



U.S. Department
of Transportation

Research and
Special Programs
Administration

MAINSTREAMING ITS WITHIN THE TRANSPORTATION PLANNING PROCESS

REVIEW OF THE LOS ANGELES, CALIFORNIA METROPOLITAN AREA

February 2000

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Prepared for

U.S. Department of Transportation
Federal Highway Administration
Office of Metropolitan Planning and Programs

FOREWORD

This paper was prepared by the U.S. Department of Transportation's (U.S. DOT) John A. Volpe National Transportation Systems Center (Volpe Center) for the Federal Highway Administration's (FHWA) Office of Metropolitan Planning and Programs. Ms. Elizabeth Deysher of the Volpe Center is the principal author. Mr. Allan J. DeBlasio, the project leader, and Mr. David W. Jackson of the Volpe Center's Economic Analysis Division provided additional support. Mr. Brian Gardner and Mr. Douglas Laird of the Office of Metropolitan Planning and Programs provided the direction for this project. Mr. DeBlasio should be contacted concerning comments on this report at (617) 494-2032.

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EXECUTIVE SUMMARY

PURPOSE AND METHODOLOGY

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 receive little or no consideration in the planning process. 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 by the Los Angeles Metropolitan Planning Organization (MPO), the California Department of Transportation (Caltrans), and other transportation agencies in the Los Angeles Metropolitan Area to mainstream ITS. In addition to this report, a cumulative summary report (*Mainstreaming ITS within the Transportation Planning Process: A Summary of Strategies in Ten Metropolitan Areas*) highlights the findings from a larger study in which ten metropolitan areas were contacted to learn about their mainstreaming efforts.

The general scope of the larger study was two-fold: (1) review how ITS have 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. 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 an initial list of 80 metropolitan areas. Telephone interviews were conducted with targeted agencies in ten of the areas. The study team conducted the phone interviews in March and April 1998. 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. Four of the ten areas were chosen for site visits.

The four metropolitan areas, Chicago, Dallas-Fort Worth, Los Angeles, and Miami, were selected for in-depth case studies based on eight factors that included the MPO’s policy board and administration support for ITS applications, the inclusion of ITS in the long-range plan and the transportation improvement program (TIP), the existence of an ITS committee that combines both operations and planning people, and the MPO staff’s collection of ITS data and use or potential use of the data in the planning process, among other items. The mere fact that the other six areas (Albany, Denver, Milwaukee, Seattle, Washington, D.C., Winston-Salem) 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.

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.

Findings from the cumulative summary report revealed that mainstreaming ITS within the metropolitan planning process can be greatly assisted by fulfilling three conditions. These conditions exist or are at least being considered in areas where ITS planning is more mature:

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.

A list of 17 strategies that help create these conditions was also generated from the discussions with the transportation professionals. The list is extensive and the strategies used varied from one metropolitan area to another:

1. Use or create MPO or non-MPO Committees or Task Forces
2. Include ITS, or a reference to ITS, in the Regional Transportation Plan
3. Include ITS projects in the TIP
4. Include ITS in other MPO planning documents (CMS, major investment study, etc.)
5. Develop regional ITS plans
6. Determine data collection needs
7. Determine the most efficient and effective ways to apply the data
8. Educate elected officials and top and mid-management of area transportation providers
9. Educate other stakeholders (public safety, emergency response, trucking industry)
10. Educate MPO staff
11. Educate general public
12. Conduct field trips for upper management
13. Use ITS advocates in the region (at the MPO and other agencies)
14. Develop a major program of regional projects

15. Utilize the National ITS Architecture or develop a Regional Architecture
16. Use peer-to-peer networking
17. Involve academia.

ORGANIZATIONS INTERVIEWED DURING THE LOS ANGELES METROPOLITAN AREA SITE VISIT

The Los Angeles Metropolitan Area was reviewed because ITS solutions are now on the verge of becoming a major element of the regional transportation strategy. The area has a rich history of ITS deployment and an extensive number of ITS products and services deployed across a large geographic area. 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 (Caltrans) staff to become an advocate for integrating ITS deployments through the transportation management centers (TMC) scattered throughout the region. Public works directors in the cities and counties are also an important force behind ITS deployments as they search for more efficient solutions to move traffic. The MPO staff, who work closely with the cities, are taking steps to mainstream ITS projects into the metropolitan transportation planning process.

Another key factor in the decision to study this area is the extensive committee structure that exists through which transportation professionals coordinate ITS planning and integration on a regional scale. 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.

During the course of the Los Angeles site visit, eleven transportation professionals from six transportation and related agencies throughout the Los Angeles Metropolitan Area were interviewed. Each of the agencies has unique responsibilities for planning, operating, maintaining, or monitoring the transportation system. This section briefly reviews key agencies' responsibilities and involvement with ITS in the metropolitan area.

The **Southern California Association of Government (SCAG)** is the regional planning agency, council of governments, and the MPO for the six counties comprising the Los Angeles Metropolitan Area. SCAG'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 TIP and long range transportation plan.

MPO staff include ITS solutions in the Regional Transportation Plan (RTP) and sit on many ITS-related committees that exist outside of the MPO structure. Recently, SCAG management instituted changes to the MPO organization in an attempt to mainstream ITS projects into the metropolitan transportation planning process. The MPO's ITS program was moved from the Planning and Policy department to the **Southern California Economic Partnership (SCEP)**. The Partnership, which is part of the MPO structure, 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 for the RTP: ITS, electric vehicles, alternative fuel vehicles, smart shuttle transit, and telecommunications. The Partnership facilitates the creation of public-private business partnerships and provides education and outreach activities for each of the advanced technologies.

The **California Department of Transportation (Caltrans)** is responsible for the network of freeways and expressways throughout the state. 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 most recent ITS-related goals as stated by Caltrans staff are:

1. Bring systems up to a certain 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.

Internal coordination of ITS projects occurs within Caltrans between ITS staff and those who design traditional capital projects. There is also a New Technology and Research Program through which Caltrans staff develop partnerships with local government and private industry to implement traffic management strategies, and test new technologies to improve the flow of traffic. The New Technology and Research Program staff test technologies, get products out and initially deployed, and then allow the Department's ITS staff that operate within each Caltrans District to take over. 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, since it is the local officials that make most of the funding decisions. Each District has a Division of ITS with staff people who coordinate with county-level ITS Planning Committees.

The **Los Angeles County Metropolitan Transportation Authority (LACMTA)**, **Orange County Transportation Authority (OCTA)**, the **Riverside County Transportation Commission (RCTC)**, the **San Bernardino Associated Governments**, the **Ventura County Transportation Commission**, and the **Imperial Valley Association of Governments (IVAG)** are the six county transportation commissions (CTC) that are responsible for the allocation of highway funds within their respective counties. These commissions develop transportation policies, projects, funding, and funding priorities for projects that involve all modes of transportation. Each CTC plans for and deploys ITS solutions to varying degrees. Staff from the first three Commissions mentioned above were interviewed as part of this study.

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

The RCTC 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 (RTA)** plans and operates the transit system for western Riverside County. The RTA's transit fleet includes transit buses, mini-buses for fixed routes, and paratransit buses. The Agency is exploring ITS solutions in its most recent transit plan. **SunLine Transit** operates transit service in the Coachella Valley portion of eastern Riverside County.

REGIONAL STRATEGIES USED IN THE LOS ANGELES METROPOLITAN AREA FOR ITS PLANNING AND DEPLOYMENT

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. This study found that it was necessary for elected officials and transportation professionals to support ITS, and especially to publicly endorse ITS to their peers and the general public. Elected officials are key supporters since they make funding decisions and can influence support by other stakeholders, while mid- and upper-level transportation managers are key supporters since they inform elected officials and guide funding decisions within their respective transportation organizations. Endorsement is gained by these key supporters by exposing them to ITS through the routine review of planning documents, participation on committees or task forces, and presentations.

In the Los Angeles Metropolitan Area, ITS policy issues regarding the RTP are raised with the Transportation and Communications Committee, whose representation includes elected officials; representatives from Caltrans, SCAG, the CTCs, and the SCAQMD; and three members from the citizenry. The **1998 Regional Transportation Plan** identified ITS specifically as transportation technology in a separate section. The next RTP will include ITS solutions as a means to relieve congestion by enhancing productivity and improving system operations. The plan will also include anecdotal benefits and performance measures, and a message that transportation professionals should explore innovative ways to move people and freight by considering multimodal solutions and advanced technology.

ITS plans can be useful tools to inform elected officials and transportation professionals. As part of the Priority Corridor, four ITS strategic deployment plans have been created for each of the following subregions: (1) Los Angeles and Ventura Counties, (2) Orange County, (3) San Bernardino County, and (4) San Diego and Imperial Counties. The OCTA staff used the approval process for that subregion's ITS strategic plan to ensure that the elected county officials were aware of local ITS activities. The county Board of Directors 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 of Directors voted on the document, they were comfortable with the projects and accepted the plan with no changes.

As previously stated, it is especially useful when elected officials and transportation managers take the extra step to personally promote ITS throughout the region. The **Southern California ITS Alliance Task Force** was formed to provide ITS 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, support ITS in legislation, and get institutions to work together to develop a regional architecture. The members are 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 SCAQMD (and other air quality districts), the six CTCs, the MPOs for the Los Angeles and San Diego Metropolitan Areas, and the SCEP participate on the ITS Alliance Task Force.

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.

Presentations are also used to inform elected officials. The Priority Corridor Outreach Subcommittee members are in charge of developing public relations materials for elected officials, major stakeholders, the private sector, and the general public. The committee members hired a public relations firm which will target selected elected officials, such as those on the SCAG and CTC boards.

Caltrans, District 7 has begun to 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. At a more local level, transportation professionals from the RCTC have presented technologies to their Board for over six years. They have a small window of time to educate elected officials while they hold office, and so they provide precise information on planned and deployed projects.

Communication and Coordination

The Los Angeles Metropolitan Area has about 190 governmental jurisdictions and over 20 other agencies that have some ties to transportation. Although some county members are coordinating ITS solutions within their respective counties, coordination does not occur often between counties. No formal mechanism or committee exists to resolve border issues. Not even the subregional ITS strategic plans are meant to resolve these types of issues. However, communicating, and to a lesser extent coordinating, ITS activities is improving through the Southern California Priority Corridor Program, ITS-related committees, and staff to staff relations.

The Southern California Priority Corridor Program is a regional program that provides a forum for agencies that operate across broadly defined regions to communicate and coordinate with one

another. The network of committees developed as part of the program enables transportation managers, who operate across broadly defined regions, to discuss institutional issues, specific projects, funding, and data sharing practices. Some participants are introduced to ITS for the first time through their participation on the committees and all participants are encouraged to think regionally. Members at the county level discuss institutional issues such as the type of data that will be available from ITS technologies, the parties that will share the data, and whether the data will be sold or given away.

To improve coordination within Los Angeles County, the LACMTA staff operate a Signal Support Group. Through this group, LACMTA staff assist the eighty-eight cities that operate their own traffic signals to coordinate their signals with one another. Staff from the Signal Support Group helped to build consensus among jurisdictions through the Traffic Signal Management program. As part of the program, eight local traffic forums have been created; each is comprised of 10-30 cities. Members of each forum have been provided with seed money by the LACMTA for feasibility studies to coordinate their arterials. 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.

SCAG staff involvement and the availability of funding are catalysts for coordination across operating agencies and improved operations. For example, the RTA staff coordinate on an as-needed basis with the staff from two other transit agencies, Sun Line in Riverside County and OmniTrans in San Bernardino County, that offer service nearby. Many times coordinating meetings are led by SCAG staff. In one case, RTA and Sun Line staff attended meetings to ensure that their systems matched to enable the transfer of voice and data to vehicles. This enabled the RTA staff to route the vehicles belonging to Sun Line as well as their own. In another case, the RTA, SunLine, and OmniTrans were provided with \$3 million in transit funds to improve the communications systems for fixed route and dial-a-ride fleets, and to install a global positioning system. SCAG staff encouraged the transit operators to procure the same technology. Many more coordinating functions are expected to occur through the MPO's modal staff as a result of moving ITS to the Partnership, explained earlier in this report.

It is equally important and beneficial for department staff within the same agency to coordinate ITS and capital projects early in the project planning stage. With intra-agency 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. 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 cable and other technologies associated with ITS projects. Coordination efforts began in the early 1990's while planning for a massive advanced traveler management system (ATMS) expansion. Each year, the ITS staff presented the ATMS project to the Planning and Design Divisions at managerial meetings attended by senior and mid-managers. The intent was to coordinate the ATMS 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 to identify possible conflicts. These reviews help determine whether a

project should be redesigned and alert project designers to take special precautions for areas that are already instrumented with ITS technology.

Collection of Data and Use of Information

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 throughout the country, collecting good data, sharing that data, and turning that data into useful information speeds the incorporation of ITS solutions into the transportation planning process. 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. 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.

Caltrans staff currently gather real-time operational data from traffic management control centers in Los Angeles and Orange 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. New systems are being installed in the centers that will provide easier access to the thirteen months of data, allowing staff to monitor system performance, volumes, and speeds.

Caltrans staff use the operational data they currently gather through the traffic management centers to calibrate the department's transportation model and for special analyses. These calibrations and analyses are completed on a limited basis. Caltrans and other organizations will not receive the full analytical benefits offered from operational data until the data are available over a long period of time through storage in the computer system.

Caltrans, through the Southern California Priority Corridor, is taking the lead to plan for the collection and storage of the ITS data being generated by the transportation control centers. Issues are being addressed, such as the types of data to be collected and with whom it will be shared. 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.

Caltrans plans to gather and share more detailed data once the traffic management centers have been upgraded, starting with only a few types and levels of data and geographic areas to be analyzed and then expanding the effort based on what is learned. ITS technologies could provide detailed data for more robust analyses. For example, SCAG staff could better analyze the effectiveness of TCMs on improving air quality if they knew the breakdown of trips by vehicle type and time of day. The CTCs and SCAG staff are planning to use the data collected at the traffic management centers to follow patterns of congestion, update models, and examine travel by vehicle type.

STRATEGIES USED TO MAINSTREAM AND DEPLOY ITS: STRATEGIES USED IN THE LOS ANGELES METROPOLITAN AREA

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, also 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. 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 that are 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 RTP 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. 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 and other technologies associated with ITS projects.

The MPO Director has recently made an organizational change, that is to move ITS responsibilities from the Planning and Policy Department to the Partnership, to better mainstream ITS into the metropolitan transportation planning process. This is a promising strategy that should help to further mainstream ITS into the metropolitan transportation planning process.

MAINSTREAMING AND DEPLOYING ITS: RECOMMENDED STRATEGIES FOR OTHER METROPOLITAN AREAS

The following strategies are those that interviewees in the Los Angeles Metropolitan Area recommend be used by transportation professionals from other metropolitan areas who would like to mainstream ITS into the transportation planning process.

1. Create non-MPO committees/task forces
2. Reference ITS in the Regional Transportation Plan
3. Develop an ITS plan
4. Educate elected officials and agency administrators in ITS
5. Educate other prime stakeholders (beyond the traditional transportation agencies) in ITS
6. Use ITS advocates in the region
7. Develop a regional ITS program.

Of these strategies, developing a regional ITS program is viewed as the most important, along with developing ITS plans and educating elected officials.

THE ROLE OF SCAG IN ITS PLANNING

About five years ago, SCAG 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, encourage coordination of ITS projects across agencies and jurisdictional boundaries. Although SCAG staff lack their own ITS standing committee, they are represented on the Southern California Priority Corridor committees. Through their participation, the MPO staff have become aware of the benefits of integrating ITS solutions and of the importance of gaining upper management support. Staff help Caltrans build consensus at the Priority Corridor meetings and bring a regional perspective to the meetings.

The MPO staff are taking steps to further mainstream ITS solutions into the metropolitan transportation planning process. 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 Partnership, where there will be a greater focus on ITS solutions.

APPLICABILITY OF THE STRATEGIES USED IN THE LOS ANGELES AREA TO OTHER METROPOLITAN AREAS

The strategies used to mainstream ITS into the regional planning process in the Los Angeles Metropolitan Area can be applied in some form to other areas, even though other metropolitan areas are not as large and do not have the funding benefits provided by a Priority Corridor program. Metropolitan areas with fewer resources than the Los Angeles area can include ITS in the RTP, present the benefits of ITS to elected officials, conduct scanning tours of local facilities, and participate on ITS-related committees. These efforts require the time of elected officials and managers, which can be a precious commodity. However, they do not require a large financial expense.

Communications and, to some extent, coordination have been improved in the Los Angeles Metropolitan Area through the committees created for the Priority Corridor program. However, it is not necessary to create a program of regional projects in order to improve communications between agencies and jurisdictions. An ITS committee whose sole purpose is to bring operations and planning staff together to learn from one another is an effective way to improve communications. No programmed funds are required for this. Actual coordination, however, does appear to occur best when funds are available, as seen with Los Angeles County's signal program and, of course, through the Priority Corridor program.

The Los Angeles area agencies have been fortunate enough to benefit from the federally designated Southern California Priority Corridor. While there are few metropolitan areas that can benefit from the designation as a Priority Corridor, there are many opportunities to develop momentum within an area that do not require large sums of resources. They do, however, require staff time and a commitment from regional agencies and jurisdictions.

MAINSTREAMING ITS WITHIN THE TRANSPORTATION PLANNING PROCESS: REVIEW OF THE LOS ANGELES METROPOLITAN AREA

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, the effects of improved operations currently receive 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.

Reaching the point whereby ITS is being routinely considered presents a challenge to most transportation officials. 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 FHWA’s Office of Metropolitan Planning and Programs. This document details efforts taken by the Los Angeles metropolitan planning organization (MPO), the California Department of Transportation (Caltrans), and other transportation agencies in the Los Angeles Metropolitan Area to mainstream ITS.

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 (RTP)?
6. What, if any, modifications to the RTP 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 RTP 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. The final product includes 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 four sites, indicated with white stars in Figure 1. 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 department of transportation (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
- RTP and TIP 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 Organizations Included in the 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)	236 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.	Metro-Dade County MPO (Miami Urbanized Area MPO)	26 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 FHWA 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 TIP.
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 (CATS), 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, DuPage County, 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 Texas DOT, the Dallas Area Rapid Transit, 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 Program is complete. The MPO officials' intentions to obtain and use operations data from the California DOT for planning are also unique.

The Miami MPO's coordination with two other MPOs in the region for ITS planning is likewise unique. The Miami 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 RTP, TIP, congestion management system (CMS) plan, major investment studies (MIS), 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 these 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 solutions are incorporated into the metropolitan planning process. This document details efforts taken by the transportation agencies in the Los Angeles Metropolitan Area to mainstream ITS. In addition, there are companion reports, similar to this Los Angeles study, that detail the mainstreaming strategies used in the Dallas-Fort Worth, Chicago, and Miami Metropolitan Areas. Finally, a cumulative summary report (*Mainstreaming ITS within the Transportation Planning Process: A Summary of Strategies in Ten Metropolitan Areas*) 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:

18. Using or creating MPO Committees/Task Forces
 - Composed of operations and planning staff or upper management of operating agencies
 - Composed of elected officials
19. Using or creating non-MPO Committees/Tasks Forces
 - Composed of operations and planning staff or upper management of operating agencies
 - Composed of elected officials
20. Including ITS, or a reference to ITS, in the Regional Transportation Plan
21. Including ITS projects in the TIP
22. Including ITS in other planning documents (CMS, MIS, transit, etc.)
23. Developing regional ITS plans
24. 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)
25. Determining the most efficient and effective ways to apply the data
 26. Educating elected officials and top and mid-management of area transportation providers
 27. Educating other stakeholders (public safety officials, emergency response services, trucking industry)
 28. Educating MPO staff
 29. Educating general public
 30. Conducting field trips for upper management
 31. Using ITS advocates in the region (at the MPO and other agencies)
 32. Developing a major program of regional projects
 33. Utilizing the National ITS Architecture or developing a Regional Architecture
 34. Using peer-to-peer networking
 35. 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 LOS ANGELES METROPOLITAN AREA

The Los Angeles Metropolitan Area was reviewed because ITS solutions are now on the verge of becoming a major element of the regional transportation strategy. The area has a rich history of ITS deployment and an extensive number of ITS products and services deployed across a large geographic area. 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 (Caltrans) staff to become an advocate for integrating ITS deployments through the transportation management centers (TMC) scattered throughout the region. Public works directors in the cities and counties are also an important force behind ITS deployments as they search for more efficient solutions to move traffic. The MPO staff, who work closely with the cities, are taking steps to mainstream ITS projects into the metropolitan transportation planning process.

Another key factor in the decision to study this area is the extensive committee structure that exists through which transportation professionals coordinate ITS planning and integration on a regional scale. 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.

This chapter includes selected demographic and geographic information about the Los Angeles Metropolitan Area; reviews the area's political composition as it relates to transportation; and provides descriptions of 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, or maintaining the transportation system within the Los Angeles Metropolitan Area. This chapter also details the structure of the MPO and where ITS elements are included within the structure. To provide context and background, the region's current transportation system is briefly described and the significant ITS planning and deployment efforts are reviewed.

2.1 DEVELOPMENT OF THE LOS ANGELES METROPOLITAN AREA

The Los Angeles Metropolitan Planning Area encompasses approximately 38,000 square miles and comprises the six Counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino, and Ventura (Figure 2). With a population of more than 15.6 million, this metropolitan area is the country's most populous. Work trips and levels of congestion continue to increase annually while transit ridership as a percentage of all daily trips declines. Truck, rail, and air traffic also increases annually due to the improved economy. Local planners estimate that, by 2020, the region's population will increase by 6.7 million and 4 million jobs. A large contributor to the expected increase in traffic congestion is from the geographic distribution of population and employment growth. Those areas projected to have the greatest increase in population are not the same areas expected to have large increases in employment. Therefore, work trips will increase in number and duration more than otherwise would be expected.

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.

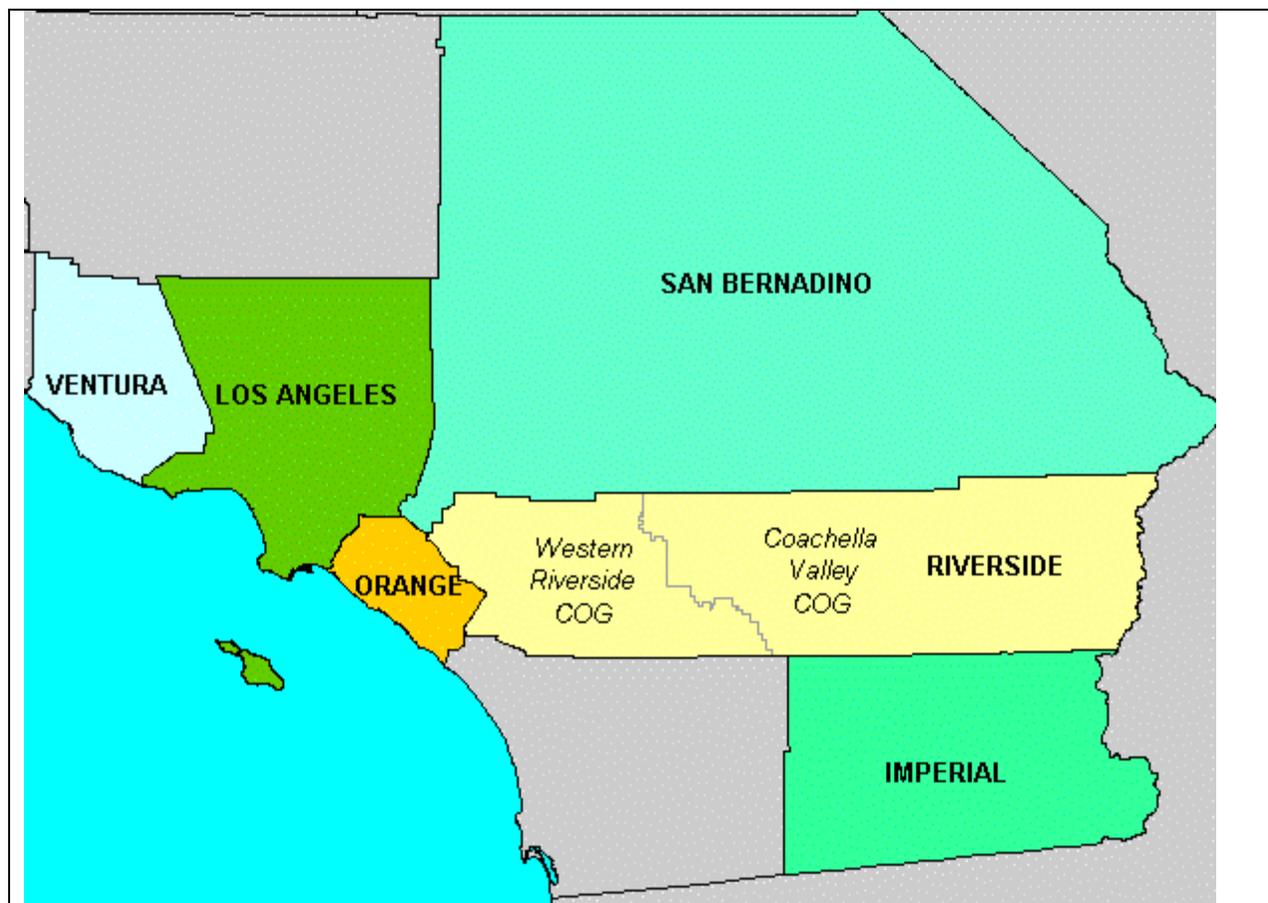


Figure 2. Map of the SCAG Planning Area

2.2 THE LOS ANGELES TRANSPORTATION SYSTEM TODAY

The Los Angeles Metropolitan Area's transportation system includes the surface roadway network, extensive transit services, major aviation hubs, prominent freight rail and maritime systems, and bikeways. In 1994, the highway system consisted of 8,078 lane miles of freeways and high-occupancy vehicle lanes and 27,500 lane miles of major, primary, and secondary arterials. There are currently one privately financed toll road and three toll roads operated by a public toll road agency.

The area's transit system consists of 12,294 route miles of local bus service and 4,073 route miles of express bus service. This service is provided by 17 separate public agencies; municipal

lines, shuttle service, and private bus companies also provide service within the region. Approximately one million workers carpool, and there are approximately 2,000 vanpools.

In the area, there are 60 airports of which six commercial airports handle the majority of jet traffic. Los Angeles International and Ontario International Airports handle 96 percent of the air freight movement in the area. Taking all of the region airports together, the Southern California area is the busiest of all regions in the country.

Two mainline railroads and three shortline or switching railroads serve the region. There are also five intermodal facilities, three major classification yards, and eight rail-truck transload and warehousing facilities.

The area is also served by three major seaports that support 80 ocean carriers, the two major railroads, and most trucking companies in the area. The ports are known for handling automotive and agricultural products, containers, and various other bulk cargoes. Movements to and from these ports place a heavy demand on the region's transportation system.

2.3 PUBLIC AGENCIES AND OTHER SIGNIFICANT ORGANIZATIONS

During the course of the Los Angeles site visit, a wide range of transportation professionals from transportation and related agencies throughout the Los Angeles Metropolitan Area were interviewed. Each of the agencies has unique responsibilities for planning, operating, maintaining, or monitoring the transportation system. This section briefly reviews each agency's responsibilities with the transportation system in the metropolitan area. Other agencies of note, whose staff or officials were not interviewed for this study, but were mentioned by the interviewees as having some bearing on the regional transportation system, are also listed.

2.3.1 Transportation and Other Agencies Contacted

The **Southern California Association of Government (SCAG)** 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. SCAG'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 TIP and long range transportation plan, modeling transportation and vehicle emissions, analyzing transportation control measures (TCMs), developing congestion and intermodal management systems, freight planning, and growth forecasting.

In the past, SCAG staff addressed ITS to a limited degree through mentioning it at a conceptual level in the RTP and through an MPO committee, the Advanced Technology Task Force, which had a two-year life span. Presently, ITS receives a higher priority within the MPO structure than in the past. MPO staff continue to include ITS solutions in the RTP but also sit on many ITS-related committees that exist outside of the MPO structure. SCAG staff also understand the

benefits that can accrue from integrating ITS systems. Most importantly, SCAG management has instituted changes to the MPO organization in an attempt to mainstream ITS projects into the metropolitan transportation planning process. These changes are described in detail in Section 2.4.

The **Southern California Economic Partnership (SCEP)**, which is part of the MPO structure, 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 for the RTP: electric vehicles, alternative fuel vehicles, ITS, smart shuttle transit, and telecommunications. 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 the advanced technologies. Membership consists of high-level business and institutional officials representing Caltrans; SCAG; the South Coast Air Quality Management District (SCAQMD); the automobile, petroleum, telecommunications, and aerospace industries; academia, and the environmental community.

The **California Department of Transportation (Caltrans)**, is responsible for the network of freeways and expressways throughout the state. 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. Caltrans funding comes from the traditional federal transportation funding programs as well as from state funding.

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 (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 New Technology and Research Program staff test technologies, get products out and initially deployed, and then allow the Department's ITS staff that operate within each Caltrans District to take over. Internal coordination of ITS projects also is occurring within the agency between ITS staff and those who design traditional capital projects.

The most recent ITS-related goals as stated by Caltrans staff are:

5. Bring systems up to a certain baseline
6. Get transportation operators to share data and information to operate their own systems better
7. Complete joint plans between agencies for improved operations such as responding to an incident or special event
8. Conduct day-to-day congestion management.

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, since it is

the local officials that make most of the funding decisions. Each District has a Division of ITS with staff people who coordinate with county-level ITS Planning Committees.

The **Los Angeles County Metropolitan Transportation Authority (LACMTA)**, **Orange County Transportation Authority (OCTA)**, the **Riverside County Transportation Commission (RCTC)**, the **San Bernardino Associated Governments**, the **Ventura County Transportation Commission**, and the **Imperial Valley Association of Governments (IVAG)** are the six county transportation commissions (CTC) that are responsible for the allocation of highway funds within their respective counties. These commissions develop transportation policies, projects, funding, and funding priorities for projects that involve all modes of transportation. Some CTCs have the authority to tax and provide matching transportation funds. They plan for and deploy ITS solutions to varying degrees. Staff from the first three Commissions mentioned above were interviewed as part of this study.

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

The RCTC 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 (RTA)** plans and operates the transit system for western Riverside County. The RTA's transit fleet includes transit buses, mini-buses for fixed routes, and paratransit buses. The Agency is exploring ITS solutions in its most recent transit plan. **SunLine Transit** operates transit service in the Coachella Valley portion of eastern Riverside County.

2.3.2 Other Transportation Agencies and Groups

Although not included in the interviews, there are other public agencies and organizations in the Los Angeles Metropolitan Area that have influence on the region's transportation policies, programs, and projects.

The **San Diego Association of Governments (SANDAG)** 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. Together, the Los Angeles and San Diego Metropolitan Areas have been selected as one of four Priority Corridor sites in the nation, and as such receive federal funds to plan for the integration of ITS products and services in the region.

The **South Coast Air Quality Management District (SCAQMD)** 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, described in Section 2.5.2, the SCAQMD has become more involved with the implementation of ITS products and services.

2.4 THE MPO ORGANIZATION

The **Southern California Association of Governments (SCAG)** is the designated metropolitan planning organization (MPO) for the Los Angeles Metropolitan Area. SCAG covers the largest population in the nation, serving over 16 million people. SCAG is mandated by the Federal Government to maintain a continuous, comprehensive, and coordinated transportation planning process that results in a RTP and a regional TIP. The MPO Director recently has given ITS a higher priority at SCAG by moving the program under the direction of a different department within the MPO, and by instituting an ITS project tracking process.

Figure 3 shows the committee structure of the MPO. The General Assembly is the governing body of SCAG and is composed of one elected official from each member city and county. The Regional Council is the decision-making body and includes representatives from the counties, CTCs, and smaller Districts within the counties. The Transportation and Communications Committee serves as the policy advisory committee to the Regional Council on issues relating to people and goods movement. This committee is also responsible for reviewing the RTP and TIP.

Transportation planning and programming activities occur through a multi-layered process in the Los Angeles Metropolitan Area. The CTCs plan for over seventy percent of the discretionary transportation funds in the region and some have the authority to build, tax, and provide matching funds. SCAG staff assemble the county transportation plans and have the primary programming responsibility for federal transportation funds.

As Figure 3 shows, there are no MPO committees that are designed specifically to address ITS. This has not stopped SCAG staff from increasingly addressing ITS in the metropolitan transportation planning process. In the past, SCAG staff have routinely received input from the Priority Corridor program's technical interagency committee and have participated on the Priority Corridor committees. Recently, SCAG staff have made attempts to further mainstream ITS into the transportation planning process. MPO staff are now treating ITS technologies as part of the "tool box" of solutions that can be implemented through the regional transportation plan. In the next transportation plan, SCAG staff will identify near-term levels of ITS functionality and coverage, based on the ITS Strategic Plans completed through the Priority Corridor program, and develop implementation milestones and performance indicators. Near term transit and highway ITS needs will be refined through this effort.

Since ITS technologies are treated as one of many solutions for relieving congestion and improving traffic flow, the MPO now considers ITS coordination and project management as implementation activities. Therefore, the ITS program has been moved from the Planning and Policy department to the Southern California Economic Partnership. The Partnership is a non-profit public-private entity that is part of the MPO structure (see Figure 4). As part of its new responsibilities, the Partnership will ensure that federally funded ITS projects are in the TIP and that they comply with the regional ITS architecture. Partnership members may also bring stakeholders together to facilitate project development and implementation, and may act as a pass through for funding. The Partnership was designed to foster and identify opportunities for public-private partnerships that can bring advanced technologies to market. One goal is to

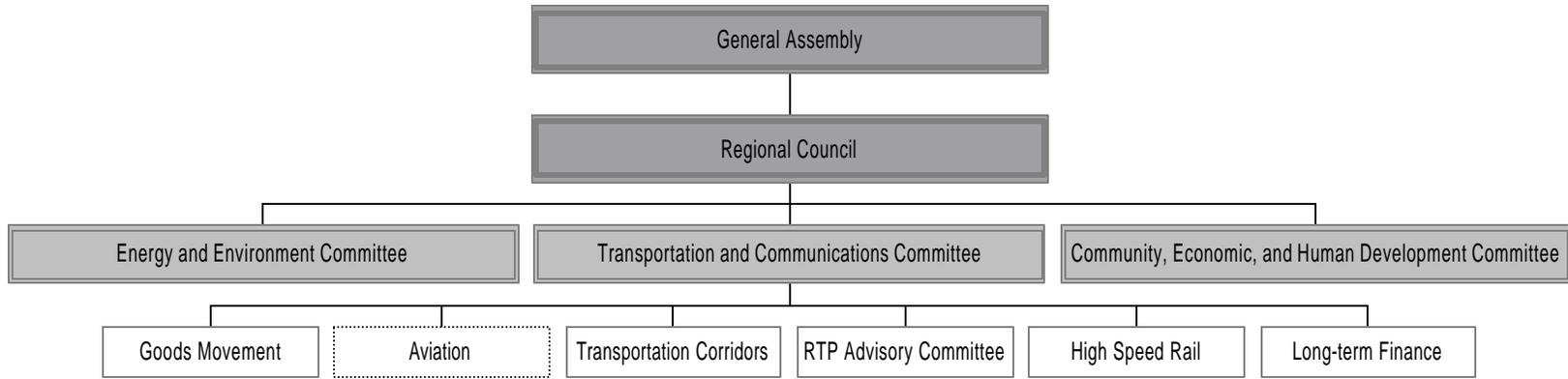


Figure 3. Committees of the Southern California Association of Governments

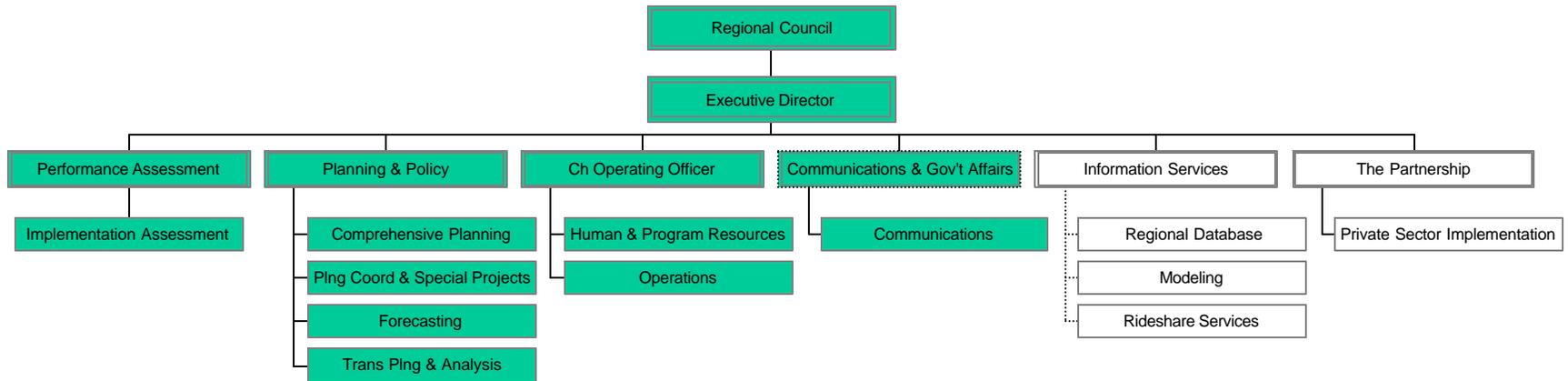


Figure 4. Departments of the Southern California Association of Governments

remind the public sector to consider the private sector's needs, such as generating usable traveler information for packaging and resale, when planning ITS products and services. In the past, members identified technologies, including ITS products and services, for both the 1994 Regional Transportation Plan and the newly adopted 1998 Regional Transportation Plan. Currently, Partnership members make presentations to the Southern California MPOs and Caltrans staff and conduct workshops on advanced traffic management and advanced traveler information systems, which traffic engineers from both the public and private sectors attend.

The MPO staff is also developing processes for ensuring compliance with the regional ITS architecture when the technologies are intended to exchange information. Although not completed, SCAG staff stated that the process will require that agencies somehow assure the MPO that their projects are compliant. The MPO will not review projects in detail. A large proportion of funding for ITS is spent on maintenance and upgrades, using a mix of federal, state, and local funds, prompting SCAG staff to educate project-level staff of transit operators and local governments on the importance of demonstrating compliance. This education effort will include sources of information, and a description of the architecture.

2.5 ITS ACTIVITY IN THE LOS ANGELES METROPOLITAN AREA

Transportation professionals in the Los Angeles Metropolitan Area began deploying ITS fifteen years ago to help relieve congestion and manage incidents. Originally, the effort was project-driven. However, recent planning efforts have focused on integrating technologies at a regional level. This effort is organized through the **Southern California Priority Corridor Program**, which was started in 1996 to address the technical and institutional coordination of ITS across seven counties: the six counties comprising the Los Angeles Metropolitan Area and San Diego County. The Priority Corridor is a federally funded program started by the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA). Federal funds were provided for four Priority Corridors to plan for the deployment and integration of ITS products and services. Together, the Los Angeles and the San Diego Metropolitan Areas were selected to receive such funding.

Through the Priority Corridor Program, the consideration of ITS solutions in the Los Angeles Metropolitan Area is moving from an individual agency focus to the regional perspective. 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.

There are two goals for the Southern California Priority Corridor:

1. To develop sub regional and corridorwide ITS Strategic Plans
2. To implement the National ITS Showcase Project within the Priority Corridor

Although ITS is still project driven in the Los Angeles Metropolitan Area, staff level transportation professionals who participate in the Priority Corridor are beginning to understand

the importance of regional coordination and the integration of technologies. Unfortunately, with the notable exception of SCAG and Caltrans' upper managers, this understanding does not yet fully exist among upper level staff and elected officials in the region.

2.5.1 ITS and Related Plans

The Southern California Priority Corridor effort calls for a regional **ITS Strategic Plan**. This plan will be the combination of four subregional 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.

By starting at the subregional level and moving to the regional level, the Priority Corridor planning process helps local officials to see where their plans and programs fit into the overall scheme.

The plans for San Diego and Imperial Counties, Orange County, and commercial vehicle operations are complete. The plan for Los Angeles and Ventura Counties and the overall corridor-wide plan are being reviewed.

In addition to the Priority Corridor plans, SCAG's most recent regional transportation plans have included ITS. The 1994 **Regional Transportation Plan** included ITS products and services that were grouped into two broad categories, signal synchronization systems and advanced technology. The 1998 Plan identifies ITS as potential solutions to the area's transportation problems. It is directly linked to the Priority Corridor's ITS Strategic Plan and recommends focusing on the development and deployment of ITS projects consistent with the plan. It also recommends developing policies and guidance to incorporate ITS projects in the development, design, and funding component of regional projects. The next RTP will identify ITS as a means to relieve congestion by enhancing productivity and improving system operations. Anecdotal benefits and performance measures will be included in the next plan.

Although there is no requirement, ITS is part of some CTC and transit agency plans. Orange County staff are updating the county's **Intelligent Vehicle-Highway Systems Master Plan** (1993), which was the first of its kind in the region. The LACMTA created a **twenty-year transportation plan** that identifies regional projects such as high-occupancy vehicle lanes, signal synchronization, and interchange improvements. Finally, the RTA staff incorporated their countywide transit needs into a **transit plan**. ITS tools will be used to fulfill some of those needs.

2.5.2 Current ITS Projects and Operations

Caltrans has established a network of **Traffic Management Centers (TMC)** complete with CCTV and electronic sensors built into the roadway. Engineers monitor traffic flow and respond to congestion using ramp meters, changeable message signs, highway advisory radio, and a computerized map, called "Freeway Vision", that broadcasts traffic flow over a limited area on a local television channel. In the Los Angeles area there is a regional TMC in the City of Los Angeles (District 7) and urban TMCs in San Bernardino (District 8) and Orange County (District 12). The District 7 center is the oldest at 14 years and is now being upgraded. Caltrans will use the TMCs to collect information and provide it to the media. Also, the Caltrans centers will be connected to traffic management centers owned and operated by county and municipal transportation agencies.

The Southern California Priority Corridor Showcase Project is a federally funded program, the goal of which is to demonstrate the technical and institutional benefits of regionally integrating ITS products and services. An intermodal transportation management and information system will be created by integrating a compilation of advanced traffic management and transportation information systems that traverse all modes of transportation within the designated Corridor.

The Showcase projects are valued at \$30 million and are planned in three phases. Phase One includes eight projects that are selected as early starts. Ten more projects will be added during Phase Two. Phase Three integrates all Phase One and Two projects, in addition to initiating any Phase One and Two projects not yet started. The Showcase project is being implemented incrementally, starting with the eight Early Start Projects in Los Angeles and Ventura Counties. The focus largely has been on system integration and design of the open architecture. Several of the projects 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 LACMTA is developing advanced technology in buses, much like the technology used by Orange County for the **Travel Probe** project, described below. The **IMAJINE** (Intermodal and Jurisdictional Integrated Network Environment) project will integrate freeway operations, arterial street operations, and the LACMTA transit operations in southeast Los Angeles County. Local and state signals will be synchronized, signals will be coordinated to give transit vehicles priority, and the schedules for paratransit and fixed-route transit vehicles will be coordinated. 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 in Los Angeles and Ventura Counties.

The LACMTA is leading another project, which is not an Early Start Project. Five or six transportation providers in Los Angeles and Ventura Counties will provide data through the L.A./Ventura Advanced Traveler Information System. These providers will create an

information network and will determine how to provide the information to the public. This project and the Modal Shift project are closely related and coordinated interfaces are being developed between the two projects.

In Orange County, the **Travel TIP** project will create a countywide traveler information system that will collect congestion and incident information from the Caltrans District 12 traffic management center and several local agency traffic signal systems. These data will be bundled with real-time transit data, special event, yellow pages, and road closure and construction information. **Transit Probe**, a small scale demonstration project, is the transit element of Travel TIP. For this project, buses will be equipped with global position system technologies and may use the buses as congestion probes. The system is built and is currently being tested. Bus schedules are being supplied to Travel TIP as well as some limited trip planning capability.

The **Advanced Traffic Management System** electronically tracks traffic flow for over five hundred miles of freeway using loop detectors, ramp meters, changeable message signs, and closed-circuit television cameras. This systems feeds information to the traffic management centers. Existing field equipment in Los Angeles County will be upgraded where necessary. New equipment will include office-to-field two-way communications, freeway surveillance equipment, ramp meters, closed circuit television (CCTV) cameras, changeable message signs, highway advisory radio (HAR), highway advisory telephone, and fiber optics and microwave communications. This effort includes the Santa Monica Smart Corridor Project.

The Santa Monica Smart Corridor Project is an effort to manage traffic along twelve miles of the Santa Monica Freeway in real time by providing travelers with traffic information and alternative route information for five arterials that run parallel to the freeway. The project utilizes ramp meters, CCTV, changeable message signs, HAR, and highway advisory telephone. Goals are to reduce congestion and accidents. Agencies involved include the FHWA, Caltrans, departments of the City of Los Angeles, California Highway Patrol, and other cities in the Corridor area.

SCAG staff run **Rideshare**, which has a traveler information database for transit and carpooling. SCAG maintains the database, which will be combined with SANDAG's database within the next year. Eventually, a transit data element may be added allowing the exchange of data in order to provide multi-agency rideshare information to intercounty and cross county travelers.

Southern California Smart Traveler Demonstration Project provides a toll free number for transit, rideshare, and telecommuting information to the residents of Los Angeles, Ventura, Orange, and Riverside Counties. The project also includes a network of almost 80 kiosks located within the greater Los Angeles area. The kiosks include real-time information in the form of a freeway condition map, transit routes and schedules, and rideshare information. The information available in the kiosks is also available by personal computer via a modem.

3. REGIONAL STRATEGIES FOR ITS PLANNING AND DEPLOYMENT

This chapter relates how the transportation officials and agency staff in the Los Angeles Metropolitan Area are utilizing various strategies, enumerated in Chapter 1, to aid in mainstreaming intelligent transportation system (ITS) activities into the metropolitan transportation planning process. Chapter 3 includes only those strategies from Chapter 1 that are actually being used in the Los Angeles Metropolitan Area. 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 5 shows the three conditions and their associated strategies. Some of the strategies are associated with more than one of the three conditions. In these cases, the objective of a 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.

3.1. CONDITION 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 the Los Angeles Metropolitan Area 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

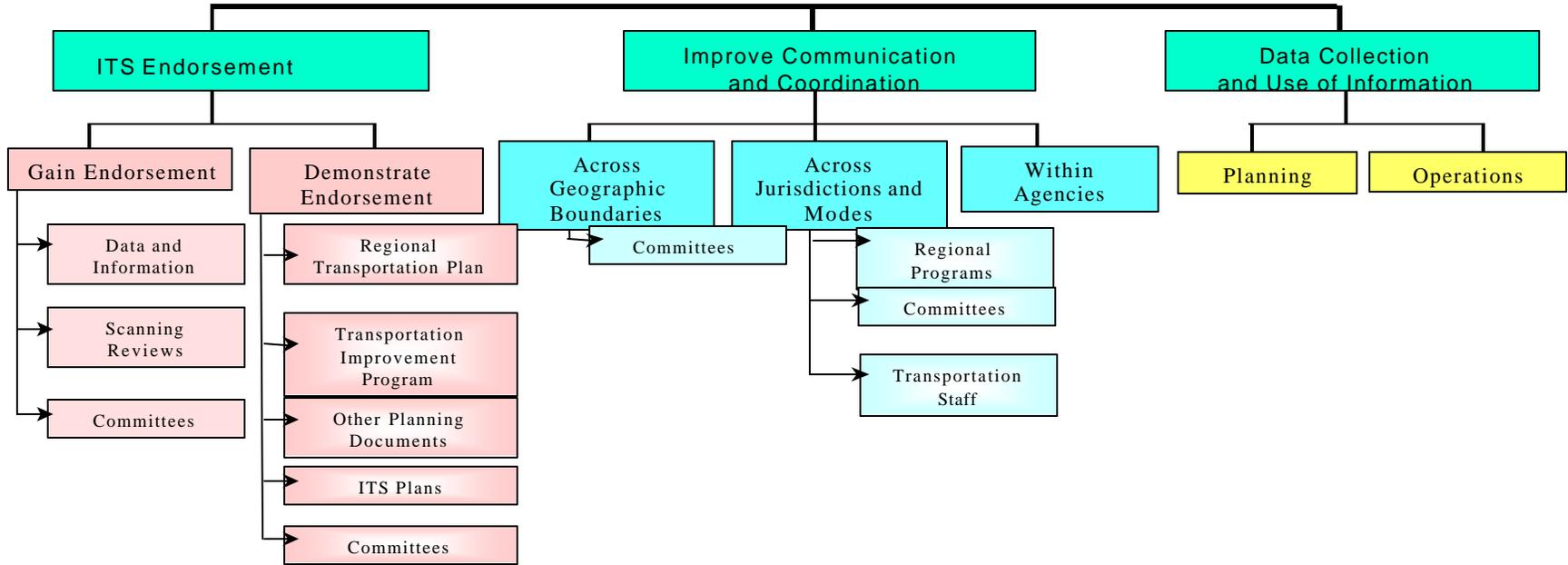


Figure 5. Mainstreaming ITS in the Regional Transportation Planning Process: Three Optimal Conditions and Associated Strategies

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 Los Angeles 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. In the Los Angeles Metropolitan Area, this information was made available through presentations, scanning reviews, and committees.

This section discusses three strategies:

- ❖ Data and Information
- ❖ Scanning Reviews
- ❖ Committees.

Overall, elected officials think ITS is a good idea, but are skeptical and need proof that there are benefits for their jurisdictions. Convincing elected officials to endorse ITS is not always easy or successful. Issues such as welfare and crime can receive priority over transportation, 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. 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. Interviewees stated that educating elected officials on ITS solutions is a role most appropriately assumed by the MPO staff, however, many interviewees in upper management positions also indicated that they, too, are responsible for educating elected officials and that it 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. There are plans to improve data-gathering methods in the Los Angeles Metropolitan Area because the data are not easily accessible. In spite of the difficulties, some ITS generated data are gathered and there are several initiatives at the regional and county levels to disseminate information to elected officials and transportation administrators.

One way that information is disseminated at the regional level is through the routine review of transportation planning documents that contain references to ITS. The Regional Council at SCAG oversees the Planning Committee, which has a Transportation and Communications Committee. ITS policy issues regarding the RTP are raised with the Transportation and Communications Committee, whose representation includes elected officials; representatives from Caltrans, SCAG, the CTCs, and the SCAQMD; and three members from the citizenry. They address ITS as part of the transportation plan and receive presentations from the Priority Corridor members. SCAG's Planning Committee also looks at ITS as part of the regional plan.

Included in the RTP is an estimate that ITS solutions will improve capacity by 2.5 percent. This value was estimated from a systems analysis that was completed through peer review. The 2.5 percent improvement in capacity is not only impressed upon those responsible for reviewing the RTP, but is widely cited by transportation administrators throughout the area during professional discussions and presentations about ITS solutions. It is a commonly cited value with which even elected officials could one day become familiar and use.

Presentations are also used in the Los Angeles Metropolitan Area to disseminate data and information. Elected officials are considered the most important target audience. Some presentations are intended to generally inform the audience on ITS technologies and associated benefits, while others contain information on particular projects planned for the area. The Priority Corridor Outreach Subcommittee members are in charge of developing public relations materials for elected officials, major stakeholders, the private sector, and the general public. The committee members hired a public relations firm with the initial intent to educate the general public. However, SCAG staff steered the firm to target selected elected officials, such as those on the SCAG and CTC boards.

Caltrans, District 7 has begun to 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. At a more local level, transportation professionals from the RCTC have presented technologies to their Board for over six years. They have a small window of time to educate elected officials while they hold office, and so they provide precise information on planned and deployed projects. It is the responsibility of individual Board members to express interest and ask for additional information. Occasionally, presentations prompt Board members to ask for more information on the technologies and data that will be supplied.

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. These visits help make people aware of ITS when it was previously not a priority to them. Although they have not used scanning reviews, an employee of the OCTA suggests that viewing existing systems as early as two to three years before identifying funding and immediately before a new technology is deployed is beneficial. If conducted early in the planning process, scanning reviews help decision-makers conceptualize what they need. If conducted immediately prior to deployment, the reviews help educate decision-makers about what they should expect in terms of operations.

The RTA staff found field trips extremely useful, not only for RTA managers but also for local elected officials. The experience in Riverside County shows that trips to local facilities are just as persuasive as trips to other cities. City Council members and County Supervisors attended scanning reviews at a local toll road equipped with automated transponders and other ITS technologies. Interviewees stated that those elected officials who were formally unaware of ITS gained an appreciation for the opportunities provided by the technologies at that local review.

A scanning tour attended by managers and elected officials from the San Diego Metropolitan Area, part of the Priority Corridor planning area, is worth mentioning. The Executive Director and Chairman of the Board of the SANDAG, as well as the District Director from Caltrans, all attended a scanning tour in Detroit. These individuals have a strong influence on funding decisions made by the MPO Board. The result of the tour was a \$40-50 million allocation for ITS projects.

Finally, the Executive Director of the Council of Fresno County Governments gained a better understanding of how ITS products and services work and became more of an avid supporter after visiting ITS facilities in San Antonio and Seattle. According to the Executive Director, it was especially useful to visit the actual ITS facilities and see concrete examples. Examples, such as the incident management facilities in San Antonio, can negate people's fear of 'big brother' and clearly demonstrate how ITS technologies can actually help improve people's lives.

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 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 specific 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.

One objective of the Southern California Priority Corridor committees is to build consensus among committee members as they plan for ITS solutions at the regional level. Building

consensus has required that committee members learn about ITS solutions and the ITS projects that their counterparts are planning throughout the region. This education has helped upper-level managers from key transportation organizations in the Los Angeles area understand and appreciate the role that ITS can play. For example, by participating on the Priority Corridor committees, the MPO Director learned that integrating ITS technologies brings greater benefits than if systems operate independently from one another. The Director now endorses ITS solutions.

Although primarily formed to demonstrate the endorsement of ITS within the Regional Transportation Plan, the SCAG' Advanced Technology Task Force actually played a dual role 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.

3.1.2. Strategies to Demonstrate Endorsement of ITS

Once support has been garnered, ITS deployments can be endorsed 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
- ❖ Other Planning Documents
- ❖ ITS Plans
- ❖ Committees

The first four strategies demonstrate ITS endorsement through planning and programming activities. For example, citing ITS in the MPO's RTP 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 are especially useful in the Los Angeles Metropolitan Area, where there is little visible and direct support from elected officials, and where ITS has been deployed as a result of transportation managers' efforts. 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. The fifth strategy is the use of committees through which elected officials and upper-managers support regional planning and ITS deployment.

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 deployment. The main objectives are to raise the significance of ITS at the policy level and make a regional commitment to ITS. This legitimizes ITS products and services and demonstrates to constituents that spending funds on ITS applications is acceptable. It also encourages transportation professionals to include ITS solutions within other planning documents, such as in major investment studies.

ITS has increasingly become a significant element in the Los Angeles Metropolitan Area RTP, especially with the requirement to meet the air quality conformity requirements of the Clean Air Act Amendments of 1990. In the 1994 Regional Transportation Plan, ITS products and services were grouped into two broad categories, signal synchronization systems and advanced technology. The 1998 Regional Transportation Plan identified ITS specifically as transportation technology in a separate section.

The next RTP will include ITS solutions as a means to relieve congestion by enhancing productivity and improving system operations. The plan will also include anecdotal benefits and performance measures, and a message that transportation professionals should explore innovative ways to move people and freight by considering multimodal solutions and advanced technology. 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 not always been easy to be innovative without regional support.

Transportation Improvement Program

All federally funded projects, with few exceptions, are included in the TIP. One significant exception, until recently, has been the federally funded projects in the Priority Corridor Program. The MPO has not been required to include the federal funds supporting this program in the TIP. The end result is that a significant amount of ITS planning, even federally funded efforts, has occurred outside of the metropolitan transportation planning process. Now, the Priority Corridor activities are directed by SCAG's management to be mainstreamed back into the planning and programming process under the MPO. As part of this effort, all federally funded ITS projects will be included in the TIP and identified as ITS projects through a tracking process. The same tracking process also will be used to identify significant ITS projects even if they are not federally funded.

ITS projects can be at a disadvantage when competing for funds under traditional project selection processes, which may favor traditional capital-intensive projects. The LACMTA staff have modified their project evaluation process to accommodate ITS projects. A state senate bill gives funding authority to the six CTCs. Now, each commission is responsible for selecting projects and submitting them to the MPO for inclusion in the regional TIP. Staff from the Los Angeles commission have special categories for ITS projects in their project selection processes.

All projects are classified into six categories: transportation system management, freeways and traffic operation centers, regional transportation improvements (roads), bikeway, transit operations, and enhancements. There is a traffic operations center section within the freeway category. The transportation system management (TSM) category, which would include any proposed ITS projects, 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 County staff have prepared project categories that will accommodate the future ITS needs of the area. Most proposed TSM projects fall into the first three tiers. However, staff stated that more Tier 4 projects may be proposed in the future as the needs in the first three tiers are met.

Other Planning Documents

In a number of areas, ITS products and services are 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 in the transportation planning process. Similar to including ITS in the RTP, this action increases awareness of ITS products and services to agencies and operators and makes a statement that it is acceptable to fund these types of projects.

ITS products and services are becoming a significant element in the Los Angeles Metropolitan Area's conformity analysis due to extensive air quality concerns. The MPO staff are able to use the air quality conformity determination required by the Clean Air Act Amendments of 1990, as a tool to influence the area agencies into thinking more regionally, enhancing the demand for ITS applications and operations.

ITS is strongly endorsed at the RTA, where staff defined their transportation problems in a transit plan, and then looked to advanced technologies as a way to solve some of them. ITS projects were considered alongside capital ones.

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 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 to tie 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 because many projects identified in these plans are subsequently submitted for funding in the regional TIP.

Although only agency staff and operators generally read the plans, one interviewee suggested that sharing the plans with elected officials would help develop regional support for ITS products and services from those who make funding decisions. ITS Plans can also help gain endorsement and can nurture the coordination efforts of agencies involved with plan development.

As part of the Priority Corridor, four ITS strategic deployment plans have been created for each of the following subregions: (1) Los Angeles and Ventura Counties, (2) Orange County, (3) San Bernardino County, and (4) San Diego and Imperial Counties. Caltrans District 7 ITS staff worked with the MPO and CTC staff for the first time while developing the Los Angeles and Ventura strategic plan. This interaction increases the awareness of ITS among the staff members.

The OCTA staff used the approval process for the ITS strategic plan to ensure that the elected county officials were aware of local ITS activities. The OCTA staff first presented the plan to members of the ITS Management Team, which is also the regional team representing Orange County on the Priority Corridor committees. Next, the staff brought the plan, with the ITS Management Team's stamp of approval, before the OCTA Board of Directors. The Board of Directors 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 of Directors voted on the document, they were comfortable with the projects and accepted the plan with no changes.

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 policy and specific projects. Two committees in the Southern California region have been used to endorse ITS activities and develop ITS solutions as part of the transportation planning process. These committees are the SCAG's Advanced Technology Task Force and the Southern California ITS Alliance Task Force.

The 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 ITS 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, support ITS in legislation, and get institutions to work together to develop a regional architecture. The members would like ITS investments to continue after the Priority Corridor Program is complete and have examined how to maintain ITS institutional relationships and find new ways to fund ITS deployments. 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 SCAQMD (and other air quality districts), the six CTCs, the MPOs for the Los Angeles and San Diego Metropolitan Areas, and the SCEP participate on the ITS Alliance Task Force. Interviewees who are representatives on the task force stated that, in order to successfully receive direct support from agencies, it is important for the meetings to be attended by upper-level managers who are directly engaged in the discussions on ITS policy and management issues within their respective organizations.

3.2. CONDITION 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 and agencies. The staffs of public works departments and operating agencies tend to focus on only those activities, such as local roadway construction and maintenance, transit service, and incident clearance, that fall within the boundaries of their individual jurisdictions. In addition, many agencies have not yet incorporated ITS planning into their internal planning processes. When an agency is not internally organized, it is even more difficult to communicate and coordinate with other agencies.

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. Strategies for coordinating ITS solutions within agencies focus on coordination between departments within the same agency, such as between the ITS staff and capital improvements staffs. The Los Angeles Metropolitan Area has about 190 governmental jurisdictions and over 20 other agencies that have some ties to transportation. This section will describe the efforts underway to improve coordination and communication among these groups.

3.2.1. Strategies to Improve Communication and Coordination across Geographic Boundaries

Interviewees stated that to plan and operate ITS on a regional level, elected officials from cities and suburban communities need to communicate and coordinate with one another, and then encourage the transportation agencies within their geographic boundaries to do the same. Elected officials use committees to accomplish these goals.

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 used existing or formed new committees to actually coordinate ITS activities throughout the metropolitan region. This on-going coordination among committee members helps to shorten the time needed for project development and to procure funding.

At this time, there is little activity among elected officials in the Los Angeles Metropolitan Area in terms of regional communication and coordination of ITS solutions, as defined in this report. Most of the effort occurs across modes and jurisdictions at the mid and senior transportation staff levels.

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 the 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:

- ❖ Regional Programs
- ❖ Committees
- ❖ Transportation staff

The first strategy uses the development of regional programs 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; Los Angeles being one of these areas. The second strategy involves participation on committees, such as those formed from the Priority Corridor program, and committees at the MPO and county level that provide members with educational and coordinating opportunities. Most interviewees stated that committees were the most common strategy used to improve communications and foster coordination. Finally, the third strategy identifies the informal coordination of transportation staff across jurisdictions and agencies on a project-by-project basis.

Regional Programs

The Southern California Priority Corridor Program

The Southern California Priority Corridor Program provides a forum for agencies that operate across broadly defined regions to communicate and coordinate with one another, and to 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 trucking interests.

A number of interviewees believed that creating a regional program of ITS projects is a useful strategy for any region. Other interviewees cautioned that this could be a dangerous and wasteful strategy for areas with less mature ITS planning processes because the region as a whole could move too quickly in the wrong direction. Instead, these interviewees suggested that officials start with small ITS projects in order to learn from them and then develop a large program. In fact, this is occurring in the Los Angeles Metropolitan Area, where ITS products and services that have been deployed as small projects are now being brought together as part of a regional program.

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) set aside funds to plan for the deployment and integration of ITS products and services in four Priority Corridors. Communications and coordination channels in the form of extensive committee structures operate within each Priority Corridor, bringing all stakeholders together. These regional programs facilitate communication of ITS planning and deployments among stakeholders as well as coordination, whereas other committees with less extensive responsibilities tend to facilitate only improved communications. The next subsection will discuss the latter types of committees.

The Southern California Priority Corridor committees enable managers, who operate across broadly defined regions, to discuss institutional issues, specific projects, funding, and data sharing practices. Interviewees stated that the federal funding and specific projects tied to the Priority Corridor program are important factors that encourage committee members to work with one another. Some participants are introduced to ITS for the first time through their participation on the committees and all participants are encouraged to think regionally.

Member agencies and jurisdictions are represented by mid and senior management from both operating and planning areas. Figure 6 shows the committee structure that comprises the Priority Corridor.

Upper managers from the area's agencies, boards, and CTCs sit on the Steering Committee. Members of this committee oversee five subcommittees. The Chair for each subcommittee is a member of the Steering Committee; other members of the subcommittees are mid-level transportation managers. Activities that take place at the subcommittee level range from developing a strategy for educating elected officials to adapting the regional architecture to conform to the National ITS Architecture. Defining the regional architecture has encouraged representatives from different agencies to coordinate with one another as they identify opportunities for ITS integration and sort out the associated institutional issues. Initially, the regional architecture is being applied to a compilation of several projects collectively called the Showcase. The Showcase projects traverse several jurisdictions by linking separately developed systems. Eventually, elements from individual projects will be integrated along corridors. Occasionally, work groups are formed to fulfill an identified need. For example, the transit work group was formed to improve representation from the many transit agencies that operate within the designated Priority Corridor area.

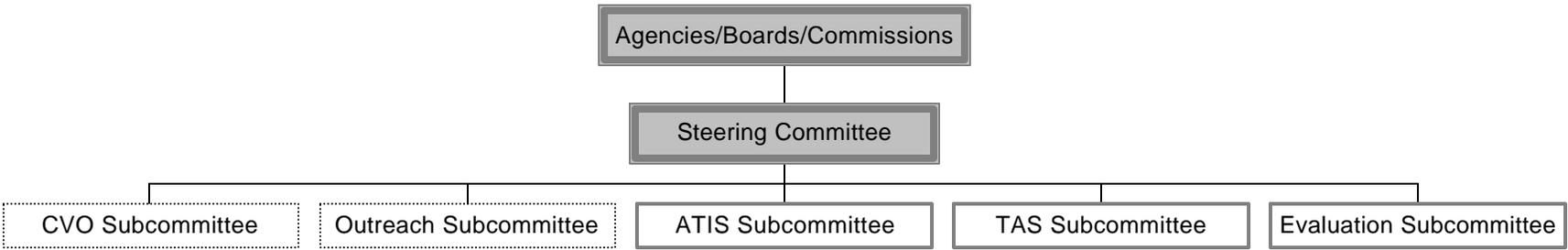


Figure 6. Southern California Priority Corridor Organizational Chart

The area covered by the Priority Corridor is vast and so is divided into four geographically defined subgroups, each composed of representatives from transportation agencies within the subgroup. The Steering Committee oversees all four groups. Each subgroup has an advisory group, a mission statement that has been approved by a high-level officials, and a subregional strategic ITS plan. Caltrans and SCAG staff sit on each advisory group and take an active role. The strategic plans are combined into one twenty-year long-range regional plan. The subgroups also help the Steering Committee implement activities at the local level. The subgroups are:

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

The Priority Corridor provides technical leadership and a forum through which members have become educated on technologies and procurement issues. Agency representatives have learned how and why technology works, how technologies relate to user services, and what it means to apply these technologies to these services. Further, they learned that they had false preconceptions about what ITS could do, how to pay for it, and what was easy and what was not. Members learned that procurement for ITS projects differ from procurement for capital improvement projects.

Members at the county level bring pragmatism and, in return, gain a better knowledge of where funding is and how to access it. Problems discussed are institutional and these come out at the meetings. Practical questions are also asked, such as what data will be available? Will members share the data? Will members sell the data or give it away? Although county members are learning more, and some are coordinating ITS solutions within their respective counties, coordination does not occur often between counties. No formal mechanism or committee exists to resolve border issues. Not even the subregional strategic plans are meant to resolve these types of issues.

The participation of the RTA staff is one example of the issues an agency can take from and bring to the Priority Corridor meetings. The Agency representatives bring transit issues and information on specific projects to the monthly meetings and ensure that transit is not overlooked. The Agency member brings back information on the regional architecture and on priority plans for funding.

The RCTC staff use the Priority Corridor projects in other areas as examples to build the Riverside County Advanced Traveler Information System. For example, Orange County staff are trying to improve the efficiency of the transit system and the Authority staff use this information to educate their own policy makers. Authority staff have gathered the most information about what is going on in the region from the Priority Corridor. According to the staff, without the Priority Corridor, they may have gathered information through American Public Transportation Association, ITS America, SCAG, or not at all.

Los Angeles County Metropolitan Transportation Authority

Within any given county in the Los Angeles Metropolitan Area, it is difficult to manage across jurisdictions and across Caltrans' road network and others' local roads. Each city has different funding capabilities, and some cities have 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 coordination, the LACMTA staff operate a Signal Support Group. Through this group, LACMTA staff assist the eighty-eight cities that operate their own traffic signals to coordinate their signals with one another.

Staff from the Signal Support Group helped to build consensus among jurisdictions through the Traffic Signal Management program that is expected to continue from 1995 to 2002. As part of the program, eight local traffic forums have been created. Each is composed of 10-30 cities. The boundaries were defined by the location of arterial roads. Members of each forum have been provided with seed money by the LACMTA 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 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 to coordinate signal synchronization and share traffic concerns.

Committees

Most interviewees stated that committees were the most commonly used strategy to improve communications and foster coordination. 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 for individual projects does occur at the ITS committees. 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.

Coordination is more likely to occur on ITS committees that function as part of a larger ITS program. In the Los Angeles Metropolitan Area, the Southern California Priority Corridor has an extensive committee structure for this purpose. This structure is explained in the previous subsection that discusses the Priority Corridor. One of the important coordinating efforts undertaken by the committees is the development of a regional architecture. As mentioned earlier (Section 3.1.2), members of the Southern California ITS Alliance Task Force are the

Executive Directors of the institutions represented in the Southern California Priority Corridor Steering Committee. They are responsible for getting institutions to work together to develop a regional architecture, which requires coordinating across jurisdictions and modes.

At the local level, the OCTA has an ITS Management Committee, which is a regional team with staff-level representation from city traffic engineers, Caltrans, the Transportation Authority, and Orange County. The team meets monthly and serves two roles. First, the team is a staff-level advisory group that has input into the county's strategic ITS plan. Team members also coordinate and share ITS information with one another, such as funding sources or ITS deployment instigated by the cities occurring within Orange County. Second, the team serves as the subregional team representing Orange County for the Priority Corridor meetings. Membership is open to anyone who wants to attend, creating an open environment in which to share information.

Transportation Staff

MPO staff typically build relationships with staff from a metropolitan area's jurisdictions and operating agencies. This can put the MPO staff in a useful role to help different agency staff communicate and coordinate with one another for ITS programs or specific projects. Although no committee or formal mechanism exists at SCAG to routinely work with member agencies on ITS planning, many coordinating functions occur through the MPO's modal staff.

SCAG staff involvement and the availability of funding are catalysts for coordination across operating agencies and improved operations. For example, the RTA staff coordinate on an as-needed basis with the staff from two other transit agencies, Sun Line in Riverside County and OmniTrans in San Bernardino County, that offer service nearby. Many times coordinating meetings are led by SCAG staff. In one case, RTA and Sun Line staff attended meetings to ensure that their systems matched to enable the transfer of voice and data to vehicles. This enabled the RTA staff to route the vehicles belonging to Sun Line as well as their own. In another case, the RTA, SunLine, and OmniTrans were provided with \$3 million in transit funds to improve the communications systems for fixed route and dial-a-ride fleets, and to install a global positioning system. They were encouraged to procure the same technology. The general managers from Sun Line and the San Bernardino transit system also play an important role in improving coordination between their agencies. These managers meet quarterly to stay up-to-date with one another.

SCAG staff also work through the Priority Corridor committees under the philosophy that MPO staff members can reach larger numbers of transportation professionals through participating on the committees than they could by working with them individually. Apart from the interaction that now takes place with the aid of SCAG staff and within the context of the Southern California Priority Corridor program, communicating and coordinating ITS projects and operations across jurisdictions and modes historically has occurred in an ad hoc fashion in the Los Angeles Metropolitan Area. Specific border issues are not currently resolved through the Priority Corridor. County transportation professionals do not coordinate with their counterparts from other counties, except to address the occasional transportation project that crosses county lines. This is despite the fact that some County Directors support ITS solutions within their

individual counties as they search for more efficient means of providing transportation services. This is due, in part, to the funding mechanisms that operate within each county. For example, the local sales tax in Los Angeles County can only be used within the County. There is little encouragement for staff from the LACMTA to coordinate on a regular basis with staff from the surrounding counties. When it is necessary to communicate, for example, if major arterials cross multiple counties, LACMTA staff talk to other county staff, however, they do not try to match the systems.

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 may occur in three ways. First, the agency may create internal ITS committees of knowledgeable staff representing different functions, such as planning, engineering, and operations. Second, the agency may schedule formal presentations to key department representatives on the status of ITS plans and deployments. Third, and probably the most lasting, the agency may create standard operating practices that require document checks or project checklists to ensure that advanced technologies have been considered for any new project.

Many benefits are derived 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 if, for example, 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.

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 cable and other technologies associated with ITS projects. Coordination efforts began in the early 1990's while planning for a massive advanced traveler management system (ATMS) expansion. Each year, the ITS staff presented the ATMS project to the Planning and Design Divisions at managerial meetings attended by senior and mid-managers. The intent was to coordinate the ATMS 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 to identify possible conflicts. These reviews help determine whether a project should be redesigned and alert project designers to take special precautions for areas that are already instrumented with ITS technology.

3.3. CONDITION 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 real-time operations or better planning. 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 faster to reduce congestion due to the reduced capacity caused by the incidents.

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 that data, and turning that 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, provide performance measures to 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, operational or planning, 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 Operational Purposes
- ❖ Strategies to Collect Data and Use Information for Planning 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 used in real-time (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. Operational data are not kept for long periods of time and will be useful for planning purposes only by storing the data in a computer system. Many metropolitan areas are now beginning to address issues associated with storing operational data for planning purposes, such as determining the level of detail at which to store the data and the parties that should collect, store, and distribute the data.

3.3.1 Strategies to Collect Data and Use Information for Operational Purposes

Operational data are characterized as data used in real-time (every 30 seconds) or on an ongoing basis to adjust transportation systems or to provide real-time information to operators or customers of the freeway system. These data enable operations staff to respond quickly to incidents. Effective collection and use of operational data do not require traditional transportation planners, but only operational staff, including dispatchers and technicians, that can coordinate multiple systems (e.g., emergency responders, clearance equipment, and traffic signal timing adjustments to accommodate traffic during incidents).

Caltrans staff currently gather real-time operational data from traffic management control centers in Los Angeles and Orange 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 thirty-second, five-minute, fifteen-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 thirteen months of data. Each field device will provide data every 30 seconds, and new software in the traffic management center will summarize it. This will allow staff to monitor system performance, volumes, and speeds.

3.3.2 Strategies to Collect Data and Use Information for Planning Purposes

Caltrans staff use the operational data they currently gather through the traffic management centers to calibrate the department's transportation model and for special analyses. These calibrations and analyses are completed on a limited basis. Caltrans and other organizations will not receive the full analytical benefits offered from operational data until the data are available over a long period of time through storage in the computer system. SCAG and the ITS community are interested in using ITS data for analytical purposes but have not seriously considered collecting and storing the data themselves due to a lack of staff and financial resources. Presently, the MPO is interested in using tools that are less technologically intensive, such as aerial photography.

Caltrans, through the Southern California Priority Corridor, is taking the lead to plan for the collection and storage of the ITS data being generated by the transportation control centers. Issues are being addressed, such as the types of data to be collected and with whom it will be

shared. 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.

Caltrans plans to gather and share more detailed data once the traffic management centers have been upgraded, starting with only a few types and levels of data and geographic areas to be analyzed and then expanding the effort based on what is learned. ITS technologies could provide detailed data for more robust analyses. For example, SCAG staff could better analyze the effectiveness of TCMs on improving air quality if they knew the breakdown of trips by vehicle type and time of day. The CTCs and SCAG staff are planning to use the data collected at the traffic management centers to follow patterns of congestion, update models, and examine travel by vehicle type.

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 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 10% of the total program budget. Caltrans staff have the primary responsibility to keep project data collection up-to-date.

4. SUMMARY

Section 4.1 of this chapter presents a summary of the actions taken by transportation agencies in the Los Angeles Metropolitan Area to mainstream ITS in the transportation planning process. These efforts are tied to a list of strategies, discussed in Section 4.2, which have been used in ten metropolitan areas. Although a number of agencies in each metropolitan area were examined, the focus of this report is 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 highlighted in Section 4.3.

Section 4.4 identifies how the examples from the Los Angeles Metropolitan Area are applicable to other metropolitan areas. It is widely recognized that no single MPO structure or model of the metropolitan transportation planning process applies to all areas. 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 the Los Angeles Metropolitan Area have already experienced many of these actions and do have successes to emulate.

4.1 MAINSTREAMING AND DEPLOYING ITS: STRATEGIES USED IN THE LOS ANGELES METROPOLITAN AREA

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, also 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 that are 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 RTP 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. 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 and other technologies associated with ITS projects.

The MPO Director has recently made an organizational change, that is to move ITS responsibilities from the Planning and Policy Department to the Partnership, to better mainstream ITS into the metropolitan transportation planning process. This is a promising strategy that should help to further mainstream ITS into the metropolitan transportation planning process.

4.2 MAINSTREAMING AND DEPLOYING ITS: RECOMMENDED STRATEGIES FOR OTHER METROPOLITAN AREAS

This section reviews those strategies, enumerated in Chapter 1, which interviewees in the Los Angeles Metropolitan Area recommend be used by transportation professionals from other metropolitan areas who would like to mainstream ITS into the transportation planning process. Some of the respondents ranked several strategies that had not been applied in the Los Angeles area over strategies that had been applied but were unsuccessful. 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.

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: (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, there are a number of strategies, listed in Table 2, that can 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 be used produce a specific condition. (Note, in Table 2, the two strategies promoting committees were merged into one because some interviewees said the sponsor of the committee made no difference). From a review of their responses, also shown in Table 2, we can conclude that the interviewees in the Los Angeles Metropolitan Area recommend seven strategies as the most effective ones 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 are considered by experienced transportation professionals to be the most instrumental in moving ITS projects to the forefront of the regional transportation planning process:

1. Create non-MPO committees/task forces
2. Reference ITS in the Regional Transportation Plan
3. Develop an ITS plan
4. Educate elected officials and agency administrators in ITS
5. Educate other prime stakeholders (beyond the traditional transportation agencies) in ITS
6. Use ITS advocates in the region
7. Develop a regional ITS program.

Of these strategies, developing a regional ITS program is viewed as the most important, along with developing ITS plans and educating elected officials.

4.3 THE ROLE OF SCAG IN THE ITS PLANNING

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 RTP with a vision that includes ITS, and then analyze ITS projects to identify those that fit into the vision. However, after visiting four metropolitan

areas and interviewing officials from different agencies, the study team concluded 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 MPO. Often this role depends on the MPO's responsibilities in the allocation of funds and application of these funds to projects, and their level of involvement with transportation operators within the area.

Many transportation professionals believe that the MPO is the most appropriate organization to increase ITS awareness throughout the region and to encourage agencies and jurisdictions to coordinate their ITS plans and projects with one another. About five years ago, SCAG 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, encourage coordination of ITS projects across agencies and jurisdictional boundaries. Although SCAG staff lack their own ITS standing committee, they are represented on the Southern California Priority Corridor committees. Through their participation, the MPO staff have become aware of the benefits of integrating ITS solutions and of the importance of gaining upper management support. Staff help Caltrans build consensus at the Priority Corridor meetings and bring a regional perspective to the meetings.

The MPO staff are taking steps to further mainstream ITS solutions into the metropolitan transportation planning process. 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 Partnership, where there will be a greater focus on ITS solutions.

Table 2. Mainstreaming ITS Within the Los Angeles Metropolitan Transportation Planning Process: Assessment of Strategies by Agency

Strategies Used to Increase ITS Awareness, Increase ITS Deployments, And Integrate ITS Activities Within the Planning Process	CATS (MPO) Management	CATS Staff	IDOT (ITS Ops)	RTA (Transit)	CTA (Transit)	City of Los Angeles DOT	DuPage County (Council of Mayors)	Other – ATTF	Area Consensus
Use or create MPO or non-MPO Committees/Task Forces	H	H	H	H	-	H	M	H	H
Include ITS, or a reference to ITS, in the Regional Transportation Plan	H	H	H	-	H	H	-	-	H
Include ITS in the TIP	M	M	M	-	-	H	L	M	M
Include ITS in other MPO planning documents (CMS, MIS, etc.)	M	H	H	-	-	M	-	-	M
Develop ITS plans	M	H	H	H	H	H	-	-	H
Determine data collection needs	L	H	M	M	M	M	L	-	M
Use data for planning and operations improvements (applying the data)	L	H	M	M	M	M	L	-	M
Educate elected officials, top management of area transportation providers	M	H	M	H	H	H	H	-	H
Educate other stakeholders (emergency response services, trucking)	H	H	M	H	-	M	H	-	H
Educate MPO staff	H	H	M	-	-	L	H	-	M
Educate general public	-	M	L	-	-	H	M	-	M
Conduct field trips for upper management (scanning reviews)	-	H	M	L	-	L	-	-	M
Use ITS advocates in the region (at the MPO and other agencies)	-	H	H	-	-	M	H	-	H
Develop a regional ITS program	-	H	H	-	-	H	-	H	H
Utilize the National Architecture or develop a regional architecture	-	-	-	-	-	-	-	-	-
Use peer-to-peer networking (experts outside the metropolitan area)	-	H	-	-	-	-	H	-	-
Involve academia	-	H	-	-	-	-	-	-	-
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 conducted with representatives of transportation agencies in the Los Angeles Metropolitan Area in July 1998</i>									

4.4 APPLICABILITY OF STRATEGIES USED IN THE LOS ANGELES AREA TO OTHER METROPOLITAN AREAS

Regardless of size, political composition, funding mechanisms, and relationships between stakeholders, metropolitan areas can attain the three conditions mentioned throughout this report that help facilitate mainstreaming ITS into the regional planning process by applying whatever mix of strategies works for their area. The strategies used in the Los Angeles Metropolitan Area can be applied in some form to other areas, even though other metropolitan areas are not as large and do not have the coordination or funding benefits provided by a Priority Corridor program.

The first condition is to obtain support for ITS from the elected officials and transportation managers. This may be more important for getting ITS projects deployed than actually for mainstreaming. However, their support is so valuable that it is considered important to educate them as part of the mainstreaming process. The strategies used in Los Angeles area, including ITS in the RTP, presentations to elected officials, scanning tours to local facilities, and committees on which upper-level managers participate are all ways to gain and demonstrate endorsement of ITS products and services. They require the time of elected officials and managers, which can be a precious commodity. However, they do not require a large financial expense.

The second condition is to improve communication and coordination among agencies and jurisdictions. Communication appears to be the first step for any successful regional ITS planning effort, followed by coordination. The goal is to improve communications among agencies and jurisdictions so they can share their needs and plans, and also to increase awareness in those agencies formally unfamiliar with ITS technologies. Coordination follows as agency representatives learn of planned local ITS activities that they can tie into their own to enhance their planned systems or avoid redundancy. Communications and coordination have been improved in the Los Angeles Metropolitan Area through the same venue, that is the committees created for the Priority Corridor program. However, it is not necessary to create a program of regional projects in order to improve communications between agencies and jurisdictions. An ITS committee whose sole purpose is to bring operations and planning staff together to learn from one another is an effective way to improve communications. No programmed funds are required for this. Actual coordination, however, does appear to occur best when funds are available, as seen with Los Angeles County's signal program and, of course, through the Priority Corridor program.

Finally, the third condition, generating and applying ITS data for planning and operational purposes, can use a large share of human and financial resources for large-scale efforts that involve reconfiguring computer systems and even institutional responsibilities. In the Los Angeles area, these activities are funded through the Priority Corridor. However, staff from metropolitan areas looking for data that support planned deployments can find some data today in the form of studies from other areas. This type of information will become more available over time as ITS systems are deployed and evaluated.

The Los Angeles area agencies have been fortunate enough to benefit from the federally designated Southern California Priority Corridor. While there are few metropolitan areas that

can benefit from the designation as a Priority Corridor, there are many opportunities to develop momentum within an area that do not require large sums of resources. They do, however, require staff time and a commitment from regional agencies and jurisdictions.

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: List Of Acronyms

ATMS	Advanced Traveler Management System
Caltrans	California Department of Transportation
CCTV	closed circuit television
CMS	congestion management system
CTC	county transportation commission
FHWA	U.S. Department of Transportation Federal Highway Administration
HAR	highway advisory radio
IDAS	Intelligent Transportation System Deployment Analysis System
ISTEA	Intermodal Surface Transportation Efficiency Act of 1991
ITS	intelligent transportation systems
LACMTA	Los Angeles County Metropolitan Transportation Authority
MIS	major (transportation) investment study
MPO	metropolitan planning organization
OCTA	Orange County Transportation Authority
RCTC	Riverside County Transportation Commission
RTA	Riverside Transit Agency
RTP	Regional Transportation Plan
SANDAG	San Diego Association of Governments
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SCEP	Southern California Economic Partnership
TCM	transportation control measure
TIP	transportation improvement program
TMC	transportation management center
TSM	transportation system management
U.S. DOT	United States Department of Transportation
Volpe Center	U.S. Department of Transportation John A. Volpe National Transportation Systems Center