects. The MPO staff have also modified the TIP project selection criteria to account for the regional and multi-jurisdictional benefits from ITS projects. State DOTs can learn from the Washington State DOT by not overreaching their responsibilities and instead seeking the assistance of the Puget Sound Regional Council staff to educate the policy makers about ITS. The MPO is much more familiar with how to reach this clientele.

There are a number of metropolitan areas that extend into more than one state, just as in the **Washington, D.C.**, Metropolitan Area. While it is difficult enough for all of the public entities in an area to have a region perspective, it is even more difficult for multi-state areas to care beyond the parochial needs that end at the state border. The unifying link to these agencies and their planning process is the MPO. The MPO management has used its committee structure to

create a common ITS vision that can now be integrated into its metropolitan transportation planning process. Administrators from the transportation agencies in this area have learned that coordination is key to getting ITS mainstreamed and deployed.

In **Winston-Salem**, the interviewees said the best way for areas new to ITS to mainstream is through small viable steps. The MPO staff, working with the city DOT staff, saw that the transit ITS applications would present the greatest opportunity to showcase ITS. This provided the opportunity to get ITS dialogue initiated. The interviewees learned that after this dialogue began, it remains the MPO staff's responsibility to keep the ITS conversation going if there is to be any opportunity for mainstreaming ITS within the metropolitan transportation planning process.

4.5 CONCLUSION

This study was undertaken to determine how ITS has been incorporated into the metropolitan planning process and to document processes that were used successfully and can be implemented in other metropolitan areas. As a result of this research, we have learned that there are three conditions that help bring ITS solutions into the metropolitan transportation planning process:

1. Endorsement of ITS by elected officials and transportation managers
2. Improved communication and coordination across geographic boundaries and between agencies
3. Collection of data and use of information.

To generate these conditions, different strategies were applied. For example, in some areas, existing committees were used to gain endorsement of ITS, while in others, new committees were formed. Because political and organizational structures and the level of maturity of ITS planning and deployment differ from region to region, the strategies used in the disparate localities varied. Therefore, elected officials and transportation managers who want to facilitate the incorporation of ITS solutions into the metropolitan transportation planning process in their areas should follow three steps.

First, the transportation officials must determine which strategies are most appropriate for their area. Not all strategies are needed or are applicable in all locations. Second, after selecting the strategies, they must then make and keep a commitment to implement those strategies. This is the most crucial step; elected officials and transportation managers must provide the resources to make the selected strategies successful. Third, they must reassess the strategies after a period of time has elapsed. This may involve modifying the approach to meet new needs for the region and each agency involved. As ITS planning and development matures, the officials and managers may create new priorities causing some of the original strategies to be eliminated and the addition of new strategies.

As demonstrated in several metropolitan areas, local officials and agency representatives have become aware of the potential opportunities that ITS products and services can provide. This, in turn, has led these managers and their staffs to routinely consider ITS solutions when making

investment decisions concerning the transportation system. While a number of individual agencies are routinely considering ITS solutions, mainstreaming ITS into the transportation planning process is necessary if ITS deployments are to thrive on a regional basis.

The metropolitan areas that are meeting the three conditions described in this report are now able to mainstream ITS into the planning process. However, a number of agency officials noted that mainstreaming efforts must go beyond the current focus of getting ITS projects deployed and operating. These efforts must accommodate the integration of the deployed systems by applying a regional architecture. These efforts must also ensure the continued long-term operations and maintenance of the systems by identifying the resources required by agencies to perform these functions. Many of the transportation officials interviewed asserted that this vision could be best achieved when considered within the metropolitan transportation planning process.

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APPENDIX B: ACRONYMS AND ABBREVIATIONS

General Acronyms and Abbreviations

3C	cooperative, comprehensive, and coordinated
AAA	American Automobile Association
AADT	average annual daily traffic
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act of 1990
ADUS	Archived Data User Service (component of the National ITS Architecture)
AMPO	Association of Metropolitan Planning Organizations
APC	automatic passenger counters
APTA	American Public Transit Association
APTS	advanced public transportation systems
ARTS	advanced rural transportation systems
ASTM	American Society for Testing and Materials
ATC	advanced traffic controller
ATIS	advanced traveler information systems
ATMS	advanced traffic management systems
ATR	automated traffic recorder
AVC	automatic vehicle classification
AVCS	advanced vehicle control system
AVCSS	advanced vehicle control and safety system
AVI	automatic vehicle identification
AVL	automatic vehicle location
CAA	Clean Air Act Amendments of 1990
CAD	computer-aided dispatch (and scheduling) system
CATV	community access television
CBD	central business district
CCTV	closed circuit television
CFP	call for proposals
CMAQ	congestion mitigation and air quality improvement program
CMF	congestion mitigation funds

CMS	congestion management system
CMS	changeable message signs (same as variable message signs)
CORSIM	micro-simulation model for freeway systems operations
CVISN	Commercial Vehicle Information Systems and Networks
CVO	commercial vehicle operations
DDS	data distribution service
DE	State Department of Transportation District Engineers
DOE	Department of Energy
DOT	Department of Transportation
DPW	Department of Public Works
DSRC	dedicated short-range communications
DTRS	digital trunk radio systems
EDP	early deployment plan (or planning study)
EFP	electronic fare payment system
EMME/2	planning model used to estimate benefits of diverting traffic to local roadways
EMS	emergency medical services
EMT	emergency medical technician
EPA	Environmental Protection Agency
ETC	electronic toll collection system
ETTM	electronic toll and traffic management
FD	fire department
FEMA	United States Federal Emergency Management Agency
FHWA	U.S. Department of Transportation Federal Highway Administration
FMS	freeway management system
FOIA	Freedom of Information Act
FOT	field operational test (ITS demonstration project)
FREQ	University of California at Berkeley freeway traffic flow simulation model
FREE-SYM	freeway simulation model
FTA	U.S. Department of Transportation Federal Transit Administration
FY	fiscal year
GHz	gigahertz

GIS	geographic information system
GPS	global positioning system
HAR	highway advisory radio
HazMat	hazardous materials
HCM	Highway Capacity Manual
HOV	high occupancy vehicle
HQ	headquarters
IBTTA	International Bridge, Tunnel, and Tollway Association
IDAS	Intelligent Transportation System Deployment Analysis System
IEEE	Institute of Electrical and Electronics Engineers
IFCS	integrated fare collection system
IGA	intergovernmental agreement
IMS	incident management system
IPR	intellectual property rights
IRM	information resource management
ISDN	hard wire communications line
ISP	information service provider
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITE	Institute of Transportation Engineers
ITS	intelligent transportation systems
ITSA	ITS America
IVHS	intelligent vehicle-highway systems (term used prior to ITS)
IVN	in-vehicle navigation
IVR	interactive voice response
LAN	local area network
LCU	local control unit
LOS	level of service
LRP	Long Range Transportation Plan (same as regional transportation plan)
MDI	Model Deployment Initiative
MDT	mobile data terminals
Mgwt	megawatt
MHz	megahertz
MIS	major (transportation) investment study

MIS	management information systems
MMTIC	multi-modal transportation information center
MMTIS	multi-modal traveler (or transportation) information system
Mobile5a	Environmental Protection Agency's Vehicle Emissions Factor Model
MOEs	measures of effectiveness
MOU	memorandum of understanding
MPO	metropolitan planning organization
NCHRP	National Cooperative Highway Research Program
NEMA	National Electrical Manufacturers Association
NETSIM	computer model used to evaluate benefits from freeway management systems
NETSUM	computer model used to evaluate benefits from freeway management systems
NHI	National Highway Institute
NHS	National Highway System
NHTSA	U.S. Department of Transportation National Highway Traffic Safety Administration
NII	National Information Infrastructure
NTCIP	National Transportation Communications for ITS Protocol
NTI	National Transit Institute at Rutgers University
O&M	operations and maintenance
PASSER	real-time signal progression model
PD	police department
PDA	personal digital assistant
PL	Federal transportation planning fund (metropolitan planning funds)
PPP	public-private partnerships
PTI	Public Technologies, Inc.
R&D	research and development
RF	radio frequency
RFI	request for information
RFP	request for participation
RFP	request for proposals
RFPI	request for partnership information
RFPP	request for proposed partners
RFS	regional fare system

RMTIC	regional multimodal traveler information center
ROW	right of way
RTP	regional transportation plan
SAE	Society of Automotive Engineers
SDO	standards development organizations
SIP	state implementation plan
SOS	scope of service
SOV	single-occupant vehicle
SPR	statewide planning and research
S.R.	State Highway Route
STIP	state transportation improvement program
STP	Surface Transportation Program
STP-MM	Surface Transportation Program – Metropolitan Mobility
STP-XA	Surface Transportation Program – Any Area
STP-XU	Surface Transportation Program – Areas greater than 200,000
T-1	hard wire communications line
T-3	hard wire communications line
TCC	transit control center
TCC	traffic signal control center
TCIP	Transit Communications ITS Protocol
TCM	transportation control measure
T-DAD	Transportation Data Acquisition Display, a planning tool
TDM	transportation demand management
TEA-21	Transportation Equity Act for the 21 st Century
Tech & Ops	Technology and Operations
TIC	traveler (traffic, or transportation) information center
TIP	transportation improvement program
TIS	traveler information system
TMA	transportation management association
TMC	traffic management center
TMDD	Traffic Management Data Dictionary
TMS	transportation management strategies (include TDM, TSM, and ITS)
TMS	transit management system

TOC	traffic operations center
TP	transportation plan (also known as the regional transportation plan)
TRANST	computer model used to evaluate benefits from freeway management systems
TRB	Transportation Research Board
TSC	traffic systems center
TSCS	traffic signal control system
TSM	transportation system management
TSP	transportation system plan
Type 170	California/New York Type 170 traffic signal controller standards
UPWP	Unified Planning Work Program
U.S. DOT	United States Department of Transportation
UTCS	urban traffic control system
UZA	urbanized area
VMS	variable message sign
VMT	vehicle-miles of travel (or vehicle-miles traveled)
Volpe Center	U.S. Department of Transportation John A. Volpe National Transportation Systems Center
VTDS	video traffic detection system
WIM	weigh-in-motion
WWW	world wide web

Albany Metropolitan Area

CDTA	Capital District Transportation Agency
CDTC	Capital District Transportation Committee (Albany MPO)
E-Z PASS	electronic toll collection and traffic management system used by seven toll authorities in four states
New Visions	1998 Regional Transportation Plan for the Albany Metropolitan Area
NYSDOT	New York State Department of Transportation
NYSERDA	New York State Energy and Research Development Authority
NYSP	New York State Police
NYSTA	New York State Thruway Authority

Chicago Metropolitan Area

ADVANCE	Advanced Driver and Vehicle Advisory Navigation Concept
ADVANCE TIC	Transportation Information Center for ADVANCE
ATTF	Advanced Technologies Task Force
BSMS	Chicago Transit Authority's Bus Services Management System
CATS	Chicago Area Transportation Study (the Chicago MPO)
CDOT	City of Chicago Department of Transportation
COM	Council of Mayors
COM Center	Illinois DOT District 1's Communication Center
CPP	GCM Priority Corridor Program Plan (June 1995)
CTA	Chicago Transit Authority
C-TIC	Illinois DOT's Corridor Traveler Information Center
ETP	Illinois Emergency Traffic Patrol
GATEWAY	GCM regional traveler information database and system
GCM	Gary-Chicago-Milwaukee (Priority Corridor)
IDOT	Illinois Department of Transportation
IDOT-District 1	IDOT district office responsible for the northeastern Illinois region
IDOT-DPT	IDOT Division of Public Transportation
IDOT-OPP	IDOT Office of Planning and Programming
IEPA	Illinois Environmental Protection Agency
I-PASS	electronic toll collection system used by ISTHA
ISTHA	Illinois State Toll Highway Authority
IUTRC	Illinois Universities Transportation Research Consortium
Metra	commuter rail division of the Regional Transportation Authority
MMTIS	Illinois DOT's Multi-Modal Traveler Information System
MONITOR	Milwaukee area traffic management center
NIPC	Northeast Illinois Planning Commission
NIRPC	Northwestern Indiana Regional Planning Commission
NWCD	Northwest Central Dispatch Center
OGL	Operation Greenlight, a multi-agency congestion and mobility program
Pace	suburban bus division of the Regional Transportation Authority
RC	Chicago MPO's Regional Council of Mayors (there are 11 RCs)
RTA	Regional Transportation Authority

RTP	Regional Transportation Plan (<i>Destination 2020 Transportation Plan</i>)
SCAT	IDOT's Signal Coordination and Timing Program
SEDP	<i>Northeastern Illinois Strategic Early Deployment Plan</i>
SEWRPC	Southeastern Wisconsin Regional Planning Commission
SRA	strategic regional arterial (highway) system designated in the 2010 RTP
SRT	strategic regional transit system
TCC	Transit Control Center
TCC	Traffic Signal Control Center
TSC	Illinois DOT's Traffic Systems Center
TSCS	traffic signal control system
TSD	<i>2010 Transportation System Development Plan</i> (previous Chicago RTP)
TSM	transportation system management
UIC/UTC	University of Illinois – Chicago / University Transportation Center
WPC	Chicago MPO's (CATS') Work Program Committee

Dallas – Fort Worth Metropolitan Area

ATMTF	Advanced Transportation Management Task Force
DART	Dallas Area Rapid Transit
DFW	Dallas-Fort Worth International Airport
DRMC	Dallas Regional Mobility Coalition
FWTA	Fort Worth Transportation Authority (also known as the “T”)
HELP	Heavy Vehicle Electronic License Plate Program
IRS	DART's Integrated Radio System
MAP	mobility assistance patrols (also called courtesy patrols)
Mobility 2010	1993 Regional Transportation Plan for Dallas-Fort Worth area
Mobility 2020	1996 Regional Transportation Plan for Dallas-Fort Worth area
Mobility 2025	1999 Regional Transportation Plan for Dallas-Fort Worth area
NCTCOG	North Central Texas Council of Governments
NTTA	North Texas Tollway Authority
Railtran	commuter rail operations
RCM	Regional Corridor Management Subcommittee, a RTC subcommittee
RTC	Regional Transportation Council, the governing body of the MPO

STTC	Surface Transportation Technical Committee, a RTC committee
TMP	Texas DOT- Fort Worth District's 1985 Traffic Management Plan
TMT	Traffic Management Team
TNRCC	Texas Natural Resources Conservation Commission, the State's EPA
TransVision	Texas DOT-Fort Worth District's Traffic Management Center (opening 1999)
TSU	Texas Southern University
TTC	Texas Transportation Commission
TTI	Texas Transportation Institute (based at Texas A&M University)
TxDOT	Texas Department of Transportation
UT-Arlington	University of Texas at Arlington

Denver Metropolitan Area

CASTA	Colorado Association of State Transit Agencies
CDOT	Colorado Department of Transportation
CFTOC	Coors Field Traffic Operations Center
CIMC	Colorado Incident Management Coalition
CoTOC	Colorado Traffic Operations Center (interim location in Lakewood)
CSP	Colorado State Patrol
C-STAR	Denver Metropolitan Area IVHS C-STAR Program
CTC	Colorado Transportation Commission
DIA	Denver International Airport
DRCOG	Denver Regional Council of Governments
E-470	E-470 Public Highway Authority
MAC	Metropolitan Area Connection, the RTD's light rail line in downtown Denver
MetroVision 2020	DRCOG's ITS Plan for the Denver Metropolitan Area
PPRCOG	Pikes Peak Regional Council of Governments
PTMS	Public Transit Management System
Region 6	Colorado Department of Transportation Region 6 (Denver Region)
RMDI	Regional Model Deployment Initiative, the Denver area's MDI proposal
RTD	Regional Transportation District of Denver
SmartPath	Colorado DOT's State ITS Plan and Program from 1993-97
SMS	Safety Management System

SMS	City of Denver street management system
TAC	Colorado Transportation Advisory Committee
TIC	traveler information center
TIC	RTD telephone information center
TMA	transportation management area
TOC	traffic operations center

Los Angeles Metropolitan Area

AQMD	Air Quality Management District
ATSAC	City of Los Angeles' ATSAC signal system
ATTF	Advanced Technology Task Force
CAATS	California Alliance of the Advanced Transportation Systems (also called the Alliance)
CalPoly	California Polytechnic University
Caltrans	California Department of Transportation (Districts 7,8, 11, 12 in the Southern California area)
Caltrans-District 7	California DOT District for Los Angeles and Ventura Counties
Caltrans-District 8	California DOT District for Riverside and San Bernardino Counties
Caltrans-District 11	California DOT District for San Diego and Imperial Counties
Caltrans-District 12	California DOT District for Orange County
CHP	California Highway Patrol
CTC	County Transportation Commission
DNT&R	Caltrans' Division of New Technology and Research
EV	electronic vehicle
HELP	Heavy Vehicle Electronic License Plate Program
IMAJINE	Intermodal and Jurisdictional Integrated Network Environment
ITMIS	Intermodal Transportation Management and Information System
IVAG	Imperial Valley Association of Governments, the CTC for Imperial County
LACTC	Los Angeles County Transportation Commission
LACMTA	Los Angeles County Metropolitan Transportation Authority
LAX	Los Angeles International Airport
OCSIS	Orange County Smart Intermodal System
OCTA	Orange County Transportation Authority, the CTC for Orange County

OmniTrans	San Bernardino County transit agency
Partnership	Southern California Economic Partnership
PATH	Partners for Advanced Transit and Highway
PC	Southern California Priority Corridor
RCTC	Riverside County Transportation Commission
RTA	Riverside (County) Transit Agency
SAFE	Service Authority for Freeway Emergencies
SANDAG	San Diego Association of Governments (the San Diego MPO)
SANBAG	San Bernardino Association of Governments, the CTC for San Bernardino County
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCEP	Southern California Economic Partnership
Showcase	Southern California Priority Corridor Showcase Project
SMART	SMART Corridor in Los Angeles County
SSIP	Orange County's Signal System Improvement Program
TravelTIP	Orange County's traveler information system (a Showcase project)
UC-Irvine	University of California at Irvine
UCI-ITS	University of California at Irvine's Institute of Transportation Studies
USC	University of Southern California
VCTC	Ventura County Transportation Commission

Miami Metropolitan Area

BCT	Broward County Transit Division
CTAC	Citizen's Transportation Advisory Committee
CUTR	Center for Urban Transportation Research at the University of South Florida
DCEA	Dade County Expressway Authority, former name of MDEA
DEP	Florida Department of Environmental Protection
DERM	Dade County Department of Environmental Resources Management
DMS	Florida Department of Management Services
FDOT	Florida Department of Transportation
FDOT-District 4	Florida DOT District covering Palm Beach and Broward Counties
FDOT-District 6	Florida DOT District covering Miami-Dade County

FDOT-District 11	Florida Department of Transportation's Turnpike District (statewide)
FFN	Florida Fiber Optics Network
FHP	Florida Highway Patrol
FIU	Florida International University
FLAMINGO	Florida Motorist Information Network for Guidance and Operations
FMT	freeway management teams, led by the Florida DOT
FSUTMS	Florida Standard Urban Transportation Model Structure
GCCS	Gold Coast Commuter Services
ICS	Southeast Florida Intelligent Corridor System Program (and 1993 Plan)
ITD	Miami-Dade County Information Technology Department
Lehman Center	Lehman Center for Transportation Research at Florida International University
MDEA	Miami-Dade County Expressway Authority (before 1998, known as DCEA)
MDTA	Miami-Dade Transit Agency (formerly Metro-Dade Transit Agency)
MIA	Miami International Airport
MIC	Miami Intermodal Center
MUAMPO	Miami Urbanized Area MPO, official name for the Miami-Dade MPO
PWD	Miami-Dade County Public Works Department
RTO	Regional Transit Organization, a three-county coordinating organization
SunPass	Florida Turnpike's electronic toll collection system
SFRPC	South Florida Regional Planning Council
TAC	Technical Advisory Committee
TCC	Miami-Dade County Traffic Signal Control Center
TIC	traveler information center
TMAS	Turnpike Motorist Aid System
TOC	FDOT's Traffic Operations Center in Miami-Dade County
TPC	Transportation Planning Council
Tri-Rail	Tri-County Commuter Rail Authority
UM	University of Miami
UP Model for ITS	Florida Standard Urban Transportation Model for ITS

Milwaukee Metropolitan Area

CDSI	Communications and Data Systems Infrastructure project
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CPP	GCM Priority Corridor Program Plan (June 1995)
C-TIC	corridor traveler information center
DPW	Milwaukee County Department of Public Works
FSOA	Freeway Systems Operational Assessment project
GCM	Gary-Chicago-Milwaukee (Priority Corridor)
HES	hazard elimination system
HOV	high occupancy vehicle
ICAC	Intergovernmental Coordinating and Advisory Committees
ICOP	Integrated Corridor Operations Program
IDOT	Illinois Department of Transportation
INDOT	Indiana Department of Transportation
MONITOR	Milwaukee Organizational Network Information of Traffic for Operations and Response (Milwaukee area's traffic management center)
MTS	Milwaukee County Transport Services, Inc.
SEWRPC	Southeastern Wisconsin Regional Planning Commission
SWIM	Southeastern Wisconsin Incident Management
TCT	Traffic Control Technologies
TIME	Traffic Incident Management program
TOC	traffic operations center
WisDOT	Wisconsin Department of Transportation

Seattle Metropolitan Area

BST	Bellevue Smart Traveler
HELP	Heavy Vehicle Electronic License Plate Program
Metro Transit	King County, Washington, Department of Transportation Transit Division
NSATMS	North Seattle Advanced Traffic Management System
PSRC	Puget Sound Regional Council, the Seattle Metropolitan Area MPO
PuSHME	Puget Sound Help Me mayday system
RTA	Regional Transit Authority
Smart Trek	Seattle Model Deployment Initiative
STS	Seattle TimeSaver (the initial name of the Seattle Model Deployment Initiative)
SWIFT	Seattle Wide-Area Information for Travelers

TRAC	Washington State Transportation Center (at the University of Washington)
TransManage	Bellevue Transportation Management Association
TravelAid	hazard warning system
UW	University of Washington
WSDIS	Washington State Department of Information Services
WSDOT	Washington State Department of Transportation
WSF	Washington State Ferries
WSP	Washington State Police

Washington, D.C., Metropolitan Area

CHART	Chesapeake Highway Advisory Routing Traffic, the Maryland statewide transportation management program
CLRP	constrained long-range (transportation) plan
DPW	District of Columbia Department of Public Works
MCDOT	Montgomery County, Maryland, Department of Transportation
MMTA	Maryland Mass Transit Administration
MSHA	Maryland State Highway Administration (Maryland DOT)
MWAA	Metropolitan Washington Airports Authority
NCRTPB	National Capital Region Transportation Planning Board, the MPO for the District of Columbia
NoVA	Northern Virginia
NVPDC	Northern Virginia Planning District Commission
NVTC	Northern Virginia Transportation Commission
OmniRide	Transportation service provided by the PRTC
PRTC	Potomac - Rappahannock Transportation Commission
SaFIRES	Smart Flexroute Integrated Real-Time Enhancement System
Umbrella Study	National Capital Area ITS Umbrella Study developed in 1997
VDOT	Virginia Department of Transportation
VDRPT	Virginia Department of Rail and Public Transportation
Vision Plan	1998 unconstrained long-range transportation plan
VRE	Virginia Railway Express
WMATA	Washington Metropolitan Area Transit Authority
WASHCOG	Metropolitan Washington Council of Governments

Winston-Salem Metropolitan Area

DMV	North Carolina Division of Motor Vehicles
DSS	Winston-Salem Department of Social Services
ICC	North Carolina's Incident Command Center
IMP	North Carolina DOT's Incident Management Plan
ITRE	North Carolina State University's Institute for Transportation Research and Education
MAP	Motorist Assistance Patrol
Mobility Manager	WSTA's multi-phased ITS demonstration transit project
NCDOT	North Carolina Department of Transportation
NCSU	North Carolina State University
RTA	Regional Transit Authority
Trans-AID	paratransit service of the Winston-Salem Transit Authority
Triad	The Greensboro, Winston-Salem, High Point Metropolitan Area
WSTA	Winston-Salem Transit Authority
WSTAC	Winston-Salem Transportation Advisory Committee