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MAINSTREAMING ITS WITHIN THE TRANSPORTATION PLANNING PROCESS

REVIEW OF THE MIAMI, FLORIDA METROPOLITAN AREA

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David Jackson
Dana Larkin
Elizabeth Deysher
Allan DeBlasio

Volpe National Transportation Systems Center
Economic Analysis Division

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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 Metropolitan Planning and Programs. Mr. David W. Jackson of the Volpe Center and Ms. Dana Larkin of EG&G Services are the principal authors. Ms. Elizabeth Deysher of the Volpe Center also provided analytical support. 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 intelligent transportation systems (ITS) solutions for transportation problems but are challenged by the fact that planning for ITS solutions has not occurred wholly within the metropolitan transportation planning process. In addition, operations planning currently receive little or no consideration in the planning process. The purpose of this research is to better understand how consideration of ITS products and services as tools to manage travel and congestion is being "mainstreamed" or integrated into the metropolitan transportation planning process.

From February through October 1998, staff from the U.S. Department of Transportation's (U.S. DOT) John A. Volpe National Transportation Systems Center (Volpe Center) conducted this research for the Federal Highway Administration's Office of Metropolitan Planning and Programs. This document details efforts taken by the Miami-Dade Metropolitan Planning Organization (MPO), the Florida Department of Transportation, and other transportation agencies in the Miami-Dade County 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 Miami Metropolitan Area was reviewed because the planned ITS activities are being deployed over multiple metropolitan areas, encompassing the jurisdictions of more than one MPO. Miami-Dade County is the influential center of the three-county Southeast Florida region, which also includes Palm Beach and Broward Counties. Key to this effort is the high level of involvement in ITS planning and agency coordination for ITS activities in both Miami-Dade County and the larger Southeast Florida region by the staff of the Miami-Dade MPO.

Planning for ITS in the Southeast Florida region was initiated by the Florida DOT in the late 1980's through the development of the freeway management system in north Miami-Dade County. Most early ITS planning was performed internally within the Florida DOT. It was not until the mid-1990's that the ITS planning process was expanded to involve a number of other key transportation providers and local jurisdictions. The freeway management system project for the Golden Glades Interchange in north Miami-Dade County was subsequently expanded to a full tri-county system known as the **Southeast Florida Intelligent Corridor Systems**. Transportation officials are currently concentrating on planning for coordinated and integrated ITS deployments and designing these systems. The Intelligent Corridor Systems program continues to serve as an umbrella program that links all ITS projects in the region to provide real-time travel information and other services to the public, including emergency assistance.

During the course of the Miami site visit, 17 transportation professionals from ten transportation and related agencies throughout the Miami-Dade County 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.

The **Metropolitan Planning Organization for the Miami Urbanized Area**, the formal name of the Miami-Dade MPO, is the organization responsible for the coordination of transportation planning in Miami-Dade County. The Miami-Dade MPO, created in March 1977, is governed by the 18-member MPO Governing Board. The Board reviews and approves the multitude of products of the planning process, including the long-range plan and the TIP.

The **Florida Department of Transportation** maintains and operates all of the freeways throughout the State of Florida. The **Central Traffic Engineering Office**, located at Florida DOT Headquarters in Tallahassee, coordinates the statewide ITS program. Central Traffic Engineering Office staff participate in an ITS technology exchange with the Florida DOT District Offices and other public agencies. Decentralization within the Florida DOT occurred in the early 1990's, giving the District Offices greater roles in both planning and deploying ITS and other transportation functions. The **Florida DOT District Six** is responsible for construction, operations, and maintenance of the major roadways in Miami-Dade and Monroe Counties. The ITS Program Manager for Districts Four (Palm Beach and Broward Counties) and Six is located at the District Six office.

The **Florida Turnpike District Office**, also known as **Florida DOT's District Eight**, is responsible for all planning, construction, operations, and maintenance along the 321-mile Florida Turnpike that extends through 13 counties. The Turnpike District's ITS efforts are coordinated through its ITS Director. The major ITS focus of the Turnpike District at this time is the installation of its **SunPass** electronic toll collection system and the statewide fiber optic backbone, known as the **Florida Fiber Communications Network**.

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

The **Miami-Dade County's Public Works Department** handles the transportation system within Miami-Dade County. Work involving ITS is primarily concentrated in the **Traffic Signals and Signs Division** and the **Highway Division**. The Traffic Signals and Signs Division maintains the Miami-Dade County Traffic Control Center, from which all traffic signals in the county are operated. A new traffic control center, along with upgraded signal controllers, is currently in design.

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

In 1960, the Dade County Commission passed an ordinance to create the Metropolitan Transit Authority. Over the years, this Authority has evolved into the **Miami-Dade Transit Agency**. The Miami-Dade Transit Agency provides transit service to all of Miami-Dade County and the southernmost part of Broward County. Transit operations in Miami-Dade County include Metrobus service, paratransit service, the Metromover automated elevated guideway, and the Metrorail heavy rail that operates on a 21-mile elevated rail line. The four-mode transit system covers more than 500 square miles.

The **Miami-Dade Expressway Authority** was created as an independent special district by local ordinance and state statute in December 1994. The Expressway Authority is charged with acquiring, building, improving, and maintaining certain toll roads, multimodal corridors, and intermodal facilities in Miami-Dade County. The Expressway Authority currently owns 32 miles of unconnected roadway on five facilities, four of which have tolls. The Expressway

Authority utilizes the region's roving service patrol and is also installing electronic toll collection systems, compatible with the Florida Turnpike's SunPass systems.

Beyond the Florida DOT and specified departments within the Miami-Dade County Government, there are other agencies that were cited as being actively involved in the ITS program or that have significant influence and impact on the region's transportation policies, programs, and projects. Other agencies cited included state and local environmental agencies, three universities, a few prominent municipalities, the County's aviation and ports departments, and three other key transit systems operating in the Southeast Florida region. The **Regional Transit Organization**, formed in 1997, enables the area's transit agencies and other transportation service providers to coordinate on regional issues unique to transit.

REGIONAL STRATEGIES USED IN THE MIAMI 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.

Transportation officials in the Miami Metropolitan Area focus on gaining the endorsement of agency administrators while educating the politicians at a very basic level to maintain some interest. In Miami, educating the general public is also a viable way to inform elected officials. The most common method used to **educate elected officials** about ITS has been through presentations made by staff to the MPO Governing Board. Since projects are often selected based on the needs of the community and not on technical input, **data and information** have not always sold ITS to elected officials. Studies commissioned to seek transportation solutions have also been effective in educating transportation decision-makers. In 1996, a study on the benefits of traveler information kiosks was instrumental in getting the Interactive Transportation Kiosk Pilot Program funded.

Although **scanning reviews** were not widely used by Miami-Dade County agencies, several officials stated that scanning reviews targeted to agency administrators, as well as politicians, had been successful for them. Site visits to Cincinnati and Washington, D.C greatly facilitated Florida DOT administration support for the development of a regional traveler information system in southeast Florida. Tollway activities have been greatly enhanced by educational travels to view electronic toll collection operations of the Texas Turnpike Authority and the Louisiana DOT, and incident management operations in Portland, Oregon. In addition, the MPO Director has used the services of the Public Technologies, Inc. to have ITS experts from four active metropolitan areas visit Miami and discuss ITS deployments in their respective areas.

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. In 1995, the MPO Director learned about ITS technologies and the benefits from systems integration while on the Public Technologies, Inc.'s Urban Consortium Transportation Task Force. The MPO Director then presented the benefits to expect from ITS to the Transportation Planning Council, the management body of the MPO, and other Miami-Dade MPO committees. Afterward, the Council decided to create an ITS committee, which has helped foster a countywide perspective of ITS to transportation operators and relevant agencies.

Gaining **citizens' support** for ITS products and services is an alternative way to gain elected officials' support. This strategy is being developed and used extensively in the Miami Metropolitan Area where there are no at-large elected offices and elected officials represent individual jurisdictions within the single county. A key County Commissioner even advised the Florida DOT and MPO staffs to increase the public's knowledge regarding ITS to aid in influencing the elected officials. Therefore, the *Dade County ITS Plan* includes a chapter on educating the public. The MPO's ITS Committee members felt that even more ITS outreach and education efforts needed to be done than was outlined in the *Dade County ITS Plan*. With state funding, the ITS Committee hired a public education consultant. The consultant is now developing a broad-based public information campaign. The goal is to "reach people who will reach people," such as key members of homeowners associations or Chambers of Commerce.

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. Transportation officials in the Miami Metropolitan Area felt that it is particularly important to include ITS concepts in the **regional transportation plan** because it provides an opportunity to show elected officials that ITS projects are part of a planned and integrated program. MPO staff stated that it was useful to be able to refer to the fact that ITS is in the regional transportation plan when justifying project ideas to operating agencies. ITS projects proposed for the most congested transportation corridors have done particularly well since the adoption of the *Metro-Dade Transportation Plan to the Year 2015*. The 1996 *Dade County ITS Plan* is also included as an addendum to the regional transportation plan. However, the MPO staff want ITS to be highlighted so they are creating a special section dedicated to ITS in the transportation plan and highlighting ITS in the Executive Summary of the *2020 Regional Transportation Plan*.

The Miami-Dade MPO staff have committed to using the **TIP** to increase awareness of ITS projects, which included designing the TIP to be a useful source of information on ITS projects for elected officials, management of transportation agencies, and representatives of other interested organizations. All ITS projects in Miami-Dade County are cross-referenced in the TIP in both an ITS section and other appropriate categories, such as highway infrastructure and transit facilities. The MPO staff include a one-page summary in the TIP that identifies the ITS projects that are listed elsewhere in various project categories within the document. Because of new selection criteria, the TIP Development Committee members examine both impacts and benefits from these projects and no longer consider projects with significant operations and maintenance costs as "second class" and discard them unless extra revenues were found.

In a number of areas, ITS products and services are included in **planning documents** such as feasibility studies, conformity determinations, congestion management plans, and major investment studies. Since 1995, ITS projects have been identified in the Miami-Dade County CMS plans as solutions in the heavily congested corridors. The ITS projects identified are also cross-referenced in the two principal ITS plans. An MPO official noted that the CMS plan has been used as a stepping stone to give compliant ITS projects more visibility, approval, and ultimately more funding.

ITS plans can be useful tools to both gain and demonstrate endorsement of ITS by transportation managers and elected officials. The transportation professionals in the Miami Metropolitan Area identified their assorted ITS plans, primarily the *Dade County ITS Plan* and the *Southeast Florida Intelligent Corridor System Plan*, as critical for setting an agenda for all the politicians to focus on and all agencies to work toward. The Florida DOT operations staff had never participated in the MPO planning process before they presented the *Intelligent Corridor System Plan* to the Miami-Dade MPO in 1993. The Miami-Dade MPO used the *Intelligent Corridor System Plan* to create the *Dade County ITS Plan*, which was adopted in 1997. The *Dade County ITS Plan* identified key players and made sure all agencies were in agreement regarding the purpose and direction of the ITS program in Miami-Dade County. The *Dade County ITS Plan* is a supplement of the *Mobility 2020 Regional Transportation Plan*. In June 1998, the *Fiber-Optic Communications Concept Plan for Dade County's Intelligent Transportation Infrastructure* was created as a direct result of discussions relating to the *Dade County ITS Plan*.

