



U.S. Department  
of Transportation

Research and  
Special Programs  
Administration

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# **MAINSTREAMING ITS WITHIN THE TRANSPORTATION PLANNING PROCESS**

## **REVIEW OF THE DALLAS-FORT WORTH, TEXAS METROPOLITAN AREA**

February 2000

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Prepared for

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

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## **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 Office of Planning and Environment, Metropolitan Planning Division. Mr. David W. Jackson of the Volpe Center is the principal author. Ms. Elizabeth Deyscher of the Volpe Center provided significant research and input into this document. Mr. Allan J. DeBlasio of the Center's Economic Analysis Division is the project leader and should be contacted concerning comments on this report at (617) 494-2032. Mr. Brian Gardner and Mr. Douglas Laird of the Office of Metropolitan Planning and Programs provided the direction for this report.

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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 (FHWA) Office of Metropolitan Planning and Programs. This document details efforts taken by the Dallas-Fort Worth metropolitan planning organization (MPO), the Texas Department of Transportation, and other transportation agencies in the Dallas-Fort Worth Metropolitan Area to mainstream ITS. 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, phone interviews were conducted with targeted agencies in ten areas, and site visits were made to four metropolitan areas. The study team conducted phone interviews with representatives from agencies in ten metropolitan areas 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.

The Chicago, Dallas-Fort Worth, Los Angeles, and Miami Metropolitan Areas 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.

This research revealed that mainstreaming ITS within the metropolitan planning process can be greatly assisted by fulfilling any or all of 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.

Further, a list of 17 strategies that help create these conditions emerged from the discussions with the transportation professionals. Although the list of strategies is very extensive, officials from none of the metropolitan areas stated they were currently implementing all of them:

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.

### **PUBLIC AGENCIES AND SIGNIFICANT ORGANIZATIONS**

The Dallas-Fort Worth Metropolitan Area was reviewed because administrators from a number of key transportation agencies within the metropolitan area have voiced strong commitments to ITS deployment initiatives, even without the influx of large amounts of federal funds earmarked for ITS. In addition, there is an increasing emphasis on regional deployments and coordination among all of the public agencies, illuminated by the creation of multi-agency committees. An integral part of the ITS planning, agency coordination, and program development activities is the extensive involvement by management and staff from the North Central Texas Council of Governments (NCTCOG), the Dallas-Fort Worth MPO.

The application of advanced technologies to solve some of the metropolitan area's transportation-related problems was first initiated by staff from the Texas DOT Fort Worth District in the late 1970's. Since the initial traffic and incident management deployments by the Fort Worth District, many of the other transportation agencies in the region have planned and deployed ITS products and services. However, it is only as of 1998, that there has been a concerted effort to consolidate all of the individual ITS efforts by each agency and jurisdiction into a comprehensive and consolidated plan.

During the course of the Dallas-Fort Worth site visit, 16 transportation professionals from ten transportation and related agencies throughout the Dallas-Fort Worth Metropolitan Area were interviewed. Each of the agencies has unique responsibilities for planning, operating, maintaining, or monitoring the transportation system. This section briefly reviews the responsibilities and involvement with ITS of key agencies in the metropolitan area.

In 1973, the **North Central Texas Council of Governments** became the body responsible for coordinating regional planning in the 16-county North Central Texas region. There are almost 160 municipalities within the NCTCOG's 16-county jurisdiction, including 33 in Dallas County and 32 in Tarrant County. The **Regional Transportation Council** of the NCTCOG serves as the officially designated MPO for the Dallas-Fort Worth Metropolitan Area. The MPO's jurisdiction incorporates only the urbanized portion of this region. As of 1993, this jurisdiction covers a nine-county, 4,980 square mile area.

The **Texas Department of Transportation** is responsible for the development and maintenance of highways and principal arterials throughout the state. The Dallas-Fort Worth Metropolitan Area includes the jurisdictions of the Texas DOT Dallas District and the Texas DOT Fort Worth District. ITS planning and operations within the two districts are out of their respective Transportation Operations Office.

The **Dallas Area Rapid Transit** manages and operates a comprehensive 700 square mile service network in and around Dallas County. Transit service includes bus, van, paratransit, light rail, the Trinity Railway Express commuter rail, and an 18-mile high occupancy vehicle (HOV) lanes system. Service expansion, especially rail and HOV service, is being planned and includes the increased use of ITS technologies. The transit agency's ITS concepts and plans are generated

from its Area Mobility Programs Division of the Planning and Development Department. In Tarrant County, the **Fort Worth Transportation Authority**, also known as the “T”, provides bus, paratransit, and other public transportation services to Fort Worth and other urbanized areas.

The Texas state legislature created the **North Texas Tollway Authority** in 1997. Originally formed in 1953 under the Texas DOT, this organization was first known as the North Texas Turnpike Authority. Like most toll authorities, this agency will use advanced technologies, such as electronic toll collection, to improve customer satisfaction and operational efficiency.

In 1980, a **Fort Worth Traffic Management Team** was created within Tarrant County. A decade later, the **Dallas Traffic Management Team** was formed. Both teams are comprised primarily of traffic engineers and other local transportation staff. The goals of the teams are to work toward the optimum movement of people and goods within freeway corridors. In 1989, the **Dallas Regional Mobility Coalition** was formed from a coalition of five counties and 26 cities to lobby the state legislature for more transportation funds for the Dallas area. A similar non-profit coalition of partners in the Fort Worth area is now being formed.

In addition to the Texas DOT districts, the tollway authority, the two transit agencies, and the MPO, a number of local agencies have taken the initiative to plan and deploy ITS components. Administrators from the lead transportation agencies created the **Regional Comprehensive ITS Steering Committee** in 1998 in an effort to seek involvement of more local jurisdictions and agencies in regional ITS deployments. Jurisdictions and organizations with representation on the Regional ITS Committee include the Cities of **Dallas, Fort Worth, Arlington, Irving, Richardson**, and 14 other municipalities; the Counties of **Dallas, Denton, and Tarrant**; the **Dallas-Fort Worth International Airport**, and the Texas Transportation Institute.

## **REGIONAL STRATEGIES USED IN THE DALLAS-FORT WORTH 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. 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 influence 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.

Twice a year, the Dallas-Fort Worth MPO staff update the Regional Transportation Council on the ITS program, planning, and implementation. To secure the Council members’ support, the MPO staff brief them on the logical arguments supporting freeway management. The members of the Council receive congestion information and are shown the relationship among incidents,

congestion, and air pollution. Staff highlight local problems and then explain how ITS products and services can help solve them. As part of this, the Council is given results of the courtesy patrol, a very popular program, and performance reports on all of the advanced systems being used in the region. The message from the MPO staff is that transportation professionals in the region should aggressively manage traffic and focus on reliability over mobility.

There have been a wide range of individuals from the Dallas-Fort Worth area that have taken part in the FHWA and Texas DOT-sponsored **educational scanning reviews** of Atlanta, Southern California, Cincinnati, Houston, and San Antonio. Some of the groups included a mix of county commissioners, NCTCOG Executive Board and MPO Policy Board members, Texas DOT and transit operations staff, and MPO staff. Other trips, specifically those that looked at incident management operations, have included politicians and public safety officials. All of the representatives agreed that the mixture of upper management, operations, and policy people seems to work better than just sending policy officials. Interviewees also recommended that scanning reviews be taken at the beginning of regional planning efforts or when exposure is needed in advance of a specific project to help decision-makers conceptualize what they need.

**Elected officials** and transportation managers can also become educated on ITS technologies, products, and services by participating on **committees**, especially those established to consider ITS solutions. There are no committees in the Dallas-Fort Worth area that have been formed primarily to educate policy makers. However, as by-products of the responsibilities of the current committees, education does occur. The most notable example is the Dallas Regional Mobility Coalition, composed of politicians and business representatives from the Dallas area. To learn more about advanced transportation technologies, the Coalition formed an ITS Task Force and use the presentations of various vendors and progress reports regarding demonstration tests as educational opportunities.

Gaining **citizens' support** for ITS products and services is an alternative way to indirectly gain elected officials' support. Two informational brochures produced by the Dallas-Fort Worth MPO staff have increased the public's knowledge of ITS and have had small impacts on the level of discussions concerning advanced transportation management between elected officials and their constituents. The brochures were the 1996 *Regional Mobility Initiatives – Advanced Transportation Management* and the 1997 *Mobility 2020, The Metropolitan Transportation Plan Executive Summary*. Both brochures were non-technical and colorful to appeal to, instruct, and gain support from the widest possible audience.

Once support has been garnered, endorsement of ITS deployments can be demonstrated through planning and programming activities, including those required as part of the MPO's federal responsibilities. Texas DOT officials remarked that inclusion of ITS in the **regional transportation plan** legitimizes ITS products and services and helps encourage transportation professionals to consider them as solutions when addressing transportation problems. A municipal engineer remarked that it is particularly important to include ITS in the transportation plan for areas that are just beginning to plan for ITS.

The current *Mobility 2020 Regional Transportation Plan* for the Dallas-Fort Worth Metropolitan Area supports ITS products and services through a traffic management philosophy that

emphasizes squeezing capacity from the existing system. One section of the *Mobility 2020 Plan* is devoted to three ITS areas: advanced traffic management systems, advanced traveler information systems, and advanced public transportation systems. The 1999 plan update (*Mobility 2025*) will include three more ITS areas: commercial vehicle operations, advanced vehicle control and safety systems, and advanced rural transportation systems.

Some MPO staffs go beyond the basic federal requirement of including transportation projects receiving certain types of federal funds in a region's **TIP** and use the TIP to highlight ITS projects. The evaluation criteria used to select projects for the latest Dallas-Fort Worth TIP were modified in order for ITS projects to be fairly evaluated. The MPO's Regional Transportation Council members believed that the traditional selection process unfairly excluded valuable ITS projects by not considering the regional benefits associated with ITS projects. Projects such as high occupancy vehicle lanes, intersection improvements, and signal improvements are more favorably evaluated as a result of the new evaluation criteria.

In a number of areas, ITS products and services are now included in **planning documents** such as feasibility studies, conformity determinations, **congestion management plans**, and **major investment studies**. Since 1995, the MPO staff for the Dallas-Fort Worth Metropolitan Area have categorized ITS as part of the Congestion Management System (CMS) special projects group. Both planners and engineers agreed that the advanced transportation management strategy is gaining prominence among CMS strategies. In addition, traffic signal improvements, an ITS-related strategy, has long been a component of the CMS and air quality improvement program. A couple of traffic engineers noted that the more ITS projects and technologies are included in major investment studies and CMS reports, the more engineers will conceive their capital projects with various technologies integrated within the design.

**ITS plans** can be useful tools to both gain and demonstrate endorsement of ITS by transportation managers and elected officials. Whereas ITS plans are typically geographically-based, the Dallas-Fort Worth plans are all agency-based. In 1985, the Texas DOT Fort Worth District staff completed an advanced traffic management plan. The Texas DOT Dallas District drafted its ITS Plan in 1996. Currently, both Texas DOT Districts are updating their ITS plans and nearing completion. ITS plans or studies are also being initiated for the Dallas Area Rapid Transit and planned for the Fort Worth Transit Authority and the North Texas Tollway Authority. A decision was made by the area's transportation directors to coordinate all of these and any future ITS Plans and create a single ITS plan for the Dallas-Fort Worth Metropolitan Area. As of the summer of 1998, this is occurring through the Regional Comprehensive ITS Program Steering Committee, a committee composed of transportation agencies and operators.

Elected officials and transportation managers sometimes use or form committees through which they act as **regional advocates for ITS**. The Dallas Regional Mobility Coalition, a non-profit government organization, is composed of elected officials, as well as business interests. The primary goal of the Coalition is to improve mobility through means of political and project advocacy. The members annually adopt a set of projects with regional significance, which include ITS products and services, to promote to city managers and local transportation officials and monitor their success. Coalition members have promoted the use of new technologies, such as toll tags, for speed monitoring and incident detection.

In some metropolitan areas, elected officials and transportation managers have personally taken on the responsibility to act as advocates for ITS products and services. Strong leadership from the top management of the transportation providers in the Dallas-Fort Worth region has been cited by transportation professionals and elected officials in that area as the most helpful factor in elevating ITS throughout the region. The interviewees specifically identified the two Texas DOT District Engineers, the MPO Executive Director, the General Managers of the two transit agencies, and the Executive Directors of the Dallas Regional Mobility Coalition and the North Texas Tollway Authority. Together, these managers created a new regional ITS committee which will coordinate all of the ITS efforts throughout the Dallas-Fort Worth Metropolitan Area.

In addition to the agency administrators, there were two elected officials that were cited for their strong and critical advocacy of advanced management systems. It would take the political will of a single elected official and the coordination of five regional agency administrators to start an ITS program in the Dallas area. Dallas County Judge Jackson was the founder of the Dallas Regional Mobility Coalition and initially conceived the Mobility Assistance Program. Dallas City Councilwoman Carroway is the other elected official cited. She is the chairwoman of the Coalition's ITS Task Force and has been responsible for encouraging the politicians and business people to examine a wide variety of technologies that could be used in the Dallas area.

## **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. A wide range of stakeholders should have input into ITS planning and deployment activities since many of these agencies will be required to operate these systems or must provide some coordination or information to enable these systems to run efficiently. This requires elected officials and staff within and across agencies to communicate and coordinate with one another. It can, however, be difficult to plan for and deploy ITS within a region, especially in areas composed of many local autonomous communities. In the Dallas-Fort Worth Metropolitan Area, there are approximately 75 governmental jurisdictions and another dozen regional or statewide agencies that have some ties to transportation.

In the Dallas-Fort Worth Metropolitan Area, with the exception the Dallas Regional Mobility Coalition, most of the groups that are involved in any ITS-related efforts are composed of agency staff and possibly agency management. One role of the Coalition is to aid in coordinating ITS activities across jurisdictions and agencies. In keeping with the coordinating role, the Coalition formed a workgroup to improve procedures for incident clearance and make the procedures more uniform within the region. The workgroup consists of law enforcement personnel, MPO staff, staff from the Texas DOT Dallas District, and officials from select cities.

When **elected officials** are included in **education initiatives**, the by-product is the enhancement of ITS discussions among elected officials from various jurisdictions. In the Dallas-Fort Worth Metropolitan Area, a few educational efforts have been targeted specifically to elected officials. Representatives from the Dallas Area Rapid Transit, the NCTCOG, and other agencies, reported that staff regularly make presentations to their governing boards on multi-jurisdictional projects

that involve their locale. The U.S. DOT-sponsored ITS training courses and the scanning reviews have provided other opportunities for elected officials to learn about activities occurring elsewhere and the coordination required for successful regional transportation systems.

Education can improve coordination across jurisdictions and modes in several ways, including increasing awareness of ITS products and services, reducing tensions between agencies representing different modes, and getting planners and operations staff to understand each other's responsibilities and terminology. Individuals in the Dallas-Fort Worth Metropolitan Area stated that a lack of awareness of the products and services and their benefits hinders the routine consideration of ITS technologies in a region's planning and deployment processes. Up to a few years ago, ITS education was primarily the responsibility of each agency considering ITS. However, at the request of the two Texas DOT District Engineers and the necessity to develop more of a regional advanced transportation management program, the MPO staff are beginning to take the lead in creating and providing programs to educate the regional stakeholders.

Initially, the NCTCOG staff used **training opportunities** provided by the U.S. DOT. **Training forums** have been expanded to educate transportation professionals from all public agencies in the area and the presenters now include representatives from academia and private companies. Recently, the MPO staff worked with the City of Dallas Police Department staff and the Dallas Regional Mobility Coalition's Freeway Management Working Group to develop an incident management training seminar. **Scanning reviews** enabled participants to learn how to use the technologies and then interject some first hand knowledge about the equipment being analyzed into the ITS discussion groups.

Creating an **ITS committee** is a common and effective strategy for improving communications on transportation needs and ITS project concepts among transportation agencies, jurisdictions, and other stakeholders. In the Dallas-Fort Worth Metropolitan Area, there are now a number of opportunities for staff from a variety of agencies to communicate about their ITS programs and to coordinate individual ITS projects. Both the Fort Worth and Dallas Texas DOT Districts have produced ITS plans with the assistance of *ad hoc* committees. Likewise, in 1995 and 1996, the MPO's Advanced Transportation Management Task Force worked with MPO staff to complete some specific ITS activities. However, all of these committees had only limited participation from transit and municipalities and participation eventually waned. Local transportation staff have had opportunities for over a decade to coordinate traffic and mobility issues as members of the Fort Worth and Dallas Traffic Management Teams. The Dallas Regional Mobility Coalition provides opportunities for discussions on the use of technology within its ITS Task Force and Freeway Management Working Group. Within the context of the planning process, the MPO's Surface Transportation Technical Committee examines ITS-type projects, products, and services.

The first opportunity for ITS coordination on a regional scale was with the newly created Regional Comprehensive ITS Committee for the Dallas-Fort Worth Region. Although the idea was actually conceived at the Dallas transit agency, the Dallas Area Rapid Transit management was willing for the MPO, a neutral organization, to take the lead to ensure that there would be no appearance of bias toward the eastern region (Dallas) over the western region (Fort Worth). The Committee's role will be to review each agency's ITS plans and detail where there are gaps with the coordination and integration of the systems.

One concern voiced by a variety of officials regarding all of the committees, work groups, and task forces, was the limited input of the private sector within the existing committees. Some interviewees did cite the Central Dallas Association as a private downtown business group that has provided some input on projects in the past. MPO and Texas DOT officials hope that with the creation of the MPO's Freight Transportation Task Force, there will be increased discussions and coordination regarding the intermodal community's needs and ITS projects.

In the Dallas-Fort Worth Metropolitan Area, ITS products and services were deployed in small projects. Now, transportation officials in the area have now initiated a major coordinating program to bring the jurisdictions and agencies from across the region together to plan for ITS. In May 1998, a memorandum of understanding was signed by the Chief Executives from seven regional transportation agencies in which they agreed to work together to develop a regional ITS program. This was an effort to prioritize regional needs and focus regional resources to their best use. Support from upper management drove the creation of the new Regional ITS Committee, composed of representatives from all major transportation agencies and jurisdictions with populations or employment of at least 50,000. Based on firsthand knowledge, some interviewees cautioned that this strategy of creating regional programs of ITS projects could be a dangerous and potentially wasteful strategy for areas with less mature ITS planning processes.

Broad steps for a **regional program** have been outlined to date. Several ITS plans have already been created by different operating agencies. The ITS Committee members will be responsible for reviewing each plan, assessing needs for sharing data, and the communications required to integrate technologies. The **National ITS Architecture** will be used to determine which organizations need to share data with one another. The general consensus was that a detailed architecture is not required before a regional plan or program is developed, but that a basic architecture could ensure that duplicative systems would not be created and that communication, not technology, would drive the process. Dallas-Fort Worth International Airport officials became involved in the Regional ITS Committee to ensure that they would not duplicate efforts.

The North Texas Council of Government's **MPO staff** have been building relationships with the metropolitan area's operating agencies for many years and put it to good use when it began planning for ITS four years ago. Initially, the Texas DOT District Engineers from Dallas and Fort Worth asked the MPO Director and his staff to help the Texas DOT Districts decide how to organize their traffic control centers, including developing a communications strategy. Both of the Texas DOT District Engineers have also requested that the MPO staff help bring the stakeholders together, coordinate, and provide leadership throughout the Dallas-Fort Worth Metropolitan Area. Many transportation officials espoused that it is up to the MPOs to create a regional vision for ITS applications.

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. Members of an ITS team in the Traffic Engineering Department of the Texas DOT Fort Worth District review traditional capital projects and flag

those that could include ITS technologies. While there is no formalized procedure for internal review, the practice of continuously conducting this routine by the Fort Worth District's ITS team has conditioned other offices to be aware of ITS issues. ITS personnel from the two Texas DOT districts also meet at least once a quarter to discuss communication links between the traffic management centers and other ITS project coordination issues.

At the Dallas Area Rapid Transit there is an intense effort to train those staff that are or may be involved in ITS planning or operations. The hope is that the more knowledge the operations staff obtains, the more they will seek to apply additional advanced technologies. Representatives from small cities added that coordination between other jurisdictions is more critical for them because internal coordination is simplified by the size of the workforce. Many of these communities need to conduct multi-jurisdictional signal corridor projects to gain benefits within their municipality.

### **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.

The ITS activities in the Dallas-Fort Worth Metropolitan Area are not in their initial stages but cannot be characterized as fully mature. Therefore, transportation professionals still require some pre-deployment data but are also looking at how to best utilize the operational data. In the Dallas-Fort Worth Metropolitan Area, three activities are seen as primary forces that will lead to a formalized method of data collection, data sharing, and standardized data analysis: (1) the learning from small-scale and test deployments, (2) the opening of the traffic management centers, and (3) the creation of the Regional Comprehensive ITS Committee.

The transportation professionals in the Dallas-Fort Worth Metropolitan Area have a two pronged approach to deployment and data collection. First, they implement a small-scale project, and then they collect the data to learn from the project, which enables them to either refine that project or design larger and improved ITS projects. **Data collection** is included as part of the investments in any project that uses advanced technologies. Management and staff use the **planning data** to learn about the technology and determine if they should redirect the design of new technologies. The incremental approach of learning through tests and small deployments allows on-going education. A Texas DOT Dallas District operations staff member said that they learned more from operating a small interim traffic operations center than what any pre-project planning analysis would provide.

Representatives from a number of the agencies in the metropolitan area believe that their MPO is a good fit for coordinating the **data archiving and analysis**. Because of air quality, congestion, and other analyses already being conducted, the MPO planning staff are seen as the local experts in data collection and manipulation. Although qualified, it is difficult for the MPO to commit any level of staff resources to perform any task related to data collection, analysis, and archiving, beyond the effort that is already being provided for air quality and project prioritization without knowing the full magnitude of time and effort needed to perform these functions. The NCTCOG staff see some regional resolution occurring through the Regional Comprehensive ITS Committee as to what data are available, are needed, and how to use the data.

A number of the Dallas-Fort Worth transportation officials noted that it is difficult to fully determine the **operating data** needs before the traffic operations centers are operating and fully staffed. Operations data are currently being gathered at the two interim centers via fiber optic cable, a 50-mile network in the Fort Worth District. Operators from a number of the municipal traffic control centers in the area are already sharing views from their closed-circuit cameras and data from their loop detectors.

Current operations data being gathered by various public agencies are intersection counts, local street and highway level of service and traffic speeds, accident locations, and street closures. Officials from the Dallas Area Rapid Transit are using data from their automated vehicle location, global positioning system, and geographic information system to improve real-time operations, provide greater information to its travelers, and enhance safety for its riders through a silent alarm system.

The NCTCOG staff is also involved in the deployment of operations information to the general public through its development of the Dallas-Fort Worth Traveler web site. The goal is to link all of the transportation agencies' Internet sites to this central location, enabling the viewer to have access to real-time seamless transportation information. Once again, the Regional ITS Committee will be called on to increase the cooperation among the numerous agencies to bring about the **data and information exchange**.

## **MAINSTREAMING AND DEPLOYING ITS: WHAT WORKS IN THE DALLAS-FORT WORTH METROPOLITAN AREA**

There are four key factors that have contributed to increased coordination and mainstreaming of ITS within the transportation planning process in the Dallas-Fort Worth Metropolitan Area:

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

Advocacy from the top managers from the Texas DOT, the NCTCOG, the Dallas Area Rapid Transit, the Fort Worth Transportation Authority, the North Texas Tollway Authority, and the

Dallas Regional Mobility Coalition has been the most beneficial factor in getting organizations to begin coordinating with one another. For coordination, committees at the technical and policy levels have been formed. This coordination has grown from traffic management teams, to an *ad hoc* Advanced Transportation Management Task Force that created supplemental selection criteria for TIP projects, to a newly formed Regional Comprehensive ITS Program Steering Committee that will merge the numerous agency-specific ITS Plans into a Regional ITS Plan.

Many officials of the transportation agencies involved with ITS intentionally did not seek to deploy large ITS projects until they knew more about these new technologies. This has been the pattern with each Texas DOT district's development of a permanent transportation operations and management center, and likewise, with the Dallas Area Rapid Transit use of demonstration projects to test ITS applications before deploying the technology throughout its entire system.

For the last five years, the MPO staff have been central to the ITS coordination efforts, including the development of the Regional ITS Committee and the Regional ITS Plans. The MPO staff were originally sought to bring the stakeholders together, coordinate, and provide leadership. They are now seen as a neutral agency with the resources to assist the jurisdictions and agencies in their ITS needs.

## **STRATEGIES USED TO MAINSTREAM ITS IN THE DALLAS-FORT WORTH METROPOLITAN AREA**

In this metropolitan area, the transportation professionals interviewed listed many effective strategies, in part, because there have been so many separate ITS planning and deployment efforts by each individual agency. However, the ITS program in the Dallas-Fort Worth Metropolitan Area is now at the cross-roads and is moving from single agency actions to a regional initiative. The interviewees in the Dallas-Fort Worth Metropolitan Area recommend up to ten different strategies as being extremely effective for transportation officials in other metropolitan areas to follow to achieve one or more conditions which aid in mainstreaming ITS:

1. Create and use a committee or task force that fosters ITS discussions and opens communications
2. Reference ITS in the regional transportation plan
3. Include ITS projects within the TIP
4. Develop an ITS plan (or ITS plans)
5. Educate elected officials and agency administrators in ITS
6. Educate other prime stakeholders (beyond the traditional transportation agencies) about ITS
7. Educate MPO staff
8. Conduct scanning reviews to ITS deployments in other areas
9. Develop regional ITS programs and projects
10. Utilize the National ITS Architecture or develop a Regional Architecture.

## **ROLE OF THE MPO IN THE ITS EFFORTS IN THE DALLAS-FORT WORTH METROPOLITAN AREA**

Transportation officials in the Dallas-Fort Worth Metropolitan Area look to their MPO as filling the roles of ITS facilitator, ITS educator, and ITS project funder. The MPO is able to provide a regional context for the projects in an area with many political boundaries and better understand the experiences of the traveling public who care little about jurisdictions they may pass through. Many representatives said that the MPO has been able to recognize the different philosophies of the east (Dallas) and west (Fort Worth) subregions and fuse them into common goals and priorities when working on regional projects. In addition, the MPO is the direct mechanism to the politicians and, therefore, seen as the only entity fully capable of educating the elected officials regarding ITS and its regional applications.

MPO staff members agreed that their involvement with specific ITS projects rely on invitations to participate from the sponsoring agencies. Inclusion in non-planning activities is only possible because the MPO staff have established a record of being knowledgeable, cooperative, and trustworthy. The MPO staff members have earned the respect not only from their collective knowledge and responsiveness, but also for not overreaching their authority. These traits for MPO staffs may prove to be the most critical toward mainstreaming ITS in the transportation planning process.

## **APPLICABILITY TO OTHER METROPOLITAN AREAS**

Even though few metropolitan areas can rival the population and size of the Dallas-Fort Worth Metropolitan Area, the experiences and successes of the public agencies in this area to mainstream ITS into the metropolitan transportation planning process can be applied to areas of any scale. In the Dallas-Fort Worth Metropolitan Area, the transportation officials from the various agencies have seen that the mainstreaming of ITS products and services is a slow process that initially requires a basic knowledge by policy makers before the staff from the individual agencies are comfortable with deploying ITS. This metropolitan area has shown a way for other areas that cannot fund major ITS deployments to benefit from an incremental approach.

One lesson highlighted by transportation professionals was to not overstudy issues and potential projects before their deployment. An evaluation component, however, should be included within every ITS project plan. Based on the actions by the transportation officials in this metropolitan area, efforts to mainstream ITS into the planning process should start after individual ITS technologies have been deployed, but before regional ITS technologies are to be deployed.

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

# **MAINSTREAMING ITS WITHIN THE TRANSPORTATION PLANNING PROCESS: REVIEW OF THE DALLAS-FORT WORTH 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, operations planning 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.

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

From February through October 1998, staff from the U.S. Department of Transportation’s (U.S. DOT) John A. Volpe National Transportation Systems Center (Volpe Center) conducted this research for the Federal Highway Administration’s Office of Metropolitan Planning and Programs. This document details efforts taken by the Dallas-Fort Worth metropolitan planning organization (MPO), the Texas Department of Transportation, and other transportation agencies in the Dallas-Fort Worth Metropolitan Area to mainstream ITS.

### **1.1 GOALS OF THE STUDY**

The general scope of the study is 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.

Initially, the research focused on answering six questions:

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

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

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

This research has yielded a number of informational products. The results include an inventory of approaches used by MPOs and other agencies to integrate ITS in the metropolitan transportation planning process. This list highlights effective methods of gaining and demonstrating endorsement of ITS solutions, and identifies mechanisms used to coordinate ITS development and operations. The study team has also provided details on actions needed to address the collection and use of data for monitoring and measuring the performance of advanced transportation systems. 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 the four sites indicated with white stars. Table 1 provides summary information on the MPOs in the ten metropolitan areas:

1. Albany, New York
2. Chicago, Illinois
3. Dallas-Fort Worth, Texas
4. Denver, Colorado
5. Los Angeles, California
6. Miami, Florida
7. Milwaukee, Wisconsin
8. Seattle, Washington
9. Washington, D.C.
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
- regional transportation plan and transportation improvement program planning process
- involvement of agencies in ITS projects and ITS outreach
- data collection and use
- staff skills and ITS information sources
- appropriate MPO role in ITS activities.

**Table 1. Metropolitan Planning Organizations Included in the Review**

<b>Metropolitan Area</b>	<b>Metropolitan Planning Organization</b>	<b>Jurisdiction</b>	<b>Composition</b>
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.	Miami-Dade County MPO (Miami Urbanized Area MPO)	30 municipalities 1 county	County Agency
Milwaukee, Wis.	Southeastern Wisconsin Regional Planning Commission (SEWRPC)	147 villages and cities, 7 counties	Regional Planning Commission
Seattle, Wash.	Puget Sound Regional Council (PSRC)	64 municipalities 4 counties	Council of Governments
Washington, D.C.	National Capital Region Transportation Planning Board	9 cities, 7 counties 2 states, 1 district	Council of Governments
Winston-Salem, N.C.	Winston-Salem Transportation Advisory Committee (elected)	20 municipalities 1 county	City Agency

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

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

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

Based on the preliminary phone interviews, the Chicago Area Transportation Study (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, the DuPage (County) Mayors and Managers Conference, and the City of Chicago's Mayor's Office.

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

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

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

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

There are a number of reports produced as a result of this research that provides insight into how ITS are incorporated into the metropolitan planning process. This document details efforts taken by the transportation agencies in the Dallas-Fort Worth Metropolitan Area to mainstream ITS. In addition, there are companion reports, similar to this Dallas-Fort Worth study, that detail the mainstreaming strategies used in the Chicago, Los Angeles, 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:

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

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

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

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

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

## 2. OVERVIEW OF THE DALLAS-FORT WORTH METROPOLITAN AREA

The Dallas-Fort Worth Metropolitan Area was reviewed because administrators from a number of key transportation agencies within the metropolitan area have voiced strong commitments to ITS deployment initiatives, even without the influx of large amounts of federal funds earmarked for ITS. In addition, there is an increasing emphasis on regional deployments and coordination among all of the public agencies, illuminated by the creation of multi-agency committees. An integral part of the ITS planning, agency coordination, and program development activities is the extensive involvement by management and staff from the North Central Texas Council of Governments (NCTCOG), the Dallas-Fort Worth metropolitan planning organization (MPO).

This chapter includes selected demographic and geographic information about the Dallas-Fort Worth 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 Dallas-Fort Worth 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 DALLAS-FORT WORTH METROPOLITAN AREA

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



Since the founding of Dallas and Fort Worth in the 1840s, transportation has played a major role in the North Central Texas region. Dallas was initially sited because of the navigable Trinity River, but it was the railroad's introduction in 1872 that accelerated growth in the region. Later, the 1930 discovery of oil likewise created a boom to the region's population, employment, and urbanization. Electric rail trolley cars were introduced to both Fort Worth and Dallas in the 1890s. During a brief period in the 1960s, a privately owned subway operated in downtown Fort Worth. However, this vast area has depended on the automobile for the bulk of its travel.

This region was developed around two central hubs, Dallas and Fort Worth, which were 20 miles apart in 1900. Both economically and physically, there were gaps between the two major cities and their surrounding communities that remained during the area's first century as an established region. Fort Worth developed around the vast ranches and stockyards, while Dallas' economy

grew from crop farming to an oil and financial center. While the suburbanization from the central cities began after World War II, it has only been since the late 1960s that the infill between the two diverse cities resulted in a continuous urbanized region, aided with the expansion of the Cities of Arlington, Grand Prairie, and Irving, and the development of the Dallas-Fort Worth International Airport.

The North Central Texas region actually encompasses 16 counties. However, the majority of the population and economic activity is concentrated in four counties: (1) Dallas County, home to the Cities of Dallas, Irving, Garland, Grand Prairie, and Richardson; (2) Tarrant County, home to the Cities of Fort Worth, Arlington, and Grapevine; (3) Collin County, home to the Cities of Plano and Carrollton; and (4) Denton County, home to the City of Denton. This urbanized area is also known as the Dallas-Fort Worth Metroplex.

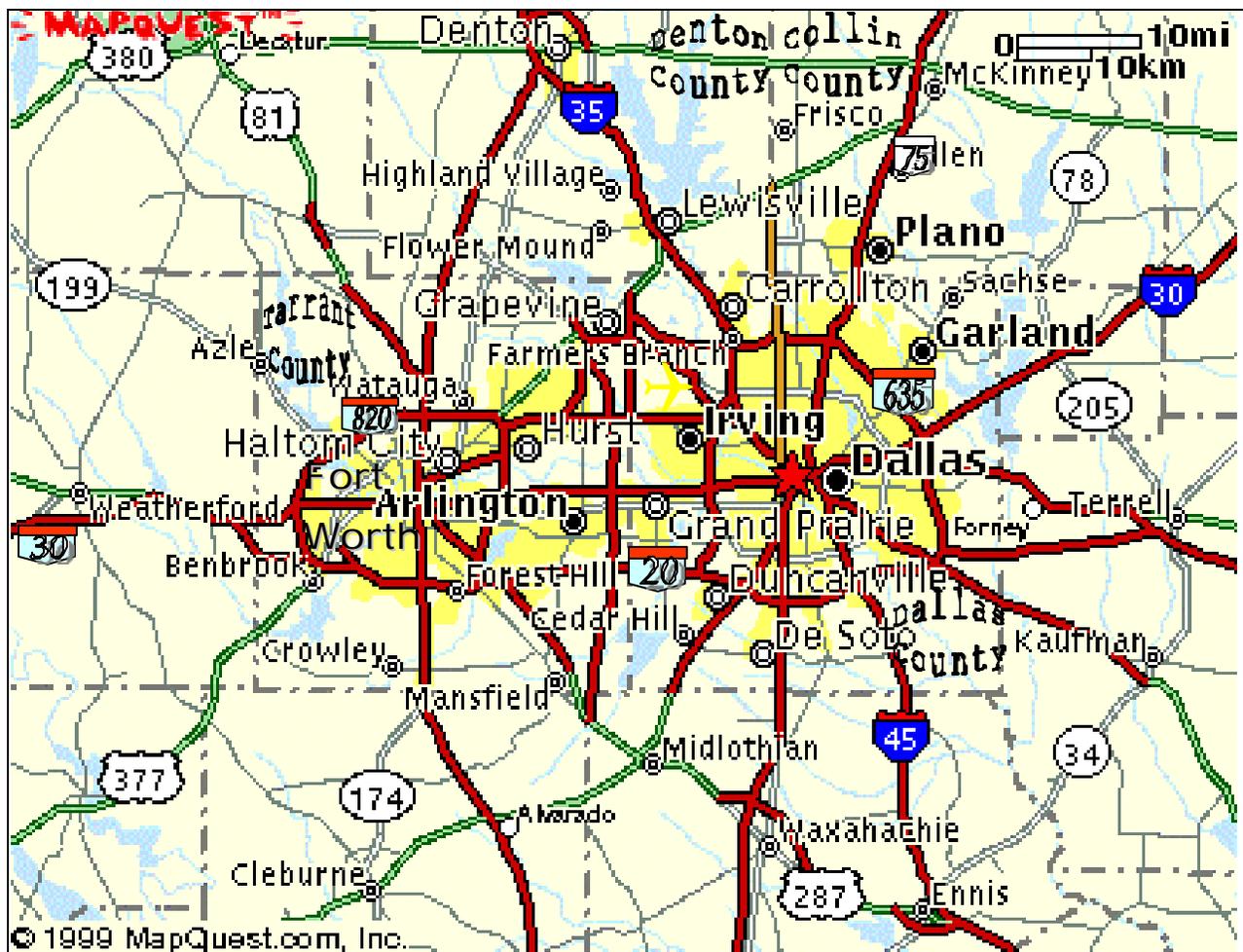


Figure 2. Map of the Dallas-Fort Worth Region

## 2.2 THE DALLAS-FORT WORTH TRANSPORTATION SYSTEM TODAY

The population explosion during the last three decades has necessitated the construction of numerous interstate highways, extensions of the state primary roadway network, as well as the creation and expansion of a variety of transit options. The freeway system includes major roads that perform different travel functions. There are highways that circumnavigate the two central cities, such as Interstate 820 in Fort Worth and Interstate 635 in Dallas. A number of the highways lead into and out of the two central business districts, including Interstates 30 and 35W in Fort Worth and Interstates 30, 35E, and 45 in Dallas. State Route 183 and Interstate 20 loop around both cities to the north and south, respectively. Interstate 30, running east-west through both central cities, is one of the most congested roadways in the metropolitan area.



There are approximately 40 miles of high occupancy vehicle (HOV) lanes in operation to the east and north of Dallas on I-35E, I-635, and I-30. There are plans for a total HOV system of 250 lane miles that may be used by express buses, vanpools, and carpools. The planned HOV network will include routes between Dallas and Fort Worth, routes to the Dallas-Fort Worth International Airport, and along some of the new tollway facilities. Tollways are already operating in a few select locations in Dallas County. Roadway expansion plans call for an additional 500 lane miles of toll roads and 770 lane miles of freeways and parkways within the next two decades. These roadways will be added to the existing 570 lane miles of freeway and 1,775 lane miles of principal and minor arterials in the metropolitan area.

There are two public transportation providers in the Dallas-Fort Worth Metropolitan Area, the Dallas Area Rapid Transit and the Fort Worth Transportation Authority. The Fort Worth Transportation Authority operates bus service throughout Tarrant County. The Dallas Area Rapid Transit provides bus service to the greater Dallas area. Since 1996, the Dallas Area Rapid Transit has also operated a 21-mile light rail system within the City of Dallas and a ten-mile commuter rail line from Dallas to Irving. The extension of the commuter rail system, the Trinity Railway Express, to the International Airport and to downtown Fort Worth is already underway and service will begin in 2000.

The impact of the aviation industry to the North Texas region is substantial. In 1917, the City of Dallas opened a municipal airport known as Love Field. Later, Great Southwest International Airport was opened in Fort Worth. However, in the mid-1960's, it became clear to local, state, and federal officials that neither airport could handle future needs. As a result of cooperation by city leaders from both Dallas and Fort Worth, the Dallas-Fort Worth International Airport opened in 1973. Its is sited at the border of the four principal counties and halfway between the two principal cities. With American and Delta Airlines both establishing hubs at the International Airport, it has grown to be the world's second busiest airport with more than 2,300 flights a day.

As a result of the 1993 North American Free Trade Agreement (NAFTA), local leaders feel the Dallas-Fort Worth region is poised to be a significant hub for international trade. Already,

approximately 80% of all overland trade between the United States and Mexico travels through Texas. Transportation officials in the region are making major efforts to link all truck, rail, air, and pipeline intermodal facilities in order for the region to take full advantage of the increased trade. Both physical improvements to increase mobility in and around these freight transfer facilities and improved communications to maximize flows and capacity at each site are planned. The bulk of the improvements will be made to the metropolitan area's nine intermodal facilities and to Interstate 35, a designated NAFTA Corridor.

## 2.3 PUBLIC AGENCIES AND OTHER SIGNIFICANT ORGANIZATIONS

During the course of the Dallas-Fort Worth site visit, a wide range of transportation professionals from transportation and related agencies throughout the Dallas-Fort Worth 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

In 1973, the **North Central Texas Council of Governments** became the body responsible for coordinating regional planning in the 16-county North Central Texas region. The **Regional Transportation Council** of the NCTCOG serves as the officially designated MPO for the Dallas-Fort Worth Metropolitan Area. The MPO's jurisdiction incorporates only the urbanized portion of this region. As of 1993, this jurisdiction covers a nine-county, 4,980 square mile area. Counties included within the metropolitan area are Collin, Dallas, Denton, Rockwall, Tarrant, and portions of Ellis, Johnson, Kaufman, and Parker.

The **Texas Department of Transportation** is responsible for the development and maintenance of highways and principal arterials throughout the state. The Texas DOT is divided into 25 geographic districts. The Dallas-Fort Worth Metropolitan Area includes the jurisdictions of two Texas DOT districts. The **Texas DOT Dallas District** includes seven counties, among them Dallas, Collin, and Denton Counties, and ten cities with populations of 50,000 or more. The **Texas DOT Fort Worth District** covers nine counties, including Tarrant County, and three cities with populations of 50,000 or more. ITS planning and operations within the two districts are out of their respective Transportation Operations Office. In the Fort Worth District, the Traffic Management section staff are directly responsible for ITS products and services. There are eight staff in the Dallas District and 13 staff in the Fort Worth District that are assigned to ITS design, deployment, operations, and maintenance.

The **Dallas Area Rapid Transit** was created in 1983 when voters approved a service plan for regional transportation. After 15 years of service, this public transportation agency now manages a comprehensive network of buses, vans, paratransit vehicles, light rail, commuter rail, and high occupancy vehicle lanes over a 700 square mile service area. In 1998, the Dallas Area

Rapid Transit provided 85.7 million passenger trips to 13 cities within Dallas County and surrounding counties. The transit agency operates 1,000 buses on 130 local and express bus routes; a 20-mile, 20-station light rail; the 10-mile, three-station Trinity Railway Express commuter rail service; and an 18-mile HOV system along three freeways in Dallas County. Many plans are underway to expand the Dallas Area Rapid Transit system, especially the rail and HOV service. These expansions include the increased use of ITS technologies. The ITS concepts and plans are generated from the Area Mobility Programs Division of the Planning and Development Department.

The Texas State legislature created the **North Texas Tollway Authority** in 1997. Prior to that time, this organization, created in 1953, was known as the North Texas Turnpike Authority and under the scrutiny of the Texas DOT. The North Texas Tollway Authority currently operates on the Dallas North Tollway and the Mountain Creek Lake Bridge. There are two projects currently under construction that will increase the jurisdiction of the Tollway Authority by over 30 miles when opened in the next two years. Like most toll authorities, this agency will use advanced technologies, such as electronic toll collection, to improve customer satisfaction and operational efficiency.

There are almost 160 municipalities within the NCTCOG's 16-county jurisdiction, including 33 in Dallas County and 32 in Tarrant County. The **City of Richardson** is one of the cities that is heavily involved with regional ITS initiatives and deployments within the city. Richardson, a small city of 87,000, is located in the northeast corner of the Dallas-Fort Worth Metroplex. Since 1994, the City of Richardson's Traffic and Transportation Department, with the support of its political officials, has been developing and deploying its own advanced traffic management system and coordinating with the regional efforts.

The **Dallas Traffic Management Team** has been in existence since 1990. However, the Management Team has been expanded in the last couple of years with the merging of the membership of the defunct Dallas ITS Plan Committee and the *Mobility 2020* Long-Range Plan Committee. The Traffic Management Team, which meet about four times a year, comprises primarily of traffic engineers and other transportation professionals from the jurisdictions and transportation agencies that operate within Dallas County. In 1980, a **Fort Worth Traffic Management Team** was created within Tarrant County. The goals of the teams are to work toward the optimum movement of people and goods within freeway corridors. Although the MPO staff are represented on the traffic management teams, neither team is an MPO-sponsored committee.

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

### 2.3.2 Other Transportation Agencies and Groups

In total, there are almost 90 jurisdictions, public agencies, and organizations in the Dallas-Fort Worth Metropolitan Area that have influence on the region's transportation policies, programs, and projects. However, many of these agencies have little involvement or impact on the ITS efforts in the Dallas-Fort Worth Metropolitan Area. While representatives from the majority of key agencies were interviewed for this study, not all of the public agencies that are actively involved in the ITS program or that have significant influence and impact on the region's transportation policies, programs, and projects were contacted. These agencies are summarized in this section.

The **Fort Worth Transportation Authority**, also known as the *T*, provides bus, paratransit, and other public transportation services to the urbanized areas of Tarrant County. The Transportation Authority uses its fleet of 170 buses on 28 fixed and flexible routes to provide more than five million passenger trips annually. The Transportation Authority will bring a new electronic fare payment system on-line in 2000 to coincide with the operation of the 35-mile Trinity Railway Express commuter rail line that will link downtown Fort Worth to the City of Irving and downtown Dallas.



The **Dallas-Fort Worth International Airport** is centrally located, 17 miles from both Dallas and Fort Worth. Within the last few years, airport administrators have gained an understanding that they must be concerned with the ground transportation system as well as the air transportation system. In 1998, an Airport Development Plan was completed that included the use of many ITS applications to improve ground transportation. Improvements include the PassKey automated parking fee collection system, the deployment of additional variable message signs, and the installation of congestion detection equipment.

In addition to the two Texas DOT districts, the tollway authority, the two transit agencies, and the MPO, there are a number of other local agencies that have taken the initiative to plan and deploy ITS components. Because the lead transportation officials have moved this metropolitan area into a new cooperative phase of regional ITS deployments, local involvement has become even more critical. Seeking involvement of these local jurisdictions and agencies in the recently created **Regional Comprehensive ITS Steering Committee** is one way that the lead transportation officials hope to initiate and maintain this regional cooperation and coordination. Significant jurisdictions and organizations with representation on the Regional ITS Committee include the Cities of **Dallas, Fort Worth, Arlington, Irving**, Richardson, and 14 other municipalities; the **Counties of Dallas, Denton, and Tarrant**; Dallas-Fort Worth International Airport, and the Texas Transportation Institute.

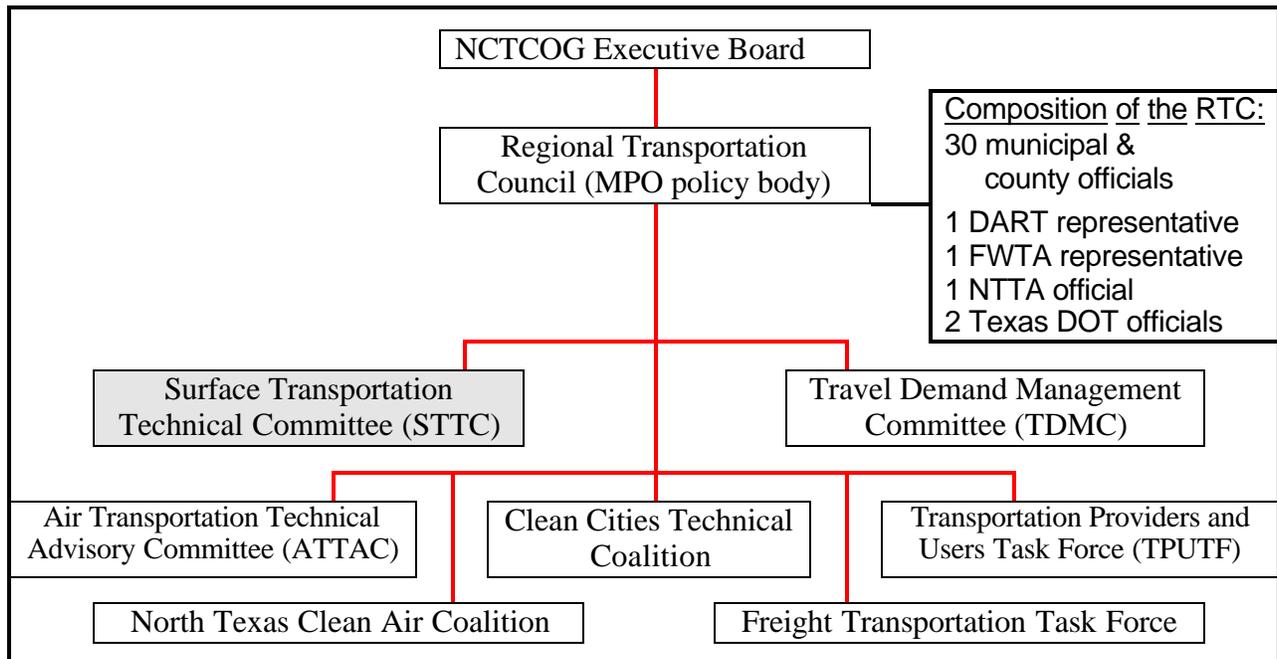
## 2.4 THE MPO ORGANIZATION

The **North Central Texas Council of Government** is a voluntary association of local governments within the 16-county North Central Texas region. This council was formed in 1966

to assist local governments in planning for common need, cooperating for mutual benefit, and coordinating for sound regional development. Since 1974, the NCTCOG’s Regional Transportation Council has served as the MPO for the Dallas-Fort Worth Metropolitan Area. However, the area served by the MPO is significantly smaller than the entire Council of Governments’ jurisdiction. The region served by the Dallas-Fort Worth MPO encompasses approximately 5,000 square miles and comprises nine counties and 75 municipalities. The Regional Transportation Council is the policy body for the MPO, consisting of 35 members who are predominately local elected officials. The NCTCOG’s Department of Transportation provides staff assistance to the MPO policy body and its technical committees.

The Department of Transportation provides technical planning services in support of development, project selection, and implementation of transportation projects in the *Mobility 2020 Regional Transportation Plan* and the TIP. The Department also conducts major investment studies, travel forecasting, air quality analysis, transit and traffic operations planning, and gives technical assistance to local governments. According to the *1997 Association of Metropolitan Planning Organizations’ Profiles of MPOs*, NCTCOG staff utilize and apply a variety of planning tools and software to perform their responsibilities, including TRANPLAN, MICROTRIPS, DRAM/EMPAL, and ARC Info.

The MPO’s Regional Transportation Council is supported by a variety of committees and specialized task forces. These committees and task forces are listed in Figure 3. Among the MPO committees are the Surface Transportation Technical Committee and the Travel Demand Management Committee. There are also a number of citizen advisory committees and task forces, such as the Transportation Providers and User Task Force and the Freight Transportation Task Force.

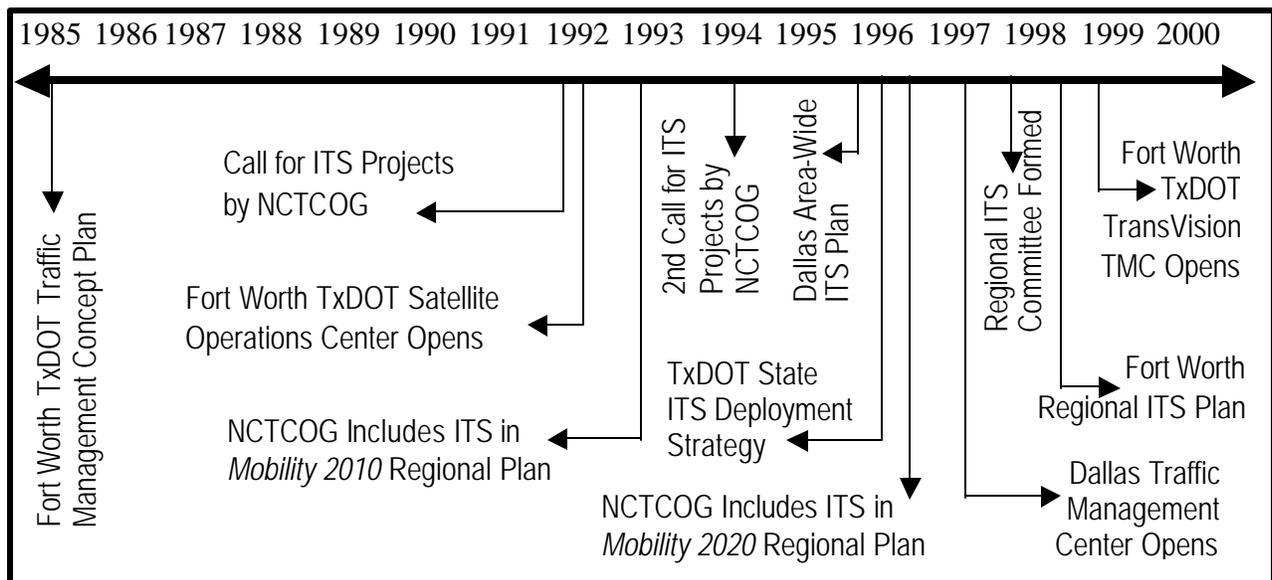


**Figure 3. Organizational Structure of the North Central Texas Council of Governments' Metropolitan Planning Organization**

Within the metropolitan transportation planning process, ITS issues are traditionally reviewed by the Surface Transportation Technical Committee and other committees formed to review and develop the regional transportation plan and the TIP. These ITS programs and projects are included under the Advanced Transportation Management System category in the transportation plan and the TIP. While the MPO revised its selection criteria for the TIP to credit regional and multi-agency projects to include more ITS-type projects, there was still a need for greater coordination. This need was to be met by a new ITS committee. Administrators from seven state and regional agencies formed the Regional Comprehensive ITS Program Steering Committee and agreed that the MPO staff would direct the new ITS Committee.

### 2.5 ITS ACTIVITY IN THE DALLAS-FORT WORTH METROPOLITAN AREA

The application of advanced technologies to solve some of the metropolitan area’s transportation-related problems was first initiated by staff from the Texas DOT Fort Worth District in the late 1970’s. Since the initial traffic and incident management deployments by the Fort Worth District, many of the other transportation agencies in the region have planned and deployed ITS products and services. However, it is only as of 1998, that there has been a concerted effort to consolidate all of the ITS efforts by the individual agencies and jurisdictions into a comprehensive and consolidated plan. Figure 4 provides a timeline of significant ITS planning and deployment activities for the Dallas-Fort Worth Metropolitan Area over the last 15 years.



**Figure 4. Regional ITS Milestones for the Dallas-Fort Worth Metropolitan Area**

### 2.5.1 ITS and Related Plans

Planning for ITS deployments in the Dallas-Fort Worth Metropolitan Area began in 1985 with the Texas DOT Fort Worth District's *Traffic Management Concept* report. This report provided a 20-year plan for the district to (1) create an area-wide surveillance network to monitor traffic conditions, (2) interconnect communications and traffic control technologies, and (3) create a management control center to both monitor and evaluate traffic situations in real-time and to implement an immediate and correct response. Through the end of 1998, almost half of the \$53 million proposal has been deployed.

In 1996, the Texas DOT Dallas District completed the *Dallas Area-Wide ITS Plan*. Using its 1985 *Traffic Management Plan* as the foundation, the Fort Worth District updated its plan in 1998, providing greater detail on technologies that were only conceptual in 1985. In addition, both the Dallas Area Rapid Transit and the North Texas Tollway Authority are each developing their own ITS plans for their agencies. The Fort Worth Transportation Authority is likewise considering developing an agency ITS plan. A number of the municipalities, such as Richardson, have also developed ITS concept reports or detailed plans that show how advanced technologies can be applied to the local road network and the municipal traffic control center's communication system can be linked to the Texas DOT traffic management centers.

In mid-1998, in the wake of the numerous ITS plans that had been completed or were under development and the increasing number of individual ITS deployments, the administrators from the Texas DOT districts, the MPO, the two transit agencies, the Tollway Authority, and the Dallas Regional Mobility Coalition got together to formally pledge their coordination and cooperation in the planning, implementation, and operation of ITS systems. One outcome of the cooperative memorandum of understanding was the creation of the **Regional Comprehensive ITS Program Steering Committee**. In addition to the seven regional and state agencies, this committee's membership includes the municipalities with population or employment bases over 50,000. The initial product of this committee will be a regional ITS plan that incorporates the common goals and projects of all of the area, agency, and municipal plans currently developed.

The development of ITS plans are also resulting in a number of ITS-related projects being included in the traditional planning documents. Advanced technologies were first recognized as a separate entity in the 1992 call for projects for inclusion in the *Mobility 2010 Regional Transportation Plan* and TIP. The *Mobility 2020 Plan* included a section on advanced traffic management systems. The *2020 Plan* outlined \$266 million of ITS projects to be operational within the next 20 years. Operations costs were estimated at \$27 million annually when all systems are implemented.

### 2.5.2 Current ITS Projects and Operations

Since the early 1980s, both the Texas DOT Dallas and Fort Worth Districts have been developing independent ITS components for their jurisdictions within the Dallas-Fort Worth Metropolitan Area. **Mobility Assistance Patrols** now monitor much of the urban freeway

system. Basic communication infrastructure is being installed in portions of Dallas and Tarrant Counties.

The Fort Worth District began developing its traffic management system in 1985. In 1992, the Fort Worth District opened a satellite traffic operations center. The District's ITS system, known as the **Transportation, Vehicular Information and Surveillance on an Intelligent Highway Optical Network (TransVISION), now include an extensive network of traffic monitoring and traveler information equipment:**

- 57 miles of fiber optic cables
- 39 variable message signs
- 221 lane control signs
- 40 closed-circuit television cameras
- 11 compressed video cameras
- 5 satellite buildings
- 1,433 loop detectors.

The Fort Worth District's permanent traffic management center is currently under construction and scheduled to be operational by the end of 1999. The TransVISION center will enable expanded traveler information capabilities. When complete, the TransVISION system will encompass 260 miles of Tarrant County freeways.

The Dallas District opened its Traffic Management Center in 1997. The two centers will be interconnected to allow for the exchange of data and video. In addition, the Dallas and Fort Worth Districts have initiated a joint ITS project on the Airport Freeway (State Highway 183) that will be the first inter-district ITS effort in the State of Texas.

An advanced public transportation system will include transit management centers, which will serve as communication hubs for Dallas Area Rapid Transit and the Fort Worth Transportation Authority. These centers will be integrated with state and local management centers. The Dallas Area Rapid Transit is now using automatic vehicle location technology and dynamic ride-matching systems. In addition, the Dallas transit agency is also involved in a demonstration project of HOV video enforcement.

Many of the municipalities are also using ITS equipment. Traffic management centers are currently in place to monitor traffic on a daily basis in the Cities of Arlington, Carrollton, Dallas, Farmers Branch, Fort Worth, Irving, Plano, and Richardson, among other municipalities. The system implemented by the City of Richardson has the capability of monitoring the highway segments that pass through the city, as well a Richardson's arterial network. The Cities of Garland and Plano also have closed-circuit television cameras. In Fort Worth's central business district, cameras are in place to monitor traffic at key intersections.

During the end of 1998 and the first quarter of 1999, the Texas DOT Dallas District, with the City of Dallas, conducted the **Downtown Dallas Quick Incident Clearance** demonstration project. This project used a number of closed-circuit television cameras and variable message signs to detect incidents even before passing motorists could call appropriate officials regarding

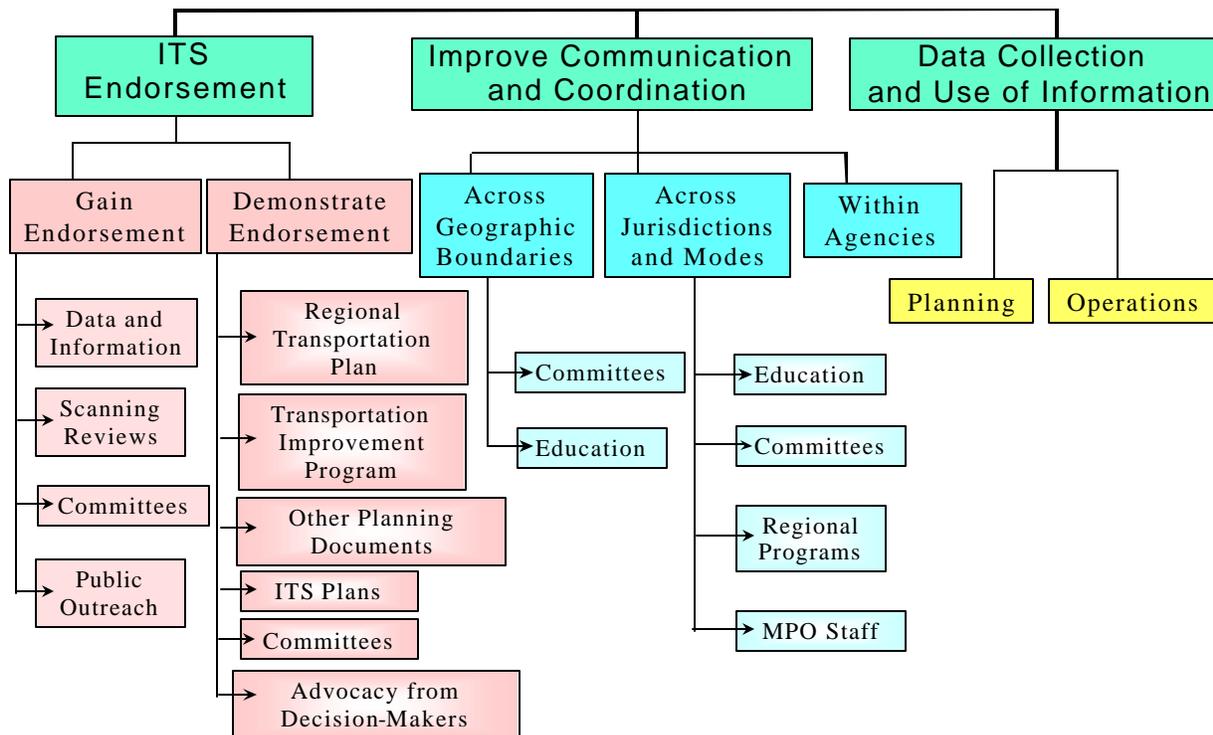
an incident. During the first two months, pre-project baseline data was gathered. This included the number of incidents, length of time for detection, and the total time to clear the incident. After the pre-project data are collected and the two-month trial begins, staff at the traffic management center will instruct the wrecker closest to the scene to report, not necessarily the wrecker crew who is next in line, which is currently the standard procedure. The attempt of this project is to overcome the onerous wrecker policy and show that one of the congested corridors can be cleared faster than what currently occurs.

### 3. REGIONAL STRATEGIES FOR ITS PLANNING AND DEPLOYMENT

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

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

In this chapter, each strategy will be presented under its related condition. Figure 5 displays the three conditions for mainstreaming ITS and their associated strategies. Some of the strategies are associated with more than one of the three conditions. When a strategy is used to achieve more than one condition the objective of that strategy may undergo subtle changes to attain each condition. For example, an ITS committee may be directly responsible for increased communication and coordination among agencies, but indirectly linked to gaining the endorsement for ITS from elected officials or agency management through the increase in ITS awareness that happens as a result of their participation on the committees.



**Figure 5. Three Conditions and Associated Strategies for Mainstreaming ITS in the Transportation Planning Process**

### 3.1 ENDORSEMENT OF ITS

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

This section is divided into two subsections:

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

Section 3.1.1 describes the strategies used in the Dallas-Fort Worth 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 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 Dallas-Fort Worth 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 influence support by other stakeholders. It is also important for mid- and upper-level transportation managers to support ITS since they inform elected officials and guide funding decisions within their respective transportation organizations. To gain their support, elected officials and transportation managers need to be provided with data and information that define ITS products and services, explain how the technologies are used, and detail the benefits that can be realized. This information can be made available through one-on-one discussions with agency management, presentations, scanning reviews, and committees. Educating the general public is also a viable way to inform elected officials.

This section discusses four strategies:

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

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

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

### **Data and Information**

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

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

To secure the Council members’ support, the MPO staff brief them on the logical arguments supporting freeway management. The members of the Council receive congestion information and are shown the relationship among incidents, congestion, and air pollution. Staff highlight

local problems and then explain how ITS products and services can help solve them. For example, local arrangements for traffic control in the Dallas area impede incident clearance. Each municipal police agency is responsible for its own traffic control and there is a tendency to shut down lanes for the police officers' safety, instead of clearing the incident quickly. If the agencies involved cooperated with one another, used variable message signs, and implemented common wrecker and clearance policies, incidents could be cleared faster, reducing congestion and improving air quality. According to one elected official, until the MPO staff brought this to their attention, the elected officials were not aware that agencies, such as the police departments from the different jurisdictions, did not coordinate their activities with one another and did not have similar incident clearance operating procedures. The Council is now considering ITS products and services that can provide some remedy to the problems with incident clearance.

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

### **Scanning Reviews**

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

There have been a wide range of individuals from the Dallas-Fort Worth area that have taken part in the Federal Highway Administration and Texas DOT-sponsored educational journeys to Atlanta, Southern California, Cincinnati, Houston, and San Antonio. Some of the groups included a mix of county commissioners, NCTCOG Executive Board and MPO Policy Board members, Texas DOT and transit operations staff, and MPO staff. Other trips, specifically those that looked at incident management operations, have included politicians and public safety officials from the Dallas Police and Fire Departments, the Texas Department of Public Safety, and the Dallas County Sheriff's Office.

All of the representatives from the metropolitan area agreed that the mixture of upper management, operations, and policy people seems to work better than just sending policy officials. It was important to get the technical people included since upper management depends on staff for information about technologies being considered. It also was enlightening for the technical staff and politicians to hear each groups' concerns and discuss the positives and negatives regarding the technologies they were viewing.

The consensus was that the scanning reviews helped put ITS on the attendees' agendas when it was not a priority to them before the trips. An elected county official said that the visit to the City of Houston really got the policy participants excited about transportation technologies. Not

surprisingly because of the competition between these two metropolitan areas, these attendees wanted all of the same technologies for their area. The technical staff tempered the discussions by letting them know that not all of the technologies seen were necessities for the Dallas-Fort Worth Metropolitan Area

In addition to endorsing varied group compositions, interviewees also recommended that scanning reviews be taken at the beginning of regional planning efforts or when exposure is needed in advance of a specific project to help decision-makers conceptualize what they need. It helps to visualize what the technology will look like and use the information to identify ITS needs early on. If funding or time constraints are an issue, a MPO and a local municipal representative suggested that pictures and slide shows either directly presented or available on the Internet can accomplish much the same, but emphasized that words alone are not enough.

### **Committees**

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

There are no committees in the Dallas-Fort Worth area that have been formed primarily to educate policy makers. However, as by-products of the responsibilities of the current committees, education does occur. The most notable example is the Dallas Regional Mobility Coalition. The Coalition, composed of politicians and business representatives from the Dallas area, examines a wide variety of programs and projects, including different technologies, and support viable technologies and projects that improve mobility in the area. To learn more about advanced transportation technologies, the Coalition formed an ITS Task Force. The ITS Task Force reviews demonstration tests of products in the downtown Dallas area. The Downtown Dallas Quick Incident Clearance demonstration project was one project that the Task Force reviewed and approved. The Coalition and Task Force members use the presentations of various vendors and progress reports regarding the demonstration tests as educational opportunities.

A number of transportation officials, including one elected official, noted that Coalition members and its Executive Director have been called upon to educate the MPO's Regional Transportation Council on various technologies supported by the Coalition. An early political advocate for incident management gained support from the Coalition Board of Directors for the Mobility Assistance Program through an education process that showed the benefits from such a program. The next step was to obtain funding for this courtesy patrol program. The Coalition's Executive Director, who had significant knowledge and credibility, spoke to the Regional Transportation Council regarding the new program. After being educated regarding the Motorist Assistance Program, the MPO Council moved quickly to approve congestion mitigation and air quality improvement program funds for the startup of this program. Education at the policy committee

level made the political endorsement and ultimately the program funding possible. A similar situation occurred with the successful deployment of HOV lanes and how support was gained from the Dallas Area Rapid Transit and Texas DOT decision makers.

## Public Outreach

Gaining citizens' support for ITS products and services is an alternative way to indirectly gain elected officials' support. It is hoped that by educating citizens, they will in turn demand that their local elected officials support the deployment and operations of ITS products and services. In the Dallas-Fort Worth area, many agency representatives admitted that public outreach is a later step in their local ITS program. This is seen as a slow process.

Two informational brochures produced by the Dallas-Fort Worth MPO staff have increased the public's knowledge of ITS and have small impacts on the level of discussions concerning advanced transportation management between elected officials and their constituents. In March 1996, the Advanced Transportation Management Task Force created a glossy 12-page brochure entitled *Regional Mobility Initiatives – Advanced Transportation Management*, that summarized existing transportation technologies and future plans for traffic management and traveler information systems in the metropolitan area. The second document was the 16-page *Mobility 2020, The Metropolitan Transportation Plan Executive Summary*. This 1997 brochure included a brief section on the region's advanced transportation management system. In addition, the term "advanced transportation management system" was interspersed throughout other sections of the summary, showing the link between transportation technologies and other elements of the transportation network. Both brochures were non-technical and included a great amount of colorful pictures and graphics to appeal to, instruct, and gain support from the widest possible audience.

### 3.1.2. Strategies to Demonstrate Endorsement of ITS

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

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

The first four strategies demonstrate ITS endorsement through planning and programming activities. For example, citing ITS in the MPO's regional transportation plan provides a policy statement that the region is committed to ITS, allowing all operating agencies to know that ITS products and services are options that can be considered to solve transportation problems. These strategies can be especially useful in areas where there is little direct support from elected

officials. In such areas, ITS tends to be planned and deployed piecemeal, in a bottom-up fashion, instead of top-down. Including ITS in planning documents can help transportation providers think through how to bring together all of the decentralized ITS activities and integrate them into a regional context.

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

### **Regional Transportation Plan**

Nationally, many MPO staffs include or are planning to include ITS in their regional transportation plans. Some plans contain more detail than others, depending on the area's ITS needs and level of ITS development. The main objective is to raise the significance of ITS at the policy level and make a regional commitment to ITS. Texas DOT officials remarked that inclusion of ITS in the regional plan legitimizes ITS products and services and helps encourage transportation professionals to consider them as solutions when addressing transportation problems and to include them within other planning documents, such as in major investment studies.

The current *Mobility 2020 Regional Transportation Plan* for the Dallas-Fort Worth Metropolitan Area supports ITS products and services through a traffic management philosophy that emphasizes squeezing capacity from the existing system. Policy statements within the Plan assert that the development in the region has matured to the point that traffic needs to be managed. It justifies this philosophy based on federal financial constraint requirements and mitigation that has to be undertaken due to the area's air quality non-attainment status. The Executive Summary of the Plan is used as a marketing piece and provides direction to agencies in the region. There is a current and ongoing effort to link the Dallas and Fort Worth ITS Plans with the regional transportation plan to make stronger connections between the planning documents.

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

The Executive Director of the Dallas-Fort Worth MPO suggests that regional transportation plans with traffic management philosophies should address such issues as which corridors need to be managed and at what times of day. Beyond this, he suggests the level of ITS detail in a regional transportation plan depends on the area's needs. A municipal engineer remarked that it is particularly important for transportation staffs from metropolitan areas that are just beginning to plan for ITS to include ITS in the transportation plan. Staff at these areas need to remain

focused since it takes a long time to implement ITS. If ITS is not in the regional transportation plan, it will not become a priority for regional funding.

### **Transportation Improvement Program**

Most ITS projects, like other transportation projects receiving certain types of federal funds, must be included in a region's TIP. MPO staff in some areas, however, go beyond this basic requirement and use the TIP to highlight ITS projects. MPO staff in other areas have modified their TIP project evaluation processes to accommodate the difference between traditional capital projects and ITS projects, resulting in an increased number of ITS projects selected for inclusion in the TIP.

Most agency officials believe that adding ITS projects to the TIP does not produce the exposure that adding an ITS policy statement in the regional transportation plan provides. The TIP is seen as a large document that compiles the priority projects from a number of transportation entities and regional associations, but not a list of priorities for the entire region. Many transportation officials from the Dallas-Fort Worth area said the approach of documenting individual agency priorities limits the ability to flexibly plan how to best apply transportation resources to accomplish complex and occasionally conflicting regional transportation and air quality objectives.

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

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

1. Implement the recommendations in the Congestion Management Plan by targeting incident detection and response technology and mobility assistance programs on congested corridors.
2. Fill gaps in existing corridor management efforts by completing critical system linkages.
3. Enhance the communication and information exchange between Texas Department of Transportation and local transportation agencies.

4. Leverage transportation resources by creating or enhancing public-private partnerships that will target the identification and mitigation of traffic congestion.
5. Leverage transportation resources by targeting investments, where possible, to facilities undergoing reconstruction.

### **Other Planning Documents**

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

The MPO staff for the Dallas-Fort Worth Metropolitan Area have categorized ITS as part of the Congestion Management System (CMS) special projects group since 1995. Because the metropolitan area is an air quality non-attainment area, it is imperative that any project, including the deployment of technologies, fit within the CMS strategies. Both planners and engineers agreed that the advanced transportation management strategy within the CMS is gaining prominence among CMS strategies. In addition, traffic signal improvements, an ITS-related strategy, has long been a component of the CMS and air quality improvement program.

In the Metropolitan Area, two major investment studies for transit are underway and two more are planned. ITS technologies are included in all four of them. In the two that are underway, which are highway corridors Interstate 30 and U.S. 75, ITS solutions are stand alone HOV-transit alternatives. In the two major investment studies yet to begin, ITS will be part of the alternative options. A transit spokesperson said that while the inclusion of ITS components into the studies are good planning practices, it is difficult to conduct impact modeling for the ITS alternative for comparisons with the other proposed options. A couple of traffic engineers noted that the more ITS projects and technologies are included in major investment studies and congestion management system reports, the more engineers will begin automatically conceiving their capital projects with various technologies integrated within the design.

### **ITS Plans**

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

Finally, it is with these plans that the first steps can be taken to incorporate ITS projects into the metropolitan transportation planning process. The creation of a plan causes many transportation officials in a region to consider ITS technologies for the first time. The plan provides a roadmap

and helps to develop consensus among operators and agencies. After the initial ITS project consideration, the next step occurs in which many projects identified in these ITS plans are submitted for funding through the regional TIP development process.

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

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

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

## Committees

Elected officials and transportation managers sometimes use or form committees through which they act as regional advocates for ITS. Through these committees, they influence ITS policy and specific projects. They also encourage staff of transportation agencies to consider ITS products and services at a regional level to solve transportation problems.

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

A primary responsibility of the Coalition members is to lobby state legislators and their staff. Although these discussions focus more on overall funding for the Dallas area, Coalition members also generate ideas and seek upper management and elected officials' support for projects. An administrator of this organization asserted that it is easier for the Coalition to lobby for support for specific regional projects than the MPO staff. It would be difficult for the MPO to engage in these activities because it has constituent responsibilities to its members to ensure that funding is equitably distributed. The Coalition, as a regional non-profit, does not have to answer to individual jurisdictions. The individual believed that this role will be even more important in three to five years when funds may be scarcer.

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

## Advocacy from Decision-Makers

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

In other metropolitan areas, the transportation managers have acted as advocates for ITS products and services. In these areas, upper level managers influence elected officials and set the

tone in their own agencies for consideration of ITS, including stressing cooperation among agencies. Strong leadership from the top management of the transportation providers in the Dallas-Fort Worth region, including the area's MPO, has been cited by transportation professionals and elected officials in that area as the most helpful factor in elevating ITS throughout the region. The interviewees specifically identified the two Texas DOT District Engineers, the MPO Executive Director, the General Managers of the two transit agencies, and the Executive Director of the Dallas Regional Mobility Coalition, who was the former interim Executive Director of the North Texas Tollway Authority. Together, these managers created a new regional ITS committee which will coordinate all of the ITS efforts throughout the Dallas-Fort Worth Metropolitan Area. The MPO Executive Director and the MPO staff have now taken the lead among the agency administrators and decision makers in promoting a regional consciousness and coordinating the relevant jurisdictions to collaborate on the deployment of ITS deployments and their operations.

In addition to the agency administrators, there were two elected officials that were cited for their strong and critical advocacy of advanced management systems. In the Fort Worth area, the Texas DOT District Engineer was very supportive of implementing these systems. Although political support was present, it was not necessary to get an ITS program initiated. However, the Dallas area lagged behind the Fort Worth area in the development of advanced transportation systems. It would take the political will of a single elected official and the coordination of five regional agency administrators to start an ITS program in the Dallas area. Dallas County Judge Jackson was the founder of the Dallas Regional Mobility Coalition, which first raised regional transportation issues and goals. It was also Judge Jackson that initially conceived the Mobility Assistance Program. The other elected official cited was the chairwoman of the Coalition's ITS Task Force and a Dallas City Councilwoman. Councilwoman Carroway has been responsible for encouraging the politicians and business people to examine a wide variety of technologies that could be used in the Dallas area.

### **3.2 COMMUNICATION AND COORDINATION**

ITS technologies can be most useful when planned and deployed with a regional perspective that cuts across geographic boundaries, agencies, and transportation modes. This requires elected officials and staff within and across agencies to communicate and coordinate with one another. It can, however, be difficult to plan for and deploy ITS within a region, especially in areas composed of many local autonomous communities. For example, in the Dallas-Fort Worth Metropolitan Area, there are approximately 75 governmental jurisdictions and another dozen regional or statewide agencies that have some ties to transportation.

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

Section 3.2 is divided into three subsections:

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

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

### **3.2.1. Strategies to Improve Communication and Coordination across Geographic Boundaries**

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

#### **Committees**

Interviewees collectively expressed that elected officials' support was most useful for obtaining funding and raising the awareness and acceptability for ITS products and services. However, some elected officials have taken their support a step further and have formed committees to coordinate ITS activities throughout the metropolitan region. This on-going coordination among committee members helps to shorten the time needed for project development and to procure funding. In the Dallas-Fort Worth Metropolitan Area, with the exception of one political committee, most of the groups that are involved in any ITS-related efforts are composed of agency staff and possibly agency management.

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

Incident detection and clearance is an important issue to the Coalition. The variation in clearance procedures among jurisdictions is a significant cause of congestion in the Dallas area. There are currently no uniform incident removal and investigation procedures for the region because each of the many local jurisdictions is responsible for managing the incidents occurring on their own freeway segments. Wrecker agencies contract with each city and the lack of

standardized procedures and coordination has prevented incidents from being cleared quickly. The workgroup members' efforts have increased awareness of these consequences.

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

### **Education**

When elected officials are included, the by-product of education initiatives is the enhancement of ITS discussions among elected officials from various jurisdictions. In the Dallas-Fort Worth Metropolitan Area, there have been a few educational efforts that have been targeted specifically to elected officials. A number of the agency representatives reported that staff regularly make presentations to their governing boards on regional or multi-jurisdictional projects that involve their locale. An official from the Dallas Area Rapid Transit said that its governing board is very interested in being educated, in any non-technical format, regarding any technologies that can improve customer service and operations efficiency. The MPO staff update the Regional Transportation Council on the status of ITS initiatives twice every year.

There have been other opportunities for elected officials to learn about activities occurring elsewhere and the coordination required to successfully to plan, deploy, and operate regional transportation systems. Since 1996, U.S. DOT-sponsored ITS training courses have been available and a number have been presented in the Dallas-Fort Worth Metropolitan Area. Most of these courses were targeted specifically for transportation professionals; however, a few key elected officials have attended some of the courses. In addition, the area's transportation officials see scanning reviews as an extremely useful process to get the participating elected officials to learn about how to use the technologies. Including both elected officials and technical staffs has enhanced the discussions occurring on the scanning reviews.

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

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

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

The first two strategies involve educating staff members and participation on committees. Most interviewees stated that committees were the most commonly used strategy to improve communications and foster coordination. However, some interviewees stated that before a committee is formed, agency and jurisdiction staff should be educated on the benefits of regional planning for ITS so that the proper level of importance would be attached to the concept of working with other agencies. This may be the first time some agency staff would find themselves being asked to coordinate with other agencies. It was stated that the most appropriate staff member should be sent to represent an agency to ensure that an agency attaches enough importance to a committee. Less experienced subordinate staff can make a committee less effective.

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

## **Education**

Education can improve coordination across jurisdictions and modes in several ways, including increasing awareness of ITS products and services, reducing tensions between agencies representing different modes, and getting planners and operations staff to understand each other's responsibilities and terminology. In addition, tensions between modal agencies and the reluctance of planners and operations staff to talk to one another can inhibit ITS planning and deployment.

Individuals in the Dallas-Fort Worth Metropolitan Area stated that there are no real opponents to ITS, but that a lack of awareness of the products and services and their benefits hinders the routine consideration of ITS technologies in a region's planning and deployment processes. Up to a few years ago, most of the ITS education was a responsibility largely placed on each agency considering ITS. This was consistent with the development of individual agency ITS plans. However, at the request of the District Engineers from the two Texas DOT Districts and due to the necessity to develop more of a regional advanced transportation management program, the MPO staff are beginning to take the lead in creating and providing programs to educate the regional stakeholders.

Initially, the NCTCOG staff used training opportunities provided by the U.S. DOT in the form of ITS awareness and education courses and scanning reviews. The early training sessions brought together between 10-50 attendees, usually from the Texas DOT districts. Training forums have been expanded to include transportation professionals from the municipalities and transit

agencies. Presenters have now included representatives from the Texas Transportation Institute, Texas Instruments, Motorola, and other private companies.

Scanning reviews were also cited as useful because participants learn to think about how to use the technologies, instead of learning only about the technologies themselves. Scanning reviews provided an educational opportunity to discuss actual deployments with peers from other departments within the same agency or from other agencies within the metropolitan area. Staff attended scanning reviews that provided a broad perspective of ITS, which allowed the staff to focus, not only on the technology, but on the need, the user, and the value the technology can provide. Back in the metropolitan area, scanning review attendees were able to interject into the ITS discussion groups some first hand knowledge about the equipment being analyzed.

Recently, the MPO staff worked with the City of Dallas Police Department staff and the Dallas Regional Mobility Coalition's Freeway Management Working Group to develop an incident management training seminar. This training will bring together emergency response personnel to learn about regional incident management procedures and new electronic accident investigation equipment to aid these participants. The training is being held at the Regional Police Academy. It is at these training sessions that discussions about traditional clearance procedures and regionally-developed procedures can now occur among the public safety and clearance staffs from multiple jurisdictions.

### **Committees**

Creating an ITS committee that operates either within or outside of the MPO structure is a common and effective strategy for improving communications on transportation needs and ITS project concepts among transportation agencies, jurisdictions, and other stakeholders. Most interviewees stated that the value of interfacing between member agencies provided by participating on an ITS committee should not be understated. Initially, participating on ITS committees provides staff members more opportunities for communication than for actual coordination and integration of projects. However, preliminary coordination between stakeholders 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.

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

In the Dallas-Fort Worth Metropolitan Area, there are now a number of opportunities for staff from a wide variety of agencies to communicate about their ITS programs and to coordinate individual ITS projects. Both the Fort Worth and Dallas Texas DOT Districts have produced ITS plans with the assistance of *ad hoc* committees. Likewise, in 1995 and 1996, the Advanced Transportation Management Task Force worked with MPO staff to complete some specific activities. The Task Force determined that multiple subregional traffic management centers should be created, continued funding for the Motorist Assistance Patrols, ascertained the type of conduit communication links between ITS centers (leased TSDN or fiber optics), and ensured that ITS was tied into the *Mobility 2020 Regional Transportation Plan*. However, all of these committees had only limited participation from transit or the local municipalities and participation eventually waned.

For over a decade local transportation staff have had opportunities to coordinate traffic and mobility issues as members of the Fort Worth and Dallas Traffic Management Teams. These teams, however, were developed outside the MPO structure and deal with much more than the deployment of advanced technologies. The Dallas Regional Mobility Coalition provides opportunities for discussions on the use of technology within its ITS Task Force and Freeway Management Working Group. These Coalition groups are composed largely of elected officials and administrators and have limited topic and geographic focus.

In addition, the MPO's Surface Transportation Technical Committee most closely examines ITS-type projects, products, and services; but this is within the context of the planning process and does not include the coordination of all of the ITS deployments within the region. There was some initial concern expressed by members of the Technical Committee that the responsibilities of the new Regional Committee would overlap with those of existing MPO committees, especially those of the Technical Committee. NCTCOG management dissuaded the concerns by showing the Technical Committee members that there was a need for a committee that could concentrate specifically on ITS issues and would bring in additional stakeholders, including transit, the Dallas-Fort Worth International Airport, and the North Texas Tollway Authority.

The first true opportunity for ITS coordination on a regional scale was with the newly created Regional Comprehensive ITS Committee for the Dallas-Fort Worth Region. The Regional ITS Committee was actually conceived by personnel from the Dallas Area Rapid Transit. Transit agency staff felt that the transit agency's ITS plan needed to be better coordinated with the current and future plans from other agencies. Although the idea was created at the Dallas transit agency, the Dallas Area Rapid Transit management was willing for the MPO, a neutral organization, to take the lead to ensure that there would be no appearance of bias toward the eastern region (Dallas) over the western region (Fort Worth). The Committee's role will be to review each agency's ITS plans and detail where there are gaps with the coordination and integration of the systems. While funding coordination will be examined, the committee members will not have the authority to make changes to the various agency plans. Changes to each ITS plan will remain the authority of the individual agencies, but it is assumed that cooperation will be enhanced with the discussions occurring in a regional context. Regional discussions will be at the policy level Executive Committee, comprising the administrators of the key agencies and government jurisdictions in the region, and the technical level Steering Committee, comprising managers and technicians.

Transportation officials from the Dallas-Fort Worth Metropolitan Area stressed that the goals and objectives of an ITS committee should be clearly defined, preferably during the creation of the committee. The goals of the Regional ITS Committee, as envisioned, were to be development, deployment, and then integration of regional advanced transportation technologies and systems. At the kick-off meeting, the committee members agreed to detail these goals and objectives to focus the work of the committee. It was also emphasized that each agency present must commit their most qualified staff to bring useful information to the committee and can effectively convey information back to their agency. Getting the most qualified representatives involved in the committee may require securing the commitment of the top management of member organizations. If ITS is not a priority, then a less knowledgeable staff person may be sent to the committee, therefore reducing the effectiveness of the committee.

One concern voiced by a variety of officials regarding all of the committees, work groups, and task forces, was the limited input of the private sector within the existing committees. Some interviewees did cite the Central Dallas Association as a private downtown business group that has provided some input on projects in the past. This Association partnered with the International Airport and the NCTCOG to complete a study for a sophisticated parking and traffic management system that would utilize smart card technology. Representation from the freight transportation industry was a private entity that was identified as being absent from the ITS committees. MPO and Texas DOT officials hope that with the creation of the MPO's Freight Transportation Task Force, there will be increased discussions regarding this industry's needs and greater coordination between planned ITS projects and the intermodal community.

### **Regional Programs**

The Intermodal Surface Transportation Efficiency Act of 1991 set aside federal funds for four Priority Corridors to promote the deployment and integration of ITS products and services. Communications and coordination channels in the form of extensive committee structures operate within each Priority Corridor, bringing all stakeholders together to solve identified transportation problems with ITS solutions.

Officials from the Dallas-Fort Worth Metropolitan Area proposed that after some ITS projects are actually deployed, a program of regional projects and its committee structure provides a forum for agencies across broadly defined regions to communicate, coordinate, and organize formal data-sharing practices. This will become more important in the future as the information is increasingly used to improve operations and to identify benefits in the face of increasing competition with capital projects. Participants begin to think regionally and include groups not traditionally targeted for transportation planning, such as representatives of airports, seaports, and trucking interests.

The Dallas-Fort Worth Metropolitan Area is composed of many jurisdictions whose transportation planning and operations have not historically been centralized. In keeping with the diversity of thought regarding transportation needs in the Dallas-Fort Worth area, many ITS activities have been planned or deployed independently of one another. However, transportation officials in the area have now initiated an effort to bring the jurisdictions and agencies from

across the region together to plan for ITS. While the Dallas-Fort Worth Metropolitan Area has not been designated as a Priority Corridor site, this regional effort is similar to that seen in those designated areas.

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

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

There was some difference of opinion between the interviewees as to whether the regional architecture or the regional systems plan should be developed first or at the same time. The complexities of the National ITS Architecture made some transportation officials wish to avoid a regional version. During the preparation for the updated Fort Worth ITS Plan, the Texas DOT Fort Worth staff and consultants created hundreds of pages of tables showing system linkages, benefits, and impacts. However, the general consensus was that a detailed architecture is not required before a regional plan or program is developed, but that a basic architecture could ensure that duplicative systems would not be created and that communication, not technology, would drive the process. Concern about duplication of efforts was one reason that officials from the Dallas-Fort Worth International Airport became involved with the Regional ITS Committee. It was generally believed that going through the exercise of creating an architecture will encourage coordination as important stakeholders and integration opportunities are identified.

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

ITS products and services were deployed in small projects, and now a major coordinating program is being developed to bring all of the deployments together.

### **MPO staff**

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

The North Texas Council of Government's MPO staff began ITS planning four years ago. Up to that time, many scattered and competing ITS projects existed within the region. Initially, the Texas DOT District Engineers from Dallas and Fort Worth asked the MPO Director and his staff to help the Texas DOT Districts decide how to organize their traffic control centers. As part of this review, the MPO staff worked with the Texas DOT staff to determine the location of the center or centers, if each District should have a center or they should share one, and the type of communications network that should be developed between the centers and the ITS field equipment. It was decided that each District would develop their own traffic control center. The MPO has been meeting with both Districts for the past two years to develop a communications strategy.

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

### **3.2.3 Strategies to Improve Communication and Coordination Within Agencies**

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

There are many benefits from internal coordination. Agency staff are able to design for later ITS infrastructure installation when designing capital projects. In addition, precautions can be taken

to not destroy installed ITS technology during reconstruction of capital infrastructure. Expensive mistakes can be made, for example, if fiber optic cable installed along a highway is damaged during highway reconstruction because construction crews were not aware of the existence or location of the cable.

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

There is on-going coordination outside of the districts, but internal to the Texas DOT. ITS personnel from the two districts meet at least once a quarter to discuss communication links between the traffic management centers and other ITS project coordination issues. Many of the multiple district meetings occur at the NCTCOG's office.

There are limited staff at the Dallas Area Rapid Transit that are involved in the application of ITS technologies to the transit system. Most of them are concentrated in the Mobility Programs Office. However, there is an intense effort to train those staff that are or may be involved in ITS planning or operations. Educational opportunities for staff have included Federal Transit Administration and American Public Transit Association training courses, and Federal Highway Administration and Texas DOT scanning reviews, such as to Houston's TransStar Traffic Management Center. The hope is that the more knowledge the operations staff obtains, the more they will seek to apply additional advanced technologies.

In many of the mid to small municipalities there are only one or two staff members assigned to ITS-type efforts, which include conception, budgeting, design, deployment, operations, and maintenance. Many times internal communication is very simple and projects can be discussed informally among staff because there are so few transportation staff. The City of Richardson is no exception. While supported by municipal administrators and staff, it is still up to the Traffic Engineer to sell the value of the ITS Program to the City Council. Representatives from small cities added that coordination between other jurisdictions is more critical for them because internal coordination is simplified by the size of the workforce. Many of these communities need to conduct multi-jurisdictional signal corridor projects to gain benefits within their municipality. For example, the City of Richardson has coordinated some signals along corridors that included the City of Dallas and Dallas County and have deployed a surveillance system that is shared with the City of Dallas, Dallas County, and the Texas DOT. The staff, administration, and elected officials were supportive of each project, but the City Council could not approve the projects for the TIP funding process until the other public entities approved and financially supported the projects.

### 3.3 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. 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.

The data used for ITS-related purposes are generated from ITS equipment in the field, other “traditional” field equipment, simulated through modeling, or estimated based on information from other ITS deployments. The intended use of the data can greatly effect what data are needed. Transportation data can be utilized in two ways - for planning purposes, which can be more generalized and based on longer time frames, and for operations purposes, which tend to be more detailed and, if possible, in real-time.

Section 3.3 is divided into two subsections:

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

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

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. The ITS activities in the Dallas-Fort Worth Metropolitan Area are not in their initial stages but cannot be characterized as fully mature. Therefore, transportation professionals still require some pre-deployment data but are also looking at how to

best utilize the operational data. In the Dallas-Fort Worth Metropolitan Area, three activities are seen as primary forces that will lead to a formalized method of data collection, data sharing, and standardized data analysis: (1) the learning from small-scale and test deployments, (2) the opening of the traffic management centers, and (3) the creation of the Regional Comprehensive ITS Committee.

### **3.3.1 Strategies to Collect Data and Use Information for Planning Purposes**

The transportation professionals in the Dallas-Fort Worth Metropolitan Area have a two pronged approach to deployment and data collection. First, they implement a small-scale project, and then they collect the data to learn from the project, which enables them to either refine that project or design larger and improved ITS projects. Data collection is included as part of the investments in any project that uses advanced technologies. There are efforts to collect data for before and after analysis, but not to the detriment of implementation. A number of agency administrators remarked that a pre-project planning process that is too extensive wastes time and money that could instead be used for the actual deployment. Planners, engineers, and elected officials interviewed all agreed that there would never be enough time to gather all the necessary data before the project for making decisions. This is an interactive process since the technologies change so quickly. Officials in the metropolitan area believe that the real planning effort should be during the project operations. ITS projects that are developed in the Dallas-Fort Worth Metropolitan Area include a planning component that enable data to be gathered for planning, as well as operational, purposes.

Management and staff use the planning data to learn about the technology and determine if they should redirect the design of new technologies. In order to build on what is learned about emerging technologies, information is continuously gathered and updated, not for controlling real-time operations, but for the specific purpose of improving efficiency in the next generation of systems deployed in the area. The incremental approach of learning through tests and small deployments allows on-going education. The Texas DOT district staffs learned from the interim, traffic operations satellite center in Dallas, for example, which was a small investment. Staff from the Texas DOT Fort Worth District applied what was learned to their permanent TransVISION Traffic Management Center. Lessons learned from Fort Worth will be applied to the permanent Dallas traffic management center. A Texas DOT Dallas District operations staff member said that they learned more from operating a small center than what any pre-project planning analysis would provide. From their own experience, Dallas District operations managers have learned that they would never use rear-projection display devices again. This could not have been learned from before studies.

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

lanes for some freeways or leave them open for emergency service access. The Texas Transportation Institute staff are assessing the usefulness of cellular phones and closed-circuit television cameras for incident detection for the Dallas-Fort Worth Metropolitan Area.

Texas Transportation Institute staff are also evaluating the use and effectiveness of HOV lanes using data gathered by the Institute and the Texas DOT staffs. This evaluation, being conducted on behalf of the Dallas Area Rapid Transit, is part of a demonstration test of HOV lane violation technology. A transit official reported that most benefit information for ITS transit projects is currently gathered through literature searches, not directly from field research.

A local politician stated that he and his peers do not focus on ITS projects in particular, but want to endorse projects that are cost-effective and can actually benefit the entire transportation network. While they do not need to know the exact performance measures that are being gathered as a result of the project evaluations, they do need to know that there are positive results. The MPO's Regional Transportation Council has been likewise concerned with system efficiency and modified its TIP selection criteria to accommodate the benefits from system linkages and projects with a regional focus. As part of the pre-project data included with each project submitted for funding within the TIP, transportation officials are now showing benefits and cost savings from system linkages and multi-jurisdictional projects. A municipal engineer noted that his city has submitted some signal coordination projects with other cities that have been approved as regional projects. The inclusion of some ITS components within traditional construction projects have also improved the projects priority under the system linkage criteria.

Representatives from a number of the agencies in the Dallas-Fort Worth Metropolitan Area believe that their MPO is a good fit for coordinating the data archiving and analysis. Because of air quality, congestion, and other analyses already being conducted, the MPO planning staff are seen as the local experts in data collection and manipulation. The MPO staff have conducted travel behavior surveys that looked at congestion pricing and trip activities which enabled the redesign of the travel forecasting process. Several of the modeling techniques now used by the MPO are considered very innovative. The MPO uses a very comprehensive database to support its transportation modeling process and regional microsimulations. The database is constructed on a geographic information system platform and can analyze travel demand on any of the 800 traffic analysis zones within the region. The state-of-the-art modeling used include two highly innovative mode choice capabilities: transit multi-path assignment and walk links generators.

Although qualified, it is difficult for the MPO to commit any level of staff resources to perform any task related to data collection, analysis, and archiving, beyond the effort that is already being provided for air quality and project prioritization without knowing the full magnitude of time and effort needed to perform these functions. An administrator remarked that it is difficult to resolve data issues locally when the type of data to be collected and how it is to be used has not been settled nationally within the planning profession. However, the NCTCOG staff see some regional resolution occurring through the Regional Comprehensive ITS Committee as to what data are available, are needed, and how to use the data. Currently, the promise of data generation is not driving any ITS deployments. Because of their limited resources, the MPO staff believe that the ITS Committee will see that there are other alternatives to using the MPO for ITS data

analyses. MPO staff have suggested using the private sector or research organizations to manage the additional data being generated by the new ITS deployments.

### 3.3.2 Strategies to Collect Data and Use Information for Operational Purposes

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

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

Many interviewees in the Dallas-Fort Worth Metropolitan Area stated that gathering data was an important activity to improve operations and evaluate projects. These individuals emphasized that more operational data will be gathered once the traffic operations centers are completed in the Dallas and Fort Worth areas. A number of the transportation officials noted that it is difficult to fully determine the operating data needs before the centers are operating and fully staffed. Operations data are currently being gathered at the two interim centers via fiber optic cable, a 50-mile network in the Fort Worth District. The two Texas DOT centers were to be physically linked by fiber optic cable sometime in 1999.

Operators from a number of the municipal traffic control centers in the area are already sharing views from their closed-circuit cameras and data from their loop detectors. The City of Richardson is sharing camera feeds with the Texas DOT Dallas District, and the adjacent Cities of Dallas, Garland, and Plano. The three cities are using some of the data now being shared to coordinate their signal timings along corridors that cross each of their jurisdictions. The Cities of Fort Worth and Arlington are likewise discussing the sharing of data and video with each other and the Fort Worth Traffic Management Center. In addition, the Texas DOT owns the software rights to its systems and has been willing to let the municipalities tie into their traffic management and operations systems when the municipalities were ready to do so.

Current operations data being gathered by various public agencies are intersection counts, local street and highway level of service and traffic speeds, accident locations, and street closures. One municipality gathers intersection counts and arterial congestion data and transmit these data, via Internet, to the Texas Transportation Institute for their analysis in the PASSER (signal progression) model. After the data inputs are fully refined, the municipal traffic engineer sees applying the data for real-time signal control. A test for this application is already planned.

Officials from the Dallas Area Rapid Transit are using data from their automated vehicle location, global positioning system, and geographic information system to improve real-time operations, provide greater information to its travelers, and enhance safety for its riders through a silent alarm system. The transit agency uses toll tag readers to estimate traffic speeds and travel times for their own use, but there are plans for the Texas DOT Dallas District to use the transit vehicles as traffic probes after the Texas DOT has developed algorithms that will enable this use. The transit agency is using the vehicle location technology for schedule adherence and to assess any damages from contracted private carriers in the event that the contracted level of service is not maintained.

An administrator and an elected official both maintained that the operations centers at the Texas DOT Districts in the metropolitan area did not need the level of technology that they saw at Houston and San Antonio. They were concerned that the operations data and information be manageable for the operators. One noted that already, the current Texas DOT center in Dallas has more monitors than the staff can view. The permanent central facility will have even more.

The NCTCOG staff is also involved in the deployment of operations information to the general public through its development of the Dallas-Fort Worth Traveler web site. The goal is to link all of the transportation agencies' Internet sites to this central location, enabling the viewer to have access to real-time seamless transportation information. The officials interviewed realize that there needs to be some regional transportation information available to the public very soon so the public status of the advanced traffic management program in the area may be increased. Once again, the Regional ITS Committee will be called on to increase the cooperation among the numerous agencies to bring about the data and information exchange. The members of the Committee felt that a regional traffic map should be the first product readily available to the public. A MPO official noted that there may be a weak link in this seamless system if data from the intermodal freight industry is not included within the web site. It is hoped that the MPO staff will be able to work with this industry through the new Freight Transportation Task Force to allay the shippers' fears of sharing information.

## 4. SUMMARY

This chapter presents a summary of what the transportation agencies in the Dallas-Fort Worth Metropolitan Area are doing that are having positive impacts on deploying ITS products and services and mainstreaming ITS in the transportation planning process. The first section reviews these positive actions. These efforts are tied to a list of strategies that have been used in ten metropolitan areas. The second section discusses the strategies which officials from the Dallas-Fort-Worth Metropolitan Area found most effective. Although the involvement of a number of agencies in the metropolitan area was examined, the focus of this report was on mainstreaming ITS into the metropolitan transportation planning process, which is primarily a MPO function. Therefore, the role of the MPO in ITS activities is highlighted in the third section.

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

### 4.1 MAINSTREAMING AND DEPLOYING ITS: WHAT WORKS IN THE DALLAS-FORT WORTH METROPOLITAN AREA

This section briefly examines the factors or activities that aid in planning and deploying ITS in the Dallas-Fort Worth Metropolitan Area. There were a number of actions cited by the transportation officials from the area as enabling them to mainstream and deploy ITS. The ability to learn from small scale deployments and demonstrations have also led to the support for larger ITS projects within the planning process. In addition, modifying the transportation improvement program (TIP) project selection criteria to accommodate more multi-jurisdictional and multi-modal project proposals, and educating elected officials and other policy makers on the applications and benefits of ITS were also cited by several officials. While there were a number of effective items that were listed, there are four key factors that have contributed to increased coordination and mainstreaming of ITS in the Dallas-Fort Worth Metropolitan Area:

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

In the Dallas-Fort Worth Metropolitan Area, the top managers from the Texas DOT, the NCTCOG, the Dallas Area Rapid Transit, the Fort Worth Transportation Authority, the North

Texas Tollway Authority, and the Dallas Regional Mobility Coalition have provided strong leadership and support that has elevated ITS throughout the region. This advocacy from management has been the most beneficial factor in getting organizations to begin coordinating with one another.

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

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

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

## **4.2 STRATEGIES USED TO MAINSTREAM ITS**

Interviewees representing transportation agencies from the ten metropolitan areas initially provided a long and varied list of strategies they used to increase opportunities for ITS

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

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, a number of the 17 strategies listed in Table 2 could be used to generate more than one of the three conditions stated as being instrumental in mainstreaming ITS in the metropolitan planning process. (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). Chapter 3 detailed how each strategy may produce a specific condition. From the analysis of their responses, we can conclude that the interviewees in the Dallas-Fort Worth Metropolitan Area recommend up to ten different strategies as being extremely effective for transportation officials in other metropolitan areas to follow to achieve one or more conditions which aid in mainstreaming ITS. Whether these strategies are being utilized within or outside the MPO structure, they have been the most instrumental in moving ITS projects to the forefront of the regional transportation planning process:

1. Create and use a committee or task force that fosters ITS discussions and opens communications
2. Reference ITS in the regional transportation plan
3. Include ITS projects within the TIP
4. Develop an ITS plan (or ITS plans)
5. Educate elected officials and agency administrators in ITS
6. Educate other prime stakeholders (beyond the traditional transportation agencies) about ITS
7. Educate MPO staff
8. Conduct scanning reviews to ITS deployments in other areas
9. Develop regional ITS programs and projects

## 10. Utilize the National ITS Architecture or develop a Regional Architecture.

In this metropolitan area, the transportation professionals interviewed listed so many effective strategies in part because there have been so many separate ITS planning and deployment efforts by each individual agency. The participants from each agency know what has worked for their agency in getting ITS funded and deployed. However, the ITS program in the Dallas-Fort Worth Metropolitan Area is now at the cross-roads and is moving from single agency actions to a regional initiative. The application of the National ITS Architecture, the creation of committees, and the development of a regionwide ITS program are all strategies that highlight the significance of a regional effort. In addition, there is recognition that the MPO staff are key to leading the regional coordination effort. Not surprising, the strategy of educating MPO staff regarding new transportation technologies was indicative of the various opinions that the MPO staff should have the background knowledge that enables them to be ready to lead. The officials in this metropolitan area have had first hand experience as to the value of an educated MPO staff to get ITS projects mainstreamed and deployed.

Many of the officials discussed the value of the scanning reviews as an educational tool for elected officials and top management. They also noted that mainstreaming cannot truly happen without ITS being referenced and included in some form in the planning documents. A good start to making this happen is to develop an ITS plan that can be used as roadmap for future projects. Finally, it was realized that there were a number of ITS components that would require stakeholders beyond the traffic engineers and transportation planners. Incident and emergency management services require the coordination and cooperation of public safety and emergency response personnel. The trucking and freight moving industry is also a critical stakeholder in ensuring that ITS projects will be deployed and used to aid in mobility in the Dallas-Fort Worth Metropolitan Area.

### **4.3 ROLE OF THE MPO IN THE ITS EFFORTS IN THE DALLAS-FORT WORTH METROPOLITAN AREA**

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

After the visits to four metropolitan areas and discussions with officials from different agencies were completed, it appeared that no single mainstreaming model could apply to all areas. Just as the political and organizational structures and the level of maturity of ITS planning and deployment differ from region to region, so will the strategies to mainstream ITS differ. This includes the role of the MPOs. Often this role depends on their responsibilities in the allocation of funds and application of these funds to projects, and their level of involvement with transportation operations within the area.

**Table 2. Assessment of Strategies by Agencies in the Dallas-Fort Worth Metropolitan Area**

<p align="center"><b>Strategies</b> Used to Increase ITS Awareness, Increase ITS Deployments, and Integrate ITS Activities within the Transportation Planning Process</p>	NCTCOG (MPO) Management	NCTCOG Staff	TxDOT Dallas Operations	TxDOT Ft. Worth Operations	Dallas Area Rapid Transit	City of Richardson	NCTCOG RTC (Policy Board)	Dallas Regional Mobility Coalition	Reg. ITS Com.	Area Consensus
Use or create MPO or non-MPO Committees/Task Forces	H	H	M	H	M	H	-	H	H	<b>H</b>
Include ITS, or a reference to ITS, in the Regional Transportation Plan	M	H	H	H	M	H	-	-	-	<b>H</b>
Include ITS projects in the TIP	H	H	H	H	M	H	-	-	-	<b>H</b>
Develop ITS plans	H	H	H	H	H	H	-	M	H	<b>H</b>
Educate elected officials, top management of area transportation providers	M	H	H	H	H	H	M	M	-	<b>H</b>
Educate other stakeholders (emergency response services, trucking)	H	M	M	M	H	L	H	H	H	<b>H</b>
Educate MPO staff	H	M	H	H	H	H	H	L	-	<b>H</b>
Conduct field trips for upper management (scanning reviews)	L	M	H	H	H	M	H	H	-	<b>H</b>
Develop a regionwide program of ITS projects	M	M	H	H	H	M	H	H	-	<b>H</b>
Utilize the National Architecture or develop a Regional Architecture	H	H	M	H	M	H	-	H	-	<b>H</b>
Include ITS in other MPO planning documents (CMS, MIS, etc.)	H	H	H	M	M	M	-	-	-	<b>M</b>
Determine data collection needs	M	M	H	M	H	M	-	M	M	<b>M</b>
Use data for planning and operations improvements (applying the data)	M	M	H	L	H	M	-	L	M	<b>M</b>
Educate general public	M	L	M	M	H	L	-	L	-	<b>M</b>
Use ITS advocates in the region (at the MPO and other agencies)	L	L	H	L	H	M	H	-	-	<b>M</b>
Use peer-to-peer networking (experts outside metropolitan area)	H	-	M	-	H	M	H	-	-	<b>M</b>
Involve academia	-	-	-	-	-	-	-	-	M	-
<b>Ratings of Strategies:</b>	“.” No response provided									
<b>H</b> – High Priority. Most effective strategy. Interviewees recommend spending time and funds on this strategy.										
<b>M</b> – Medium Priority. This strategy is recommended if the agency or region has time and funds.										
<b>L</b> – 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 Dallas-Fort Worth Metropolitan Areas in September 1998</i>										

Transportation officials in the Dallas-Fort Worth Metropolitan Area look to their MPO as filling the roles of ITS facilitator, ITS educator, ITS project funder, and liaison and educator to the local elected officials and municipal administrators. Most of the representatives from the agencies interviewed think the MPO staff should be very involved in ITS projects in the area. The MPO is able to provide a regional context for the projects in an area with many political boundaries and better understand the experiences of the traveling public who care little about jurisdictions they may pass through. Many representatives said that the MPO has been able to recognize the different philosophies of the east (Dallas) and west (Fort Worth) subregions and fuse them into common goals and priorities when working on regional projects.

In keeping with this regional context, the MPO has been able to use Congestion Mitigation and Air Quality Improvement Program funds to leverage multi-jurisdictional ITS work. Because local agencies have not seen ITS projects take funds away from their projects, the MPO has been able to avoid conflict while building support for ITS. None of this ITS involvement would be possible without support from the elected officials who highly respect the MPO staff. The staff members have earned the respect not only from their collective knowledge and responsiveness, but also for not overreaching their authority. The MPO is the direct mechanism to the politicians and, therefore, seen as the only entity fully capable of educating the elected officials regarding ITS and its regional applications.

In summary, the interviewees generally agreed on a wide range of roles and responsibilities that the Dallas-Fort Worth MPO staff have been successful performing during their involvement with the ITS efforts in the metropolitan areas:

- Educator of ITS technologies and processes
- Integrator of ITS within the regional planning documents
- Sponsor of, or contributing participant on, a multi-jurisdictional and multi-discipline ITS regional committee
- Designer of new TIP project prioritization criteria that aids in the selection of ITS-type projects
- Mediator of conflicts arising from regional project proposals and project deployments
- Liaison to elected officials, local public agency officials, and the private sector
- Contact to private sector and advisor of needs for tests of specific products
- Lead or a contributing participant on regional ITS research and studies.

With the exception of some transportation demand management programs like ridesharing, the Dallas-Fort Worth MPO staff emphasized that they were not considered the operators or designers of any transportation modes or systems. Because of these limitations, MPO staff members agreed that their involvement with specific ITS projects rely on invitations to participate from the sponsoring agencies. The two Texas DOT Districts have already included MPO officials in design stages of some of their ITS projects. Inclusion in these non-planning activities is only possible because the MPO staff have established a record of being

knowledgeable, cooperative, and trustworthy. These traits for MPO staffs may prove to be the most critical toward mainstreaming ITS in the transportation planning process.

#### **4.4 APPLICABILITY TO OTHER METROPOLITAN AREAS**

Even though few metropolitan areas can rival the population and size of the Dallas-Fort Worth Metropolitan Area, the experiences and successes of the public agencies in this area to mainstream ITS into the metropolitan transportation planning process can be applied to other areas of any scale. In spite of the differences in the size of metropolitan areas, political composition, and agencies involved, there are some common strategies that transportation operators and jurisdictions use to mainstream ITS within their metropolitan areas. In some cases, mainstreaming is occurring within the transportation agencies first, before they submit their projects to the MPO. Coordination between agencies and jurisdictions takes place through several methods, be it through MPO or non-MPO committees or creating ITS plans. Another important consideration is to obtain support from the elected officials. This may be more important for getting ITS projects deployed than actually for mainstreaming. However, their support is so important that it is considered important to educate them as part of the mainstreaming process.

In the Dallas-Fort Worth Metropolitan Area, the transportation officials from the various agencies have seen that the mainstreaming of ITS products and services is a slow process that initially requires a basic knowledge by policy makers before the staff from the individual agencies are comfortable with deploying ITS. Relative to its size, the Dallas-Fort Worth Metropolitan Area has not benefited from an abundance of federal funding for ITS like other areas in Texas. Although not receiving extensive outside assistance, area transportation officials have attempted to plan for staged ITS deployment. Their goals have been to deploy what was realistically needed and capable of being funded, not attempting to duplicate the extensive technologies deployed in Houston and San Antonio. This metropolitan area has shown a way for other areas that cannot fund major ITS deployments to benefit from an incremental approach.

The education of staff and officials and deployment of small-scale systems can coincide with the creation of ITS plans. One lesson highlighted by transportation professionals was to not overstudy issues and potential projects before their deployment. An evaluation component, however, should be included within every ITS project plan. An administrator noted that overstudy of problems occurs when there is not enough respect for the technical staff by the policy makers. After the learning process from the initial deployments has occurred, it is easier to look at long-term and regional integration of advanced transportation systems.

Based on the actions by the transportation officials in this metropolitan area, efforts to mainstream ITS into the planning process should start after individual ITS technologies have been deployed, but before regional ITS technologies are to be deployed. This process includes the insertion of ITS projects within the regional transportation plan, the TIP, and other planning documents. Perhaps the greatest and most applicable lesson presented by this area's officials is that staff from an MPO should be seen as a valuable resource for ITS and for other transportation issues. If the MPO staff are, among other things, knowledgeable of ITS applications, good

listeners, and not prone to force their own agenda on the region, the process to mainstreaming ITS products and services is much simpler because the agency most attuned to the metropolitan transportation planning process, is also the agency most trusted.

## 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 new strategies to be added.

As demonstrated in several metropolitan areas, local officials and agency representatives have become aware of the potential opportunities that ITS products and services can provide. This, in turn, has led these managers and their staffs to routinely consider ITS solutions when making investment decisions concerning the transportation system. While a number of individual agencies are routinely considering ITS solutions, mainstreaming ITS into the transportation planning process is necessary if ITS deployments are to thrive on a regional basis.

The metropolitan areas that are meeting the three conditions described in this report are now able to mainstream ITS into the planning process. However, a number of agency officials noted that mainstreaming efforts must go beyond the current focus of getting ITS projects deployed and operating. These efforts must accommodate the integration of the deployed systems by applying

a regional architecture. These efforts must also ensure the continued long-term operations and maintenance of the systems by identifying the resources required by agencies to perform these functions. Many of the transportation officials interviewed asserted that this vision could be best achieved when considered within the metropolitan transportation planning process.

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## APPENDIX B

### ACRONYMS AND ABBREVIATIONS USED BY TRANSPORTATION OFFICIALS IN THE DALLAS- FORT WORTH METROPOLITAN AREA

#### *General Acronyms and Abbreviations*

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

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

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

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MDT	mobile data terminals
ME	medical examiner
Mgwt	megawatt
MHz	megahertz
MIS	major (transportation) investment study
MIS	management information systems
MMTIC	multi-modal transportation information center
MMTIS	multi-modal traveler (or transportation) information system
Mobile5a	Environmental Protection Agency's Vehicle Emissions Factor Model
MOEs	measures of effectiveness
MOU	memorandum of understanding
MPO	metropolitan planning organization
NCHRP	National Cooperative Highway Research Program
NEMA	National Electrical Manufacturers Association
NETSIM	computer model used to evaluate benefits from freeway management systems
NETSUM	computer model used to evaluate benefits from freeway management systems
NHI	National Highway Institute
NHS	National Highway System
NHTSA	U.S. Department of Transportation National Highway Traffic Safety Administration
NII	National Information Infrastructure
NTCIP	National Transportation Communications for ITS Protocol
NTI	National Transit Institute at Rutgers University
O&M	operations and maintenance
PASSER	real-time signal progression model
PCD	personalized communications device
PCS	personalized communications service
PD	police department
PDA	personal digital assistant
PL	Federal transportation planning fund (metropolitan planning funds)
PPP	public-private partnerships
PTI	Public Technologies, Inc.
R&D	research and development

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RF	radio frequency
RFI	request for information
RFP	request for participation
RFP	request for proposals
RFPI	request for partnership information
RFPP	request for proposed partners
RFS	regional fare system
RMTIC	regional multimodal traveler information center
ROW	right of way
RTP	regional transportation plan
SAE	Society of Automotive Engineers
SCAT	Sydney Coordinated Adaptive Traffic System
SDO	standards development organizations
SIP	state implementation plan
SOS	scope of service
SOV	single-occupant vehicle
SPR	statewide planning and research
S.R.	State Highway Route
STIP	state transportation improvement program
STP	Surface Transportation Program
STP-MM	Surface Transportation Program – Metropolitan Mobility
STP-XA	Surface Transportation Program – Any Area
STP-XU	Surface Transportation Program – Areas greater than 200,000
T-1	hard wire communications line
T-3	hard wire communications line
TCC	transit control center
TCC	traffic signal control center
TCIP	Transit Communications ITS Protocol
TCM	transportation control measure
T-DAD	Transportation Data Acquisition Display, a planning tool
TDM	transportation demand management
TEA-21	Transportation Efficiency Act for the 21 <sup>st</sup> Century
Tech & Ops	Technology and Operations

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TIC	traveler (traffic, or transportation) information center
TIP	transportation improvement program
TIS	traveler information system
TMA	transportation management association
TMC	traffic management center
TMDD	Traffic Management Data Dictionary
TMS	transportation management strategies (include TDM, TSM, and ITS)
TMS	transit management system
TOC	traffic operations center
TP	transportation plan (also known as the regional transportation plan)
TRANST	computer model used to evaluate benefits from freeway management systems
TRB	Transportation Research Board
TSC	traffic systems center
TSCS	traffic signal control system
TSM	transportation system management
TSP	transportation system plan
Type 170	California/New York Type 170 traffic signal controller standards
UPWP	Unified Planning Work Program
U.S. DOT	United States Department of Transportation
UTCS	urban traffic control system
UZA	urbanized area
VMS	variable message sign
VMT	vehicle-miles of travel (or vehicle-miles traveled)
Volpe Center	U.S. Department of Transportation John A. Volpe National Transportation Systems Center
VTDS	video traffic detection system
WAN	wide area network
WIM	weigh-in-motion
WWW	world wide web

### **Dallas – Fort Worth Metropolitan Area**

ATMTF	Advanced Transportation Management Task Force
CV	compressed video

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DART	Dallas Area Rapid Transit
DATMC	Dallas Area Traffic Management Center
DBMS	database management system
DFW	Dallas-Fort Worth International Airport
DRMC	Dallas Regional Mobility Coalition
EMRS	emergency response management system
EMS	emergency management system
FWTA	Fort Worth Transportation Authority (also known as the “T”)
HAT	highway advisory telephone
HELP	Heavy Vehicle Electronic License Plate Program
IDR	incident detection and response
IRS	DART’s Integrated Radio System
ITMS	integrated transportation management system
ITP	incident timing plan
LCN	local communication network
MAP	mobility assistance patrols (also called courtesy patrols)
Mobility 2010	1993 Regional Transportation Plan for Dallas-Fort Worth area
Mobility 2020	1996 Regional Transportation Plan for Dallas-Fort Worth area
Mobility 2025	1999 Regional Transportation Plan for Dallas-Fort Worth area
MTC	Mobility Technical Committee
NAFTA	1993 North American Free Trade Agreement
NCTCOG	North Central Texas Council of Governments
NTTA	North Texas Tollway Authority
OPAC	optimization policies for adaptive control
Railtran	commuter rail operations
RCM	Regional Corridor Management Subcommittee, a RTC subcommittee
RTC	Regional Transportation Council, the governing body of the MPO
STTC	Surface Transportation Technical Committee, a RTC committee
TBC	time-based controller
TIPS	trip itinerary planning system
TMP	Texas DOT- Fort Worth District’s 1985 Traffic Management Plan
TMT	Traffic Management Team
TNRCC	Texas Natural Resources Conservation Commission, the State’s EPA

TransVISION	Texas DOT-Fort Worth District's Traffic Management Center (opening 1999)
TSU	Texas Southern University
TTC	Texas Transportation Commission
TTI	Texas Transportation Institute (based at Texas A&M University)
TxDOT	Texas Department of Transportation
UT-Arlington	University of Texas at Arlington
VIP	video imaging processing