Elected officials and transportation managers sometimes use or form committees through which they act as **regional advocates for ITS**. The MPO's Transportation Planning Council created an ITS Committee which sought to increase county coordination of ITS deployments, move from the deployment of individual projects to regional projects, and expand support for ITS from local and state politicians. A Miami-Dade County Commissioner was credited with creating the Regional Transit Organization, which provides a forum for participants to learn, among other items, more about ITS. One interviewee noted that as a result of the Transit Organization's meetings, regional coordination is beginning to occur. Individually, the Miami-Dade MPO Executive Director is a strong ITS advocate and understands that future support depends on delivering projects that show ITS technologies work, as well as ensuring that key agencies, including the Florida Turnpike, are represented on the MPO's ITS Committee.

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 in areas composed of many local autonomous communities. In the Miami-Dade County Metropolitan Area, there are approximately 30 governmental jurisdictions and another ten regional or statewide agencies with some ties to transportation.

According to the interviewees, there have been few **educational efforts** that have targeted elected officials in the Miami Metropolitan Area. Transportation officials have attempted with limited success to direct some ITS education to the County Commissioners and the Mayor of the City of Miami in order to encourage them to discuss ITS among themselves. The MPO Executive Director has presented, multiple times, the benefits of ITS as tools for congestion management to the MPO Governing Board. However, due to the structure of the countywide government, the best ways to improve coordination and communication of elected officials are through the citizenry and through successful and well received ITS projects, such as the Service Patrol program.

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. Transportation officials in Miami-Dade County stated that because the MPO staff have become educated on ITS, they are best suited to educate other regional stakeholders. In Miami-Dade County, MPO staff have effectively used the regional transportation plan development process, the ITS Committee, and town meetings as methods to **educate stakeholders** on regional ITS needs. In addition, the Florida DOT staff have made presentations to a variety of organizations and have even hired a marketing consultant to conduct outreach and assist the MPO staff in their educational efforts. Finally, scanning reviews and visits from ITS experts allowed participants to learn firsthand how the technologies enable individual agencies and modes to work together to address transportation issues.

Creating an **ITS committee** is a common and effective strategy for improving communications regarding transportation needs and ITS project concepts among stakeholders. In January 1995, the Miami-Dade MPO's Transportation Planning Council passed a resolution to create the ITS Steering Committee, now called the ITS Standing Committee. To form the ITS Standing Committee, the MPO staff identified people at high levels in each organization who were familiar with ITS activities within their individual organizations and who had some decision-making authority. Interviewees stated that the interaction of Committee members has led to a breakdown of agencies' parochial interests. Members discuss which ITS technologies would be useful countywide and have become knowledgeable about the needs of other agencies. Several initiatives have been developed through the ITS Committee: a fiber optics study, an interactive kiosk study, the *Dade County ITS Plan* and *ITS Plan Update*, and an application for federal model deployment initiative funds. Some members of the ITS Committee formed the Advanced Traveler Information System (ATIS) Subcommittee to coordinate specific ITS projects that will improve traveler information across Miami-Dade, Broward, and Palm Beach Counties.

There are two **regionally focused initiatives** in the three-county Southeast Florida region that can be considered more than just a single agency's or jurisdiction's project - the Southeast Florida Intelligent Corridor System program and the ATIS project. The Intelligent Corridor System program began in the late 1990's as primarily a Florida DOT freeway endeavor, but has since been expanded to cover multiple modes and jurisdictions. Currently, the region's **ITS architecture** builds on concepts developed in the Intelligent Corridor System plans. As the operation centers and more of the independent existing and planned transportation systems are connected to the Intelligent Corridor System, area officials will have a better idea as to the

details of the system and what their information flows should look like. The second regional effort is the three-county traveler information initiative that is being undertaken through the ATIS Subcommittee of the ITS Standing Committee. Discussions regarding the information distribution networks have enhanced with the added involvement of the Miami-Dade Information Technology Department and the Florida Turnpike District.

Miami-Dade **MPO staff** understand the unique role that they play in communicating and coordinating ITS across jurisdictions and modes and took the position early on, with the support of the Florida DOT, to become the lead ITS coordinator. Transportation officials agreed that MPO staff have proven to be very effective in bringing agencies together and improving communications between agencies through the ITS Committee. MPO staff have also been credited with providing a very effective public dissemination role. The MPO staff realized early that they must understand the technologies that comprise the National ITS program in order to be effective. This has required the use of experts from other metropolitan areas, attendance at numerous ITS awareness and training sessions, and the initiation of a number of studies.

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 not to destroy installed ITS technology during reconstruction of capital infrastructure. All Florida DOT Districts have an ITS coordinator who ensures that ITS elements are considered well in advance of any project deployment and that ITS projects are included in both the Department's and MPO's planning process. The Florida DOT's internal efforts also include the development of two ITS plans, the *ITS Strategic Plan* and the *Update of the ITS Planning Guidelines*.

Collection of Data and Use of Information

Reliable data are important inputs into regional transportation project planning and into transportation planning system assessment. 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.

In the Miami Metropolitan Area, there are several driving forces behind the initiation of a formalized method of data collection, data sharing, and standardized data analysis. The regional ATIS project has resulted in major data efforts. Another critical component is the involvement with the ITS activities of the Miami-Dade Information Technology Department staff who have greatly aided in determining data needs.

A number of interviewees, planners and engineers alike, said that early ITS planning should be directed at getting appropriate projects operational and showing positive results from the ITS deployments. After each agency has conceived their data needs and collection processes, then

the area is ready to develop data sharing procedures for the agencies in the metropolitan area. Transportation officials interviewed feel that the Miami Metropolitan Area is just now ready to explore the potential benefits from **data collection**, **sharing**, and **archiving**. Data exchange is a subject being covered by the ITS Committee.

Representatives from a number of agencies noted that their current need for data is to justify ITS projects. The Florida DOT, among other agencies, include funds for data gathering and project evaluation within each project. The 1996 *Dade County ITS Plan* includes a system to track projects and measure their benefits and costs. However, there are many intangible benefits associated with these projects, which makes the total benefit from an ITS project difficult to quantify. One concern voiced by the MPO and the Florida DOT staffs are the quality and reliability of traditional transportation modeling tools when used to assess ITS projects. The Florida DOT Headquarters has already responded by developing the Florida Standard Urban Transportation Model for ITS, which is now being using to compare highway speeds with and without the ITS technologies.

There are a number of operating agencies in the metropolitan area that are already using data generated from ITS equipment in the field to monitor and improve their daily **operations**. Currently, there are few opportunities for the public transportation agencies to share real-time data and information, except through the traditional verbal phone communications. The ATIS project will require the non-exclusive collection and use of data by the cooperating agencies. Each agency that could contribute data to the ATIS project was contacted to determine the type of data (planning and operations) they could supply.

A number of agencies are attempting to create **compatible databases**. The ITS Committee and the ATIS Subcommittee are discussing common databases. There are also discussions for a single database or compatible databases among the public transportation providers, among the state and county traffic control centers, and between the Florida Turnpike and Miami-Dade Expressway Authority. The greater the compatibility among the databases, the easier it will be for outside agencies to use operations data, for both operations and planning purposes.

MAINSTREAMING AND DEPLOYING ITS: WHAT WORKS IN MIAMI

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

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

ITS efforts in the metropolitan area started with a single agency, the Florida DOT District Six, and a grand project design with the Southeast Florida Intelligent Corridor System. However, in order to gain approval within the transportation planning process, many of the deployments were

scaled down. A coordinated ITS planning process has emerged and new players have become involved. The inclusion of these new public entities has greatly assisted in the expansion of ITS applications in the region beyond just freeway and incident management programs to traveler information, electronic toll collection, and transit fleet management.

Transportation officials in Miami-Dade County learned that ITS deployments do not naturally lend themselves to cooperative efforts unless an agency leads the coordination and increases the awareness of ITS among key decision makers and the general citizenry. The Miami-Dade MPO, with the support of the Florida DOT, assumed the role of the local lead and, in 1995, created the ITS Steering Committee. The ITS Committee, comprised of diverse representation, is now working to plan for proper levels of deployment by state, county, and regional agencies. It was generally recognized that ITS applications must include the highways, local roads, and transit in order to have the full benefits of the systems realized. The ITS Committee is currently expanding its vision to develop the tri-county ATIS Program.

Key transportation officials realize that more work is necessary before ITS can be considered mainstreamed in the Miami-Dade County transportation planning process. The MPO staff have found that ITS deployments with multiple uses, such as the fiber optics communication network, are much easier for politicians and agency administrators to support. Educating the general citizenry is considered an especially effective way to influence policy makers in Miami-Dade County due to the existing political structure. Concurrently, top administrators from the Florida DOT and the MPO continue to target their educational efforts to the area's policy makers.

STRATEGIES USED TO MAINSTREAM ITS

Interviewees in the Miami Metropolitan Area recommend five 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. Develop an ITS plan (or ITS plans)
3. Educate elected officials and agency administrators in ITS
4. Make use of ITS advocates in the region to promote ITS applications
5. Use a peer-to-peer network of experts outside of the metropolitan area to gain knowledge regarding ITS technologies and applications.

Transportation officials overwhelmingly cited the formation of the MPO's ITS Committee as the most effective strategy and being key to mainstreaming ITS within the transportation planning process in the metropolitan area. In contrast to the other metropolitan areas studied, the strategy of educating the general public to mainstream ITS was considered an effective strategy in the Miami Metropolitan Area, primarily because of the lack of countywide representation by elected officials. Many interviewees also espoused that strong ITS advocates greatly aid in mainstreaming ITS and credited the MPO Director with being a significant catalyst in these efforts. Finally, the MPO Director and others credited their interest and knowledge for the use of

ITS technologies in the Southeast Florida region to outside experts that either visited the metropolitan area or were contacts through an assortment of professional groups.

ROLE OF THE MPO IN THE ITS EFFORTS IN MIAMI-DADE COUNTY

Transportation officials in Miami-Dade County saw the MPO's primary role in ITS activities as the centralized lead coordinating agency for the metropolitan area. The Miami-Dade MPO staff were applauded for selecting the right mix of participants in the region's ITS efforts, for educating both itself and other agencies on ITS, and for the thorough consideration of ITS applications for Miami-Dade County and in the three-county region. Many interviewees cited the importance of the MPO staff as ITS educator and marketer in mainstreaming ITS efforts.

The Florida DOT officials were among the many that noted the value of the MPO staff to think regionally, yet understand the parochial concerns of the multitude of agencies, elected officials, and citizens. The MPO staff were instrumental in creating a regional perspective by the area's transportation agencies through the formation of the ITS Committee within the MPO structure.

APPLICABILITY TO OTHER METROPOLITAN AREAS

Of the 341 MPOs, almost half are one-county MPOs like the Miami-Dade MPO. However, the MPO jurisdiction of Miami-Dade County is unique in many regards. There are natural barriers to continued urban expansion. There is not a strong political influence for regional initiatives. In addition, the Florida DOT limits new highway construction and expansion. However, the actions that the transportation officials in this area have taken to mainstream ITS into the metropolitan planning process can be applied to other areas with their own set of unique characteristics.

Based on the experiences of the Miami-Dade County agencies, it is imperative to include a wide variety of key transportation and other public agencies in planning for ITS products and services. With the inclusion of communications experts from the Miami-Dade County Information Technology Department, discussions about ITS applications are now being tied to other government functions, including schools and courts, greatly aiding in gaining the attention of the politicians. It is beneficial to expand the scope of ITS projects beyond transportation.

In the absence of countywide political representation, Miami-Dade County representatives have found that the general public can be instrumental in influencing transportation decision makers to support ITS. In addition, the Miami experience has shown that officials should use as many local and national advocates as possible to increase the knowledge of and support for ITS applications. Political support can also be increased through the use of various planning documents to summarize and highlight impacts of each project on a specific political district.

The two principal institutions that are leading the ITS effort in the region, the Florida DOT District Six and the Miami-Dade MPO, clearly demonstrated that cooperation is necessary to get ITS mainstreamed. The District Six staff is still leading the deployment efforts throughout the three-county region, but have deferred to the Miami-Dade MPO staff to coordinate the ITS planning efforts and gain local support, including from agencies outside of Miami-Dade County.

MAINSTREAMING ITS WITHIN THE TRANSPORTATION PLANNING PROCESS: REVIEW OF THE MIAMI 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 Miami-Dade Metropolitan Planning Organization (MPO), the Florida Department of Transportation, and other transportation agencies in the Miami Metropolitan Area to mainstream ITS.

1.1 GOALS OF THE STUDY

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

Initially, the research focused on answering six questions:

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

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

Metropolitan Area	Metropolitan Planning Organization	Jurisdiction	Composition
Albany, N.Y.	Capital District Transportation Committee (CDTC)	8 cities, 70 villages 4 counties	Regional Planning Commission
Chicago, Ill.	Chicago Area Transportation Study (CATS)	236 municipalities 6 counties	Policy and Research Organization
Dallas-Fort Worth, Tex.	North Central Texas Council of Governments (NCTCOG)	75 municipalities 9 counties	Council of Governments
Denver, Col.	Denver Regional Council of Governments (DRCOG)	41 municipalities 8 counties	Council of Governments
Los Angeles, Cal.	Southern California Association of Governments (SCAG)	180 municipalities 6 counties	Association of Governments
Miami, Fla.	Miami-Dade MPO (Miami Urbanized Area MPO)	30 municipalities 1 county	County Agency
Milwaukee, Wis.	Southeastern Wisconsin Regional Planning Commission (SEWRPC)	147 villages and cities, 7 counties	Regional Planning Commission
Seattle, Wash.	Puget Sound Regional Council (PSRC)	64 municipalities 4 counties	Council of Governments
Washington, D.C.	National Capital Region Transportation Planning Board	9 cities, 7 counties 2 states, 1 district	Council of Governments
Winston-Salem, N.C.	Winston-Salem Transportation Advisory Committee (elected)	20 municipalities 1 county	City Agency

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

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

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

Based on the preliminary phone interviews, the Chicago Area Transportation Study (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. MPO officials' intentions to obtain and use operations data from the California DOT for planning are also unique.

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

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

There are a number of reports produced as a result of this research that provide insight into how ITS are incorporated into the metropolitan planning process. This document details efforts taken by the transportation agencies in the Miami Metropolitan Area to mainstream ITS. In addition, there are companion reports, similar to this Miami-Dade County study, that detail the mainstreaming strategies used in the Chicago, Dallas-Fort Worth, and Los Angeles Metropolitan Areas. Finally, a cumulative summary report (*Mainstreaming ITS within the Transportation Planning Process: A Summary of Strategies in Ten Metropolitan Areas*) highlights the findings from ten study areas initially contacted about their mainstreaming efforts.

1.3 FINDINGS

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

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

25. Determining the most efficient and effective ways to apply the data
26. Educating elected officials and top and mid-management of area transportation providers
27. Educating other stakeholders (public safety officials, emergency response services, trucking industry)
28. Educating MPO staff
29. Educating general public
30. Conducting field trips for upper management
31. Using ITS advocates in the region (at the MPO and other agencies)
32. Developing a major program of regional projects
33. Utilizing the National ITS Architecture or developing a Regional Architecture
34. Using peer-to-peer networking
35. Involving academia.

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

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

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

2. OVERVIEW OF THE MIAMI METROPOLITAN AREA

The Miami Metropolitan Area was reviewed because the planned intelligent transportation system (ITS) activities are being deployed over multiple metropolitan areas, encompassing the jurisdictions of more than one metropolitan planning organization (MPO). Miami-Dade County is the influential center of the three-county Southeast Florida region, which also includes Palm Beach and Broward Counties. Key to this effort is the high level of involvement in ITS planning and agency coordination for ITS activities in both Miami-Dade County and the larger Southeast Florida region by the staff of the Miami-Dade Metropolitan Planning Organization.

This chapter includes selected demographic and geographic information about the Miami 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 Miami 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 MIAMI METROPOLITAN AREA

The Miami Metropolitan Area encompasses almost 2,000 square miles and all of Miami-Dade County, including its 30 municipalities. The population of this area is almost 2.1 million, making it the 16th most populous metropolitan area in the United States. The area is bounded by Biscayne Bay and the Atlantic Ocean to the east, by the Everglades to the west and southwest, by the Florida Keys to the south, and by Broward County to the north.

Dade County was founded in 1836, but was slow to expand primarily because of its marshy topography and humid climate. A milestone in the development of Dade County was the southern extension of the railroad to the Miami River in 1896. The Miami area continued to grow at a moderate pace until 1959, when mass emigration from Cuba to South Florida occurred in the wake of the political change in Cuba. Foreign immigration continues to account for two-thirds of all population growth.

Until the mid-1970's, most of the employment in Miami-Dade County was concentrated in the central business district in downtown Miami. Since then, the development of suburban activity centers in Miami-Dade County has dispersed employment throughout the area, with a corresponding development of low-density residential development. Major suburban employment centers include the Miami International Airport and its vicinity, downtown Coral Gables, and the Dadeland/Datrans area in south Miami-Dade County. Principal cities include Miami, Hialeah, Miami Beach, North Miami, and Coral Gables.

Sprawling, low-density suburbanization in the Miami Metropolitan Area has changed travel patterns from central business district-oriented travel to suburb-to-suburb commutes that have encouraged the increased use of private automobiles and exasperated the growth in congestion. According to Miami-Dade Transit Agency documents, more than 95% of urban travel in the area is made using automobiles.

Since its formation in 1957, Miami-Dade County has had a two-tiered system of government with the County government functioning as a municipal authority for all unincorporated areas within Miami-Dade County and acting as a regional body for the 30 incorporated municipalities. In the mid-1990s, the government composition of the metropolitan area was modified. An executive mayor and the Miami-Dade Board of County Commissioners, along with the county manager, now govern Miami-Dade County. Each commissioner represents one of 13 districts. As a result of a 1997 election and in recognition of the revisions to and regional responsibilities of the County government, the name of the County was officially changed from "Dade" to "Miami-Dade."

2.2 THE MIAMI-DADE COUNTY TRANSPORTATION SYSTEM TODAY

The Miami-Dade County's transportation system includes the surface roadway network, a wide variety of transit services, and an airport and seaport of international significance. No discussion about the area's transportation system can avoid the intermodal and international activities. In total, there are 11 intermodal facilities located within the County: six airports, two seaports, and three major rail yards.

Miami's strategic location and multilingual work force have positioned the metropolitan area to be the "hub of the Americas." As such, the area serves as a major gateway between the United States and the Caribbean, Central America, and South America, and other international destinations for both passengers and cargo. Aviation and seaport operations account for over one-third of the one million jobs in Miami-Dade County. Freight movement and passenger travel is concentrated in and around the Miami International Airport and the Port of Miami. The Miami International Airport has the second highest international passenger traffic in the U.S. and is first in the world for international cargo trade. The Port of Miami is the world's busiest cruise port, providing service to more than three million passengers annually, and with ten million tons of cargo moved annually, the nation's eighth busiest cargo port. Both the airport and the seaport plan major expansions to accommodate additional passengers and cargo.

There are over 5,600 miles of roadway contained in the metropolitan area's highway system. Of the total roadway miles, only 2% (113 miles) are classified as interstate, freeway, or expressway limited access facilities. However, the limited access roadways serve almost one-third of the vehicle-miles of travel in the metropolitan area. Major north-south transportation corridors that service Miami-Dade County are I-95, I-75, the Florida Turnpike, the Palmetto Expressway (State Route 826), and the Don Shula Expressway (SR 874). Major east-west corridors include the East-West Expressway (SR 836 and I-395), the Airport Expressway (SR 112 and I-195), the Tamiami Trail (U.S. 41), and the Gratigny Parkway (SR 924). The Dixie Highway (U.S 1)

provides a major arterial extension from the end of I-95 through Coral Gables, South Miami and Kendall, south to Homestead. In 1991, the Florida DOT adopted a policy that prohibits the expansion of six and eight-lane freeways unless the additional lanes are auxiliary lanes or exclusive lanes for transit or other high-occupancy vehicles.

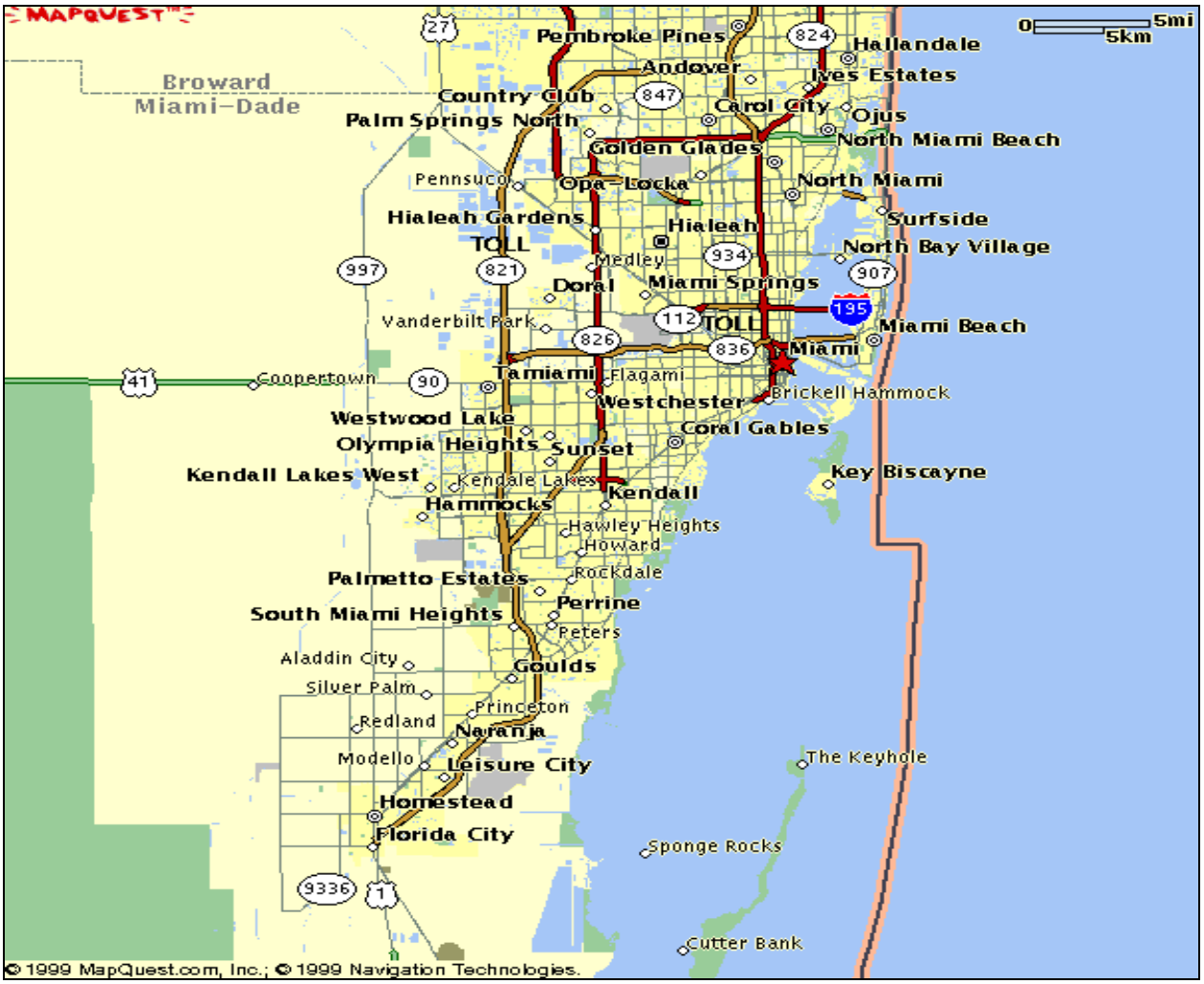

Figure 2. Map of Miami-Dade County (Urbanized Portion of the County)

Public transportation in Miami-Dade County is provided by the Miami-Dade Transit Agency and the South Florida Tri-County Commuter Rail Authority (Tri-Rail). The Tri-Rail Authority provides a 67-mile commuter rail service to Miami-Dade, Broward, and Palm Beach Counties. The Miami-Dade Transit Agency offers a variety of public transit modal options. The Metrorail is the Agency's 21-mile, 21-station heavy rail system. The Metromover is a 4.4-mile elevated automated guideway system serving downtown Miami. The Agency also provides Metrobus, which encompasses an extensive system that provides local and express bus routes.

2.3 PUBLIC AGENCIES AND OTHER SIGNIFICANT ORGANIZATIONS

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

2.3.1 Transportation and Other Agencies Contacted

The **Metropolitan Planning Organization for the Miami Urbanized Area**, the formal name of the Miami-Dade MPO, is the organization responsible for the coordination of transportation planning in Miami-Dade County. The Miami-Dade MPO was created in March 1977 through a Florida statute and established by an Interlocal Agreement between the Miami-Dade County and the Florida DOT. The 18-member MPO Governing Board is responsible for reviewing and approving the multitude of products of the planning process, including the long-range plan and the transportation improvement program (TIP).

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

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

Along with the Florida DOT, various departments within the Miami-Dade County government are the principal agencies involved in the transportation network in Miami-Dade County. **Miami-Dade County** is a constitutional charter county with all powers for local self-government, including specified authority over surface, air, and water transportation granted to

the county. It is a unique government structure in which the cities own and maintain non-arterial and local roads, but have no other authority over the transportation network. The Miami-Dade MPO is the primary transportation planning agency and the Miami-Dade County Public Works Department, Information Technologies Department, and Miami-Dade Transit Agency are the primary deploying and operating agencies.

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

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

In 1960, the Dade County Commission passed an ordinance to create the Metropolitan Transit Authority. Over the years, this Authority has evolved into the **Miami-Dade Transit Agency**. The Miami-Dade Transit Agency, an agency within the Miami-Dade County government, provides transit service to all of Miami-Dade County and the southernmost part of Broward County. By county charter, the Miami-Dade Transit Agency is entirely responsible for transit operations in Miami-Dade County, which involve bus service, paratransit service, the Metromover automated elevated guideway, and the Metrorail heavy rail that operates on a 21-mile elevated rail line. The four-mode transit system covers more than 500 square miles. Its Metrobus service uses 600 buses operating on over 60 routes to provide service to 200,000 passengers daily. The other modes account for almost 100,000 more passengers daily.

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

2.3.2 Other Transportation Agencies and Groups

In the Miami area, there are over 40 jurisdictions, agencies, and organizations that have some governing authority over or other responsibilities with the transportation network. However, many of these agencies have little involvement or impact on the ITS efforts in the Miami Metropolitan Area. Beyond the Florida DOT and specified departments within the Miami-Dade County Government, there are other agencies that were cited as being actively involved in the ITS program or that have significant influence and impact on the region's transportation policies, programs, and projects. While representatives from the majority of key agencies were interviewed for this study, not all of the public agencies with involvement into the planning, deployment, or operations of the area's transportation network were contacted. Those not contacted for input into this study are listed in this section.

Officials from the transportation agencies noted that a number of transportation projects required the review and approval of state and local environmental agencies. The two agencies noted were the **Florida Department of Environmental Protection** and the **Miami-Dade County Department of Environmental Resources Management.** Three universities were cited as important to the development of the ITS program in Southeast Florida: (1) the **Florida International University Lehman Center for Transportation Research**, (2) the **University of South Florida - Center for Urban Transportation Research**, and, (3) the **University of Miami**.

Other key transit systems in the Southeast Florida region included the **South Florida Tri-County Commuter Rail Authority** (Tri-Rail), the **Broward County Mass Transit Division**, and the **Palm Beach County Transit**. The **Regional Transit Organization**, formed in 1997, enables these agencies, along with the Miami-Dade Transit Agency and other transportation service providers to coordinate on regional issues unique to transit. The Regional Transit Organization members are currently considering a regional marketing campaign and a regional consumer information center.

Additional county agencies included the **Broward County MPO** and **Palm Beach County MPO** and other agencies within these counties. The Miami-Dade County **Aviation Department**, Miami-Dade County **Ports Department**, and the **Bureau of Tourism** were also cited as agencies that should be involved with the MPO-led ITS Standing Committee. Both the seaport and the airport operate solely on funds derived from rental charges, assorted fees, and other internal revenues. No local tax dollars are used for operations or improvements.

Because the Miami-Dade County government has the majority of responsibilities for the transportation system, the municipalities' principal transportation responsibility is through community planning. The most prominent municipalities in Miami-Dade County include the **City of Miami**, the **City of Hialeah**, the **City of Miami Beach**, and the **City of Coral Gables**. The municipalities are represented on the ITS Standing Committee by the **Miami-Dade League of Cities.**

2.4 THE MPO ORGANIZATION

The **Miami-Dade Metropolitan Planning Organization** is the designated agency to coordinate federal, state, and local transportation solutions for the 30 municipalities in Miami-Dade County. The MPO is the authority on all local transportation planning matters and ensures that all entities engaging in transportation related activities conform to federal laws. The MPO approves the development and deployment of highways, public transportation services, and other transportation facilities and services. The Florida DOT utilizes the MPO's long-range transportation plan as the guide for implementing state transportation systems within Miami-Dade County. As part of its responsibilities, the MPO ensures that all federally funded transportation programs occurring within Miami-Dade County are consistent with all MPO approved plans, including the long-range plan, the TIP, the congestion management system, any major investment study, and other legally-mandated transportation planning documents.

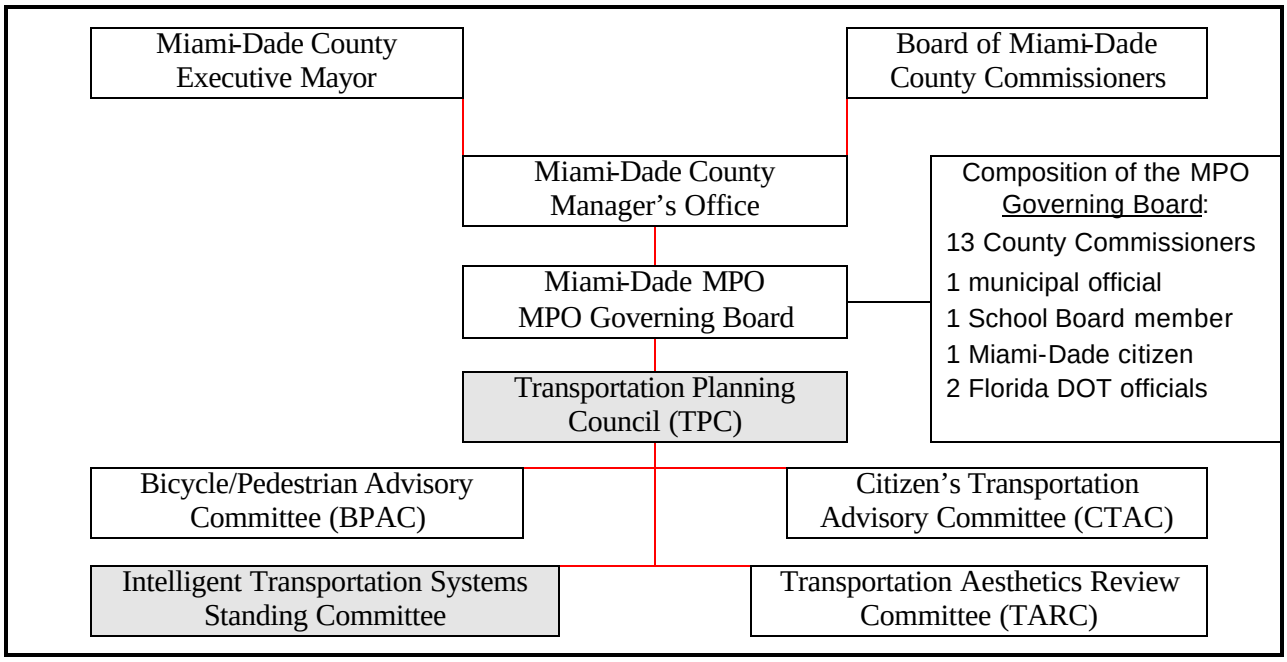

Figure 3. Miami-Dade Metropolitan Planning Organization Organizational Structure

The Miami-Dade MPO operates under a Management Services Agreement with Miami-Dade County and is organized under the County Manager's Office. Figure 3 displays the MPO structure. The MPO's Governing Board comprises 18 members, including all 13 Miami-Dade County Commissioners, a School Board member, a municipal mayor, a citizen appointed by the Governor, and two non-voting representatives from the Florida DOT also appointed by the Governor. Under the MPO Governing Board is the Transportation Planning Council, made up of Directors of all the local agencies involved in transportation or planning, along with representatives from state transportation and environmental agencies and the public school system. Current MPO committees include the Citizen Transportation Advisory Committee, the Transportation Aesthetics Review Committee, the Technical Bicycle and Pedestrian Advisory

Committee, and the ITS Standing Committee. There are currently 16 full-time MPO staff members that coordinate the activities of the MPO. The County Manager appoints the Director of the MPO Secretariat. Only the Transportation Planning Council and the ITS Standing Committee deal directly with ITS-related issues.

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

2.5 ITS ACTIVITY IN MIAMI-DADE COUNTY

From a transportation perspective, Miami-Dade County is recognized as the third most congested metropolitan area in the United States *(Texas Transportation Institute, 1999)*. The combination of the increase in the overall population and a western and southern shift in growth patterns has placed a greater strain on the existing facilities and caused demands for new facilities in the growth areas. Traffic projections for the region indicate that by the year 2010, intercounty trips will double and the number of facilities operating at or beyond capacity will increase significantly. Add to this the Florida DOT's implementation of the 1991 Intrastate Highway System Policies and Priorities that limits the amount of new lane construction that can be added on the state's highway system. Given these congestion and policy factors and air quality concerns, there was a need by transportation officials in the metropolitan area to find additional solutions to improve traffic flows beyond the "conventional" types of capacity improvements. The need to reduce congestion has given rise to the application of ITS in Miami-Dade County and Southeast Florida.

2.5.1 ITS and Related Plans

Planning for ITS in the Southeast Florida region was initiated by the Florida DOT in the late 1980's through the planning of the freeway management systems developed in north Miami-Dade County. Much of the early ITS planning was performed internally within the Florida DOT. It was not until the mid-1990's that the ITS planning process was expanded to involve a number of other key transportation providers and local jurisdictions.

The **Southeast Florida Intelligent Corridor System Plan** was released in late 1994. The Florida DOT staff created the plan to guide ITS planning and deployment along the state and local roadway network throughout the three-county Southeast Florida region, especially the areas in and around I-95 and the Florida Turnpike. The *Corridor Plan* presented information on how the program's ITS components would be deployed, administered, operated, and maintained. The *Corridor Plan* emphasized technologies for integrated travel, traffic, public transportation, and emergency management. The *Corridor Plan* described four objectives:

1. Provide complete and accurate real-time information concerning travel conditions and transportation providers
2. Utilize intelligent control systems for the reduction of recurrent and non-recurrent congestion
3. Facilitate access to regional transportation
4. Facilitate multimodal transportation.

The Florida DOT Central Office in Tallahassee has also worked with its district offices to develop first, the **Florida ITS Conceptual Plan**, and second, the **Florida DOT ITS Strategic Plan** for the deployment of ITS throughout Florida. The former document, completed in late 1994, defined the short and long-range plans for development and implementation of a statewide ITS program for the Florida DOT. The *Conceptual Plan* addressed the operational needs over the next 20 years for selected ITS elements to be deployed as both district and statewide programs. The latter document, currently being completed, has built on the initial concepts of the earlier plan and further details the statewide and district needs, concentrating on traffic management, traveler information systems, commercial vehicle operations, and electronic toll collection. The *Strategic Plan* lays out the institutional and technical foundations necessary to sustain Florida's ITS program into the 21st Century. There has been minimal input from local agency officials on either of these statewide plans.

In an effort to tie the state-led ITS efforts to the local needs, the Miami-Dade MPO staff took the lead on developing a county ITS plan. In July 1995, the MPO contracted with the University of South Florida's Center for Urban Transportation Research and the Lehman Center for Transportation Research at the Florida International University to develop the plan. The **Dade County ITS Plan Element for the Intelligent Corridor System of Southeast Florida** was completed in July 1996. The *Dade County ITS Plan* identified immediate, short-, mid-, and long-term recommendations for ITS. The *ITS Plan* was developed to fulfill four objectives:

1. Establish a general policy planning process for ITS products and services
2. Coordinate ITS project planning, and integrate it with the area's overall regular transportation planning process
3. Provide a means for education and accountability for ITS investment to the general public
4. Seek and sustain overall support for ITS, particularly by facilitating partnerships with the private sector.

Since the completion of the *Dade County ITS Plan*, the MPO staff have initiated the development of two focused ITS studies. The first, the **Interactive Transportation Information Stations Study**, completed in December 1997, examined the feasibility and

methods to deploy information kiosks throughout the Miami-Dade County. The second, the **Fiber Optic Communications Concept Plan for Dade County's Intelligent Transportation Infrastructure**, completed in June 1998, has proven to be the cornerstone communications plan for future ITS deployments in Miami-Dade County. This plan has been responsible for initiating discussions regarding how to best deploy and link the advanced transportation systems to achieve maximum communications and operational efficiency. Development of this plan has brought together not only representatives from the Florida DOT, the Miami-Dade County transportation providers, and private communication companies, but other agencies within Miami-Dade County that either create or require communication links, such as the Information Technology Department, emergency and public safety services, the courts system, and the public schools.

2.5.2 Current ITS Projects and Operations

ITS deployment efforts in the Southeast Florida region began in the late-1980's when the Florida DOT staff developed a project to create a freeway management system for the Golden Glades Interchange in north Miami-Dade County. Initially known as "FLAMINGO" (Florida Motorist Information Network for Guidance and Operations), the project was subsequently expanded to a full tri-county freeway management system. The **Southeast Florida Intelligent Corridor Systems** was the outgrowth of the initial FLAMINGO project and includes the I-95 corridor, along with the Florida Turnpike, other regional expressways and freeways, and pertinent arterials that tie into the freeway corridors. In 1995, the Florida DOT opened an interim traffic operations center to monitor the initial project site, now known as Mini-Flamingo. While some deployments have continued after 1995, the staffs from the area's agencies realized that the greatest need was cooperative and coordinated ITS deployments that were supported by the metropolitan area's politicians and policy makers. Transportation officials are currently concentrating on planning for coordinated and integrated ITS deployments and designing these systems. The Intelligent Corridor Systems program continues to serve as an umbrella program that links all ITS projects in the region to provide real-time travel information and other services to the public, including emergency assistance.

The **Florida Fiber Communications Network** is a proposed statewide project for installing fiber optic trunk along the 2,000 miles of interstate highways, from Pensacola east to Jacksonville and south to Miami and Homestead in Miami-Dade County. Southeast Florida is the priority location for the initial network installation. The South Florida system is expected to be operational in the year 2000.

The Florida Turnpike and the Miami-Dade Expressway Authority are both developing electronic toll collection programs that will be compatible with each other. The Florida Turnpike's **SunPass** electronic toll collection system is already being deployed in the South Florida region. In addition, the Rickenbacker and Venetian causeway toll facilities, operated by the Miami-Dade County Public Works Department, are being converted from manually operated cash lanes to electronic toll collection systems known as **C-Pass** and **C-Card**.

SunPass will be followed by the Turnpike's **Advanced Traveler Information System Program**. The project includes construction of infrastructure needed to gather traffic information, to monitor highway conditions, and establish the services to provide real-time travel information to motorists. The Turnpike's control center is planned for the Pompano Beach Plaza. The Miami-Dade MPO's ITS Standing Committee is also working on plans to develop a **Southeast Florida Regional Traveler Information System** that will provide highway and local roadway congestion information and traveler alternatives such as public transportation options.

Both the Miami-Dade Transit Agency and the Tri-County Commuter Rail Authority use **automatic vehicle location** and **global positioning satellite technology** for transit management and customer information. All 610 buses used by the Miami-Dade Transit Agency are also equipped with silent alarms that alert the Transit Agency's command center of an emergency and locates the vehicle so that emergency assistance can be sent to the vehicle.

The new **Miami-Dade County Advanced Traffic Management Systems Center** is currently under design and will be operational in the year 2003. As part of this project, the current control center and the 20-year-old traffic signal system will be replaced, providing enough capacity to monitor and control all of the upgraded 2,500 traffic signals within Miami-Dade County, as well as capacity to monitor and control all future signals. Additional enhancements to the traffic signal control system will include the electronic notification of signal light outages, as well as independent turn lane activities.

The **Miami Intermodal Center** will be a focal point for air and surface transportation users in Miami-Dade County. Design is currently underway for the $2.1 billion retail, office, and transportation center that will serve as an extension of the Miami International Airport and allow arriving passengers to choose from Metrorail, Metrobus, Tri-Rail, Amtrak, rental cars, over-the-road buses, or taxis to get to their destinations. The Intermodal Center will be equipped with the latest information technology to make the travel mode choices as simple as possible for the user.

The **Interactive Transportation Kiosks Pilot Program**, sponsored by the Miami-Dade MPO, is a direct result of the Interactive Transportation Information Stations Study. The project currently underway, will use touch screen monitors that continuously display a series of messages and information about public transit, construction, ridesharing, areas of congestion, park-and-ride locations, shuttle services, tourist destination sites, weather conditions, and special events. The kiosks will be located at various major travel locations throughout Miami-Dade County, including the Port of Miami, the Miami International Airport, and the Civic Center area.

3. REGIONAL STRATEGIES FOR ITS PLANNING AND DEPLOYMENT

This chapter relates how the transportation officials and agency staff in the Miami Metropolitan Area area 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 on-going improvements to operations and planning of the transportation network.

In this chapter, each strategy will be presented under its related condition. Figure 4 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. In these cases, the objective of that strategy may undergo subtle changes to attain each condition. For example, an ITS committee may be directly responsible for increased communication and coordination among agencies, but indirectly linked to gaining the endorsement for ITS from elected officials or agency management through the increase in ITS awareness that the committee brings about.

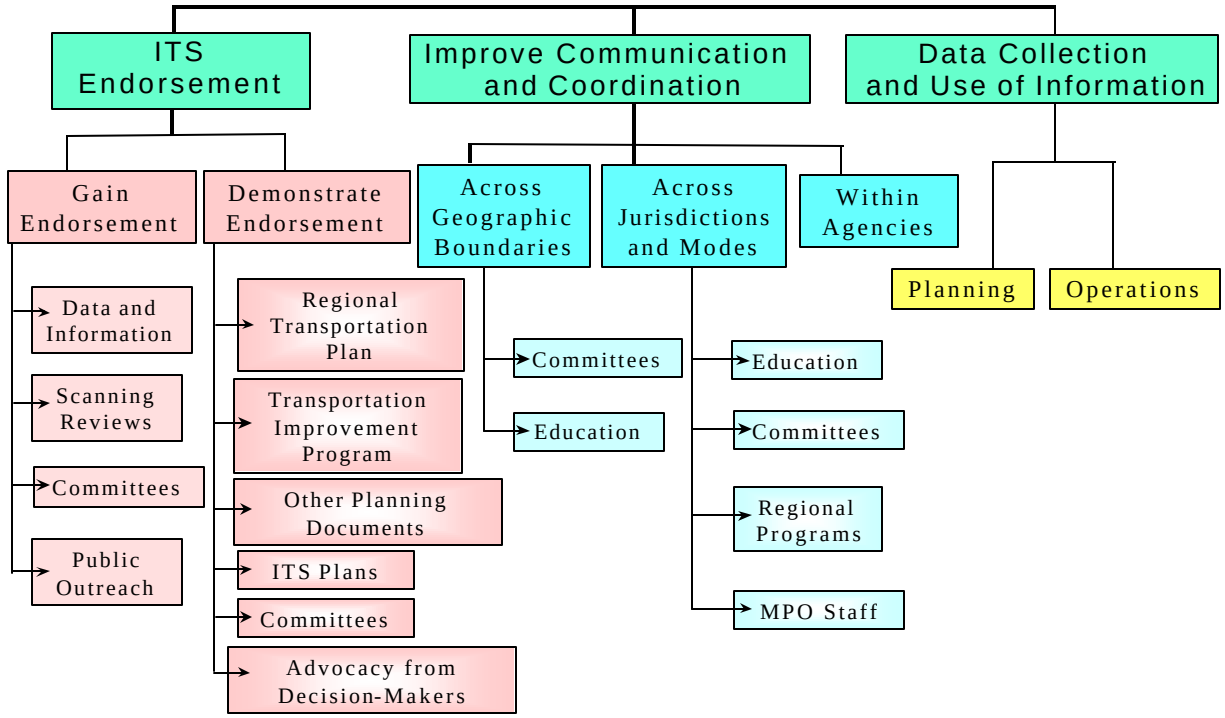

Figure 4. Three Conditions and Associated Strategies for Mainstreaming ITS in the Transportation Planning Process

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 Miami 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 Miami 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.

Transportation officials in the Miami Metropolitan Area focus on gaining the endorsement of agency administrators while educating the politicians at a very basic level to maintain some interest. 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 from the Miami Metropolitan Area stated that elected officials at the county level 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 multiple jurisdictions 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 throughout the country 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.

In Miami-Dade County, the most common method used to educate elected officials about ITS has been through presentations made by staff to the MPO Governing Board. The MPO Board includes 13 County Commissioners. Many transportation officials noted that these presentations are the only direct contact that they have with elected officials. A widely held view in Miami was that data and information, although useful education tools, did not always sell ITS to elected officials, since projects are often selected based on the needs of the community and not on technical input.

Although not the most common method used to educate transportation decision-makers, interviewees described several ways that data and information have been used to educate and promote ITS in Miami-Dade County. Data was used effectively to sell the benefits of the I-95 high-occupancy vehicle (HOV) lanes to elected officials and agency administrators in Miami-Dade, Broward and Palm Beach Counties. The data collected showed that the average trip time from Miami-Dade County to Palm Beach County was reduced by 37 minutes (more than half the average trip time) by using the I-95 HOV system. These data were also cited in a congestion management system (CMS) study.

Studies commissioned to seek transportation solutions have also been effective in educating transportation decision-makers. In 1996, the MPO funded a study through the Unified Planning Work Program to review the benefits of traveler information kiosks. One transportation official noted that the MPO staff did not know a great deal about ITS before the study, and they were not able to provide the Transportation Planning Council information they would need to fully support any related project. As a result of this study, awareness was greatly increased for decision-makers as well as staff and the Interactive Transportation Kiosk Pilot Program was funded.

Scanning Reviews

Scanning reviews, or the visiting of facilities in cities that have deployed ITS, is one useful strategy being used nationally for informing not only elected officials and upper management, but other stakeholders as well, such as staff from fire, police, and public works departments. These visits help make people aware of ITS products and services when they were not previously a priority to them. Interviewees generally considered scanning reviews a useful strategy if the agency or region had the time or funds. Although this approach was not widely used in Miami-Dade County, several officials stated that scanning reviews targeted to agency administrators and not just politicians had been successful for them.

The Federal Highway Administration's Florida Division hosted a tour for key administrators and top managers from the Florida DOT Districts Four and Six to gain first hand experience of the traveler information centers in Cincinnati and Washington, D.C. The visits highlighted the benefits that could be attained from public-private partnerships and led to discussions about what could be expected from a similar advanced traveler information system (ATIS) for the Southeast Florida region. These site visits were greatly responsible for Florida DOT administration support for the development of a regional traveler information system.

Tollway activities have been greatly enhanced by these educational travels. An official from the Florida Turnpike District credited the site review of electronic toll collection technologies being used by the Texas Turnpike Authority and by the Louisiana DOT as being instrumental to his agency's involvement with electronic toll collection.

The Executive Director of the Miami-Dade Expressway Authority visited Portland, Oregon to see their incident management program in operation. The Director was interested in gaining insight into how the agencies were able to effectively coordinate and cooperate with each other.

The Director was impressed that every agency in Portland has its own fiber optic cable network, which the agencies have linked and use to communicate with each other. The Director's visit to the Portland area also showed Expressway staff the value of cooperation and coordination. In Portland, there are 20 closed circuit television cameras available for use by an agency. Every one of the agencies involved has limited funds to operate them; however, each agency has found a common purpose and can fund their use.

Some of the respondents thought that scanning reviews were difficult to conduct because of the busy schedules of those that should attend. The alternative to sending politicians, administrators, and staff to a site was to have experts from around the country come to the metropolitan area. The MPO Director was responsible for getting a group of experts through the Public Technologies, Inc. to visit Miami and discuss ITS deployments in their respective areas. The group included knowledgeable managers from Atlanta, Houston, Los Angeles, and Montgomery County, Maryland.

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 specific regional transportation problems. Participation on either type of committee improves the knowledge base of elected officials, who are then more likely to support ITS deployments.

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

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

Public Outreach

Gaining citizens' support for ITS products and services is an indirect and alternative way to gain elected officials' support. It is hoped that by educating citizens, they will in turn demand that

their local officials support the deployment and operations of ITS products and services. This is seen as a slow process. Many agency representatives admitted that public outreach is a later step in their local ITS program. However, this strategy has emerged as a priority in Miami-Dade County.

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

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

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

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

The Miami-Dade MPO's ITS Committee members felt that even more ITS outreach and education efforts needed to be done than was outlined in the *Dade County ITS Plan*. The Florida DOT has added to this effort by providing state funding so the ITS Committee, through the MPO, could hire a public education consultant. The consultant is now developing a broad-based public information campaign. The goal is to "reach people who will reach people," such as key members of homeowners associations or Chambers of Commerce. The public relations campaign includes a number of initiatives. The consultants will create an identifiable ITS program name and logo for Southeast Florida, and an informational video for the general public along with a companion brochure to be distributed at fairs, clubs, and to various associations. This effort also includes a media tool kit for both politicians and the media and a marketing campaign for the Service Patrol Program.

The Florida DOT staffs only contact with the local elected officials is through the MPO. This condition encourages the state staff to educate at the grass roots level and build political support with a wide range of interest groups and individual constituents. The Florida DOT staff use in-house resources for outreach and are developing an organized approach that includes an ITS

presentation that can be used for a variety of audiences. The Florida DOT District Six recently created two new staff positions that are dedicated to the Intelligent Corridor System Program. Public outreach for ITS is one of their responsibilities.

The Florida DOT staff and administrators learned early about the importance of using public relations efforts to gain support for ITS, after problems with the variable message sign deployment in north Miami-Dade County set back the ITS program in the region for a couple of years. The Florida DOT District staff have already presented to the local League of Cities, Chambers of Commerce, condo associations, students and faculty at universities, at town meetings, and to a number of professional organizations, such as the Institute of Transportation Engineers. The Florida DOT staff members stated that they are willing to make presentations and "talk to anyone who will listen," but want to target interest groups to achieve the greatest awareness that will ultimately lead to political support. The Florida DOT officials want to show ITS as *proven* technologies, not *fancy* technologies. They realize that it is easier to show benefits from recognizable programs such as service patrols than from pieces of technology, such as automatic vehicle location equipment or closed-circuit television cameras.

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 the Miami Metropolitan Area where there is little direct support from elected officials and where ITS has been deployed as a result of transportation managers' efforts. In such areas, ITS projects tend to be planned and deployed piecemeal, in a bottom-up fashion, instead of top-down. Including ITS in planning documents can help transportation providers think through how to bring together all of the decentralized ITS activities and integrate them into a regional context.

The fifth strategy is the use of committees through which elected officials and upper-managers support regional planning and ITS deployments. 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 objectives are to raise the significance of ITS at the policy level and make a regional commitment to ITS. This legitimizes ITS products and services and demonstrates to constituents that spending funds on ITS applications is acceptable. It also encourages transportation professionals to include them within other planning documents, such as in major investment studies.

Interviewees in the Miami Metropolitan Area stated that incorporating ITS projects, products, and services in the regional transportation plan elevates the use of technologies throughout the region. Transportation officials felt that it is particularly important to include ITS concepts in the regional transportation plan because it provides an opportunity to show elected officials that ITS projects are part of a planned and integrated program, not just individual projects. This also provides the added advantage of showing the full benefits of an integrated ITS program. MPO staff, who have become strong proponents of ITS products and services, stated that it was useful to be able to refer to the fact that ITS is in the regional transportation plan when justifying project ideas to operating agencies. One Florida DOT official noted that it has been easier to justify the deployment of ITS for District Six, since ITS is in the MPO's regional transportation plan.

The criteria for inclusion of any specific project into the Miami-Dade County Transportation Plan is that the project is already funded within the current TIP, is on the TIP's unfunded projects list, or is a recommended project submitted by citizens through their representatives or directly to any agency involved in the regional transportation plan process. The MPO's Transportation Planning Council meets monthly to review projects for potential inclusion within the County Transportation Plan. Since the adoption of the *Metro-Dade Transportation Plan to the Year 2015*, ITS projects proposed for the most congested transportation corridors have done particularly well. One planner conjectured that was because road expansion is limited and ITS project deployments are seen as the next logical, and possibly only, steps to take. Many of these projects included in the regional transportation plan are already included within the 1996 *Dade County ITS Plan*. The *Dade County ITS Plan* is also included as an addendum to the regional transportation plan. However, the MPO staff want ITS to be highlighted so that more attention will be paid to it. This is being achieved by creating a special section dedicated to ITS in the regional transportation plan and highlighting ITS in the Executive Summary of the *2020 Regional Transportation Plan*.

One interviewee cautioned that the planning process needed to remain flexible if specific ITS deployments are identified in the regional transportation plan. The technologies and metropolitan areas are changing so quickly that the specific technology identified may be obsolete before it has been deployed. The plan must be able to be revised to adapt to a changing environment and most useful technologies in order to remain effective.

Operating costs for ITS are currently not included in regional transportation plans. The Miami Metropolitan Area's transportation plan includes operating and maintenance costs in one lump sum for all proposed highway and transit projects, but these are not specific ITS costs. Many acknowledged that operating costs would have to be addressed in the future with increased ITS deployment. However, there is no consensus on whether these costs should be included in regional transportation plans and TIPs.

Transportation Improvement Program

There are two ways MPO staffs from the areas interviewed use the TIP to endorse ITS. First, staff highlight ITS projects in the TIP. Second, they modify the TIP project selection criteria to accommodate the differences between traditional capital and ITS projects, thereby increasing the number of ITS projects selected for inclusion in the TIP.

Most ITS projects, like other transportation projects receiving certain types of federal funds, must be listed in a region's TIP or included as part of a larger capital project listed in the TIP. Still, many transportation officials around the country stated that the TIP is not particularly useful as a resource document for demonstrating endorsement of ITS because, unlike the regional transportation plan which can include a clear policy statement supporting the use of ITS solutions, the TIP's contents can be difficult to decipher. The Miami-Dade MPO staff overcame this shortcoming and designed the TIP to be a useful source of information on ITS projects for elected officials, management of transportation agencies, and representatives of other interested organizations.

The Miami-Dade MPO staff use the TIP to increase awareness of ITS projects. All ITS projects in Miami-Dade County are cross-referenced in the TIP in both an ITS section and other appropriate categories, such as highway infrastructure and transit facilities. The MPO staff include a one-page summary in the TIP that identifies the ITS projects that are listed elsewhere in various project categories within the document. This presents the projects as an ITS program, demonstrates how the projects planned for the area are interrelated to each other and to traditional projects, and conveys that individual deployments can work together to help reduce congestion. This page is capable of being faxed to interested parties to respond to their concerns and questions. The MPO staff routinely send the County Commissioners a list of projects in their individual jurisdictions, including those categorized under ITS. Other interested parties have included a variety of public agency and private sector transportation professionals, real estate agencies, insurance companies, and even students.

One interviewee from the Miami area stated that it has been useful having ITS projects highlighted in the TIP because it makes the projects more visible. For example, a new operations center was identified on the TIP's unfunded needs list and had the highest priority of all the projects on that list. Therefore, the project gained recognition and the MPO Governing Board is finding ways to fund it. Both planners and engineers remarked that many of the funded ITS-type projects are actually older traditional construction projects that were originally among the numerous projects in the TIP's unfunded list, but have had technology worked into the design.

A new project selection criteria is operations and maintenance costs. A lead planning official said that any project with significant operations and maintenance costs use to be considered "second class" and often discarded unless extra revenues were found. The TIP Development Committee members are now willing to consider these additional impacts while also examining the added benefits from these projects. The planner was quick to point out that this category of projects covers a wider range of projects than just ITS initiatives and these costs are only provided as a cumulative total in the TIP; however, it was a first step to realizing on-going benefits and costs.

Other Planning Documents

In a number of areas, ITS products and services are included in planning documents such as feasibility studies, conformity determinations, congestion management plans, and major investment studies. Including ITS in any of the documents indicates movement toward mainstreaming ITS products and services 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 it is acceptable to fund these types of projects.

ITS projects are identified in the Miami-Dade County CMS plans as solutions in the heavily congested corridors. The MPO's project manager for the CMS program began including ITS-type projects in the congestion management plan after attending one of the MPO-sponsored ITS Committee meetings in late 1994. The ITS projects identified are also cross-referenced in the two principal ITS plans, the *Dade County ITS Plan* and the *Southeast Florida Intelligent Corridor System Plan*. An MPO official noted that the CMS plan has been used as a stepping stone to give compliant ITS projects more visibility, approval, and ultimately more funding.

There has not been as much exposure of ITS products, services, and projects within the major investment studies developed in the Miami Metropolitan Area. However, an executive from the Miami-Dade Expressway Authority credits the inclusion of electronic toll collection systems and fiber optic cable line extensions in the East-West Corridor Major Investment Study and the Miami Intermodal Center Major Investment Study for making it easier for advanced technologies to be part of the Authority's operations.

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 tie together ITS projects in those areas in which ITS has been planned for and deployed on an individual project basis.

Finally, it is with these plans that the first steps can be taken to incorporate ITS projects into the metropolitan transportation planning process because many projects identified in these plans are subsequently submitted for funding in the regional TIP. 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. The transportation professionals in the Miami Metropolitan Area were almost unanimous in identifying their assorted ITS plans as critical for setting an agenda for all the politicians to focus on and all agencies to work toward.

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

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

- Establish a general policy planning process for ITS products and services.
- Coordinate ITS project planning, and integrate it within the area's overall transportation planning process to allow ITS products and services to compete for capital improvements funding, not just discretionary funds.
- Provide a means for education and accountability for ITS investment to the general public
- Seek and sustain overall support for ITS by creating a sound plan that will attract private investors and facilitate public-private partnerships.

The *Dade County ITS Plan* was adopted by the MPO Governing Body in early 1997. The ITS Committee will soon update the *Dade County ITS Plan*, to include more specific projects. The *Dade County ITS Plan* is a supplement of the *Mobility 2020 Regional Transportation Plan*, which will also be updated with a special section dedicated to ITS. One ITS project that will be contained in the *2020 Plan* is the fiber optics network expansion in Miami-Dade County to accommodate the regional ATIS project and other ITS deployments. In June 1998, the *Fiber-Optic Communications Concept Plan for Dade County's Intelligent Transportation Infrastructure* was created as a direct result of discussions relating to the *Dade County ITS Plan*.

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. Politicians in Miami-Dade County have not been extremely interested in pushing regionally applied technologies, unless there are proven benefits for their direct constituents. However, there are examples of elected officials and administrators requesting the formation of committees to examine regional activities, including the use of advanced technologies.

In Miami-Dade County, the MPO's Transportation Planning Council created an ITS Committee which sought to increase county coordination of ITS deployments and expand support for ITS from local and state politicians. The ITS Committee also sought to move from the deployment of individual projects to regional projects. The Committee comprises transportation professionals from key organizations who would be familiar with ITS activities throughout their respective organizations and who could promote advanced technologies to their organizations. The ITS Committee formed an ATIS Subcommittee to focus on developing an ATIS for Miami-Dade, Broward, and Palm Beach Counties.

The Regional Transit Organization was created with the goal of improving transit service regionally and increasing coordination and modeling for needs and impacts. A Miami-Dade County Commissioner was credited with creating this organization, which includes the three MPOs (Broward, Miami-Dade, and Palm Beach), and is led by the Broward County MPO staff. Although ITS is not the Organization's major focus, it provides a forum for participants to learn more about ITS. The Miami-Dade County staff share their experiences relating to ITS technologies, thus allowing the Organization members to fully examine how these technologies could potentially be used to solve regional transit issues.

One interviewee noted that as a result of the Transit Organization's meetings, a shift in the paradigm has occurred and regional coordination is beginning to occur. One project under consideration by the Organization is the regional consumer information center. The information center would allow travelers to obtain transit information throughout the three counties by using one telephone number to access information from a common database. This would also include the development of a common website. There is currently no source of funding for this project, but support from the Regional Transit Organization will go far in securing support from decision-makers and locating potential funding sources.

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 such as coordinated signal systems, traffic control centers, and motorist assistance patrols have been in operation for a number of decades, are accepted as normal transportation management strategies, and do not need a high-level

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.

There is no ITS champion operating in the political arena in Miami-Dade County. Most interviewees stated that it has been difficult to cultivate ITS proponents among elected officials because there is no longer any countywide representation. In addition, the terms of the County Commissioners last for four years, while the life of an ITS project from conception to deployment is much longer. Finally, the Commissioners are required to make funding decisions based on a variety of social and economic factors on issues that compete with transportation.

Occasionally, an elected official will develop an interest in regional issues and support ITS. When this occurs, the region clearly benefits, as in the case of one County Commissioner, who also serves as the Chair of the Transportation Planning Council. The Commissioner, a strong supporter of utilizing innovative solutions to reduce congestion, convinced the MPO staff to develop advanced systems for this purpose and to increase public outreach regarding ITS solutions. Unfortunately, support from elected officials only happens by chance, when one of them develops an interest. The MPO Director understands that future support depends on delivering projects that show ITS technologies work, and so he is promoting the deployment of a traveler information system to do just that.

Like the MPO Director, transportation managers act as advocates for ITS products and services. In the absence of strong support from elected officials, transportation professionals at the Miami-Dade MPO and the Florida DOT have elevated the awareness of ITS technologies to upper management of the area's transportation agencies. In Miami-Dade County, the MPO Executive Director is a strong ITS advocate. Beginning in 1994, the Director began including ITS on the agenda of various MPO committee meetings. He used these meetings to educate the MPO staff and Board members on ITS by providing examples of how other areas were using advanced technologies for transportation solutions. These presentations were considered an impetus in the Transportation Planning Council's decision to create the ITS Committee in 1995. The MPO Director continued to promote ITS by ensuring that key agencies were represented on the Committee. A Florida Turnpike official credited the MPO Director with his agency's participation on the ATIS Subcommittee. The MPO Director included Florida Turnpike on the ITS Committee's agenda and informed the Florida Turnpike staff of the benefits of ITS.

The Florida DOT Turnpike District Secretary was also cited as a strong supporter of ITS. The Turnpike has a bonding capacity in excess of $1 trillion, and the Secretary is willing to spend some of these funds for ITS projects. He would like the Turnpike to lay the foundations for justifying ITS projects in the way of a business plan, benefit-cost analyses, and analysis of the benefits from areas who have deployed ITS. In lieu of benefit-cost studies, a consultant will perform cost-effectiveness reviews that will be used to analyze the ITS program and provide supporting documentation to justify additional investments. This advocacy from the Turnpike administrator can prove very beneficial to the Southeast Florida region, which has been designated as the Turnpike's highest priority area for ITS deployments.

3.2 COMMUNICATION AND COORDINATION

ITS technologies can be most useful when planned and deployed with a regional perspective that cuts across geographic boundaries, agencies, and transportation modes. This requires elected officials and staff within and across agencies to communicate and coordinate with one another. It can, however, be difficult to plan and deploy ITS within a region, especially in areas composed of many local autonomous communities and agencies. For example, in Miami, there are 30 governmental jurisdictions and another ten regional or statewide agencies that have some ties to transportation.

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

Section 3.2 is divided into three subsections:

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

Strategies for communicating and coordinating across geographic boundaries call for the involvement of policy makers and elected officials. Strategies for communicating and coordinating across jurisdictions and modes depend on the active participation of transportation professionals. 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

Interviewees stated that to plan and operate ITS on a regional level, elected officials from cities and suburban communities need to communicate and coordinate with one another and then encourage the transportation agencies within their jurisdictions to do the same. 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.

Due to the electoral structure of Miami-Dade County, this strategy has not been used extensively. Elected officials have not formed any committees comprised solely of elected officials with the objective of educating others on the benefits of ITS solutions. One key County Commissioner did, however, push to have additional funds spent on public outreach, that will improve communication with constituents.

Education

When elected officials are included, the by-product of education initiatives is the enhancement of ITS discussions among elected officials from various jurisdictions. According to the interviewees, there have been few educational efforts that have targeted elected officials in the Miami Metropolitan Area. Most of the ITS awareness and training courses given in the county, region, or state have been for transportation professionals. However, transportation officials have attempted with limited success to direct some ITS education to the County Commissioners and the County's Executive Mayor in order to encourage them to discuss ITS among themselves.

In Miami–Dade County, the MPO Executive Director has, at a number of times, presented the benefits of ITS as tools for congestion management to the MPO Governing Board. These presentations produced discussions that identified ITS projects that could be coordinated across geographic boundaries and ultimately led to the formation of an ITS committee at the MPO.

There have been other educational efforts targeted specifically towards elected officials. These efforts include a media kit developed under the sponsorship of the Florida DOT's District Six and presentations on ITS projects by the Florida DOT's regional ITS manager before various policy groups. However, due to the structure of the countywide government, many interviewees stated that the best ways to improve coordination and communication of elected officials are through the citizenry and through successful and well received ITS projects, such as the Service Patrol program. This program, sponsored by the Florida DOT, uses service patrols along I-95 and SR836 as probe vehicles and incident informers. While this is not exclusively ITS, politicians like the program. The program is visible, shows progress, displays benefits under multiple jurisdictions, and helps project a positive image regarding ITS-type projects. Many area staff remarked that identifying positive results to the area's elected officials is a catalyst to spark interest and increase discussions regarding any subject, including ITS, which is not high on the Commissioners' agendas.

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 might not be sent to represent an agency unless that agency attaches enough importance to a committee. Less experienced, subordinate staff can reduce a committee's effectiveness.

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; Miami 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, and reducing tensions between modal agencies and between planners and operations staff who often do not understand each other's responsibilities and terminology. These tensions can inhibit ITS planning and deployment.

Many interviewees stated that there are no real opponents to ITS in the Southeast Florida region, but that a lack of awareness of the products and services and their benefits hinders the routine consideration of ITS technologies in the region's planning and deployment process. Transportation officials in Miami-Dade County stated that because the MPO staff have become educated on ITS, they are best suited to educate regional stakeholders, including staffs at public agencies and individuals from private entities involved in the transportation system.

Many MPO staff educate stakeholders on regional ITS needs as part of the regional transportation plan education. Other MPOs hold meetings or conduct presentations exclusively to educate stakeholders on ITS needs. In Miami-Dade County, MPO staff have effectively used both of these methods to educate. Town meetings have been held to increase the knowledge base of how ITS will be used to solve transportation problems. Additional town meetings are planned that will target specific agencies and organizations to ensure the maximum distribution of information. The MPO also stresses accountability to the citizens of Miami-Dade County that

includes an extensive citizen input mechanism into the TIP. There have been some comments from the public that they know money was spent for technology, but they are still stuck in traffic and do not perceive any benefits. As part of this accountability, there are major efforts by both the MPO and the Florida DOT District Six staffs to educate other transportation professionals regarding ITS so all of these parties may talk to the citizens and private stakeholders with an accurate and common message.

The MPO has also been instrumental in creating an ITS Committee which has brought together major stakeholders, effectively providing a forum for these stakeholders to educate each other on the ITS activities of their respective agencies. Several interviewees asserted that it is essential to educate private industry stakeholders, including the Chamber of Commerce, the large employers, commercial truckers, and the Bureau of Tourism. The *Dade County ITS Systems Plan* has been shared with other potential stakeholders. Through this outreach effort, a few of the newly targeted groups have sent representatives to the ITS Committee meetings.

Officials at the Florida DOT District Six agreed with the general belief that there is no real opposition to ITS, but there are differing levels of understanding of the technical issues. They concluded that education to the Florida DOT and the Miami-Dade County staffs are essential to bring up this level. In addition to making presentations to various public agencies, the Florida DOT staff have also taken an active role in educating other stakeholders in Southeast Florida. District staff have made presentations to a variety of organizations, including engineering societies, the local chapters of the League of Cities, boards and committees from the region's three MPOs, at town meetings, and at universities. The ITS Administrator for the Southeast Florida Intelligent Corridor System program estimates that almost half of his time has been dedicated to ITS education and outreach. With the hiring of additional staff and a marketing consultant to conduct outreach, and the expanded educational efforts from the MPO staff, the administrator hopes this figure will decrease dramatically and allow him to concentrate more on project coordination and technical issues.

Scanning reviews were also cited as useful because participants learn to see firsthand how the technologies enable individual agencies and modes to work together to address transportation issues. The MPO Director brought in, through Public Technologies, Inc., ITS experts from four other metropolitan sites (Atlanta, Houston, Los Angeles, Montgomery County, Maryland) to meet and discuss ITS deployments with local transportation officials. The Florida DOT District's upper management and staff, and representatives from other key agencies in the Southeast Florida region, benefited from the educational opportunities provided them during visits to traffic management and information centers in Cincinnati and Washington, DC.

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 or other similar committees should not be understated. Initially, participating on ITS committees provide 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. Nationally, 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 January 1995, the Miami-Dade MPO's Transportation Planning Council passed a resolution to create the ITS Steering Committee, now called the ITS Standing Committee. The ITS Standing Committee provides a forum for all agencies and organizations to update one another on ITS activities and to identify opportunities for coordination. Coordination may occur through the ITS Committee, but it is more likely that agencies will coordinate on specific projects with one another outside of the Committee. Organizations now communicate with one another because they all bring their ideas to the Committee. Several initiatives have been developed through the ITS Committee: a fiber optics study, an interactive kiosk study, the *Dade County ITS Plan* and *ITS Plan Update*, and an application for federal model deployment initiative funds.

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

An important factor voiced in other metropolitan areas was that committee meetings should be well attended, and that those attending should be the most qualified representatives from each agency. An MPO official said that invitations to join the ITS Committee were intentionally limited. Too many participants from "secondary agencies" would lead to non-focused, unproductive meetings. An unproductive committee would create its own demise. The Committee has plans to expand its Committee membership as ITS projects are deployed.

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

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

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

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

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

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

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

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

Regional Programs

Approximately half of the almost 100 transportation professionals interviewed nationally believed that the development of a major regional program of ITS projects is a useful strategy for a region to initiate. This program leads to improved and expanded communications and coordination channels in the form of extensive committee structures, which bring all stakeholders together to solve identified transportation problems with ITS solutions. Participants begin to think regionally and include groups not traditionally targeted for transportation planning, such as representatives from airports, seaports, and trucking interests. Part of the benefit from such a program is that it provides a forum for agencies across broadly defined regions to communicate, coordinate, and organize formal data-sharing practices.

When discussing ITS initiatives in the Miami Metropolitan Area, a single project or a group of projects encompassed in a program must cover the three-county Southeast Florida region to be considered a truly regional program. There are two projects in Southeast Florida that are focused

on the region and can be considered more than just a single agency's or jurisdiction's project - the Southeast Florida Intelligent Corridor System program and the ATIS project.

The Intelligent Corridor System program began in the late 1990's as primarily a Florida DOT freeway endeavor, but has since been expanded to cover multiple modes and jurisdictions. The first attempt to implement the Intelligent Corridor System program was more of a unilateral effort, rather than a regional effort, by the Florida DOT District Six staff. This resulted in the lack of coordination and communication among various agencies regarding the technologies and projects that comprised the Intelligent Corridor System program. The local planning and transportation officials outside of the Florida DOT were not clear on program components and did not support the Intelligent Corridor System program. As a result, a large number of the projects within the Florida DOT's ITS program were not being approved for funding in the TIP. In addition, the Florida DOT officials had only limited backup support from other public officials to counter the negative publicity that arose when one of the first technologies deployed, variable message signs at the Golden Glades Interchange in north Miami-Dade County, did not perform as planned. The Florida DOT's ITS staff admitted that this program would have been more positively received had it been initiated through the metropolitan planning process. They are now working closely with the Miami-Dade MPO staff to direct and coordinate the updated Intelligent Corridor System program with agencies in Miami-Dade County and other agencies throughout the three-county region. This program has expanded to include projects on the tollway system and local arterials, and integration with other modes.

The Intelligent Corridor System is the largest ITS initiative occurring in the region. Currently, the region's ITS architecture builds on the concepts developed in the Intelligent Corridor System plans. At this stage, it is only loosely defined. Local representatives in Miami-Dade County noted that as the operation centers and more of the independent existing and planned transportation systems are connected to the Intelligent Corridor System, they will have a better idea as to what a detailed system and their information flows should look like. Senior transportation officials from the Florida DOT District Six and the Miami-Dade MPO attended the Federal Highway Administration's National ITS Architecture training session in Atlanta in 1998 to learn more about how to best apply the National ITS Architecture on a regional scale.

The second regional effort is the three-county traveler information initiative that is being undertaken through the ATIS Subcommittee of the ITS Standing Committee. The ATIS initiative will provide citizens with travel information for the tri-county region that will enable them to make travel decisions based on freeway, expressway, and arterial congestion; the status of public transportation services; and information on primary destinations, including seaports and airports. Discussions regarding the information distribution networks have been made possible and enhanced with the added involvement of the Miami-Dade Information Technology Department and the Florida Turnpike District. The Information Technology Department came to the discussions with a 1986 *Fiber Optics Plan* and a 71-mile network of fiber optics cable already installed throughout Miami-Dade County. The staff of the Information Technology Department developed a new fiber optics plan and directed the research as to how to best partner with the private sector for the ATIS.

There are other efforts by single or multiple agencies in the Southeast Florida region that have the potential to become regional ITS projects and therefore will enhance the communication among the transportation officials and agency administrators. Many of these potential regional projects are being brought about through initial discussions at the MPO's ITS Standing Committee. The Florida Turnpike's SunPass electronic toll collection system is being installed throughout its tollway system, beginning in the Southeast Florida region. The Miami-Dade Expressway Authority is developing plans for interoperability between its electronic toll collection system and SunPass.

Even before the discussions regarding electronic toll collection technologies, the Expressway Authority created support for multi-jurisdictional activities through a study it commissioned to examine congestion along all highways under Authority control and the freeways that feed into the expressway system and how to make traffic flow smoother. The study showed that cooperative efforts between the Expressway Authority, the Florida DOT, and the Florida Turnpike were needed to significantly improve any of the roadways. As a direct result of this study, the Florida DOT agreed to use, for the first time, National Highway System funds outside of their own interstate system. Although ITS technologies were not part of this funded project, this was a significant step in creating a cooperative, multi-agency process whereby regional ITS projects can be developed.

The transit agencies in the region and the Florida DOT formed the Regional Transit Organization in 1997 to coordinate transit projects and services and discuss regional transit issues. While this group does not specifically address ITS, it does provide a regional forum in which multi-jurisdictional technologies may be developed. There are two projects that the Regional Transit Organization members are currently considering – regional marketing for transit and a regional consumer information center. A Miami-Dade Transit Agency administrator said that ITS issues will likely come before the Organization's Technical Advisory Committee. This group is already examining a common database for all public transportation providers in the region and the creation of an "800" regional customer information number. However, there has not been any discussions regarding incorporating this transit effort into the work now occurring for the regional ATIS initiative.

Although some of the programs being developed are regional in nature, officials from the MPO and other Miami-Dade County agencies feel that the projects should first be deployed in the Miami area and then expanded to cover the Fort Lauderdale and Palm Beach Metropolitan Areas. There are four principal reasons to concentrate deployments first in the Miami Metropolitan Area while still coordinating regionally. First, the greatest interest and understanding about these deployments are in Miami-Dade County. Second, Miami-Dade County has the greatest level of congestion. Third, the time frame for deployment in Miami-Dade County is much faster than in either Broward or Palm Beach Counties. Fourth, the Miami-Dade MPO staff are willing to lead the multi-county ITS effort, but must show local results to maintain approval and proceed to a regional deployment and operations phase.

MPO staff

MPO staff typically build relationships with staff from the metropolitan area's operating agencies. This can put 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.

In Miami-Dade County, the MPO covers one county and has authority over all funds (federal, state, and local) provided to the county with the exception of the National Highway System funds. This authority makes the MPO staff more powerful than the average MPO. MPO staff understand the unique role that they play in communicating and coordinating ITS across jurisdictions and modes and took the position early on, with the support of the Florida DOT, to become the lead ITS coordinator. The MPO created the ITS Committee, which has greatly aided in streamlining ITS within the MPO's transportation organization's planning process. The MPO staff also realized that they must understand the technologies that comprise the National ITS program. This has required the use of experts from other metropolitan areas, attendance of numerous ITS awareness and training sessions, and the initiation of a number of studies. Miami-Dade MPO staff admitted that much of the knowledge they gained had to be "self-taught" through professional journals and ITS magazines.

Transportation officials agreed that MPO staff have proven to be very effective in bringing agencies together and improving communications between the agencies through the ITS Committee. One interviewee noted that as a result of an ITS Committee meeting, it was learned that the Miami-Dade Expressway Authority was using a different transponder than the Florida Turnpike's SunPass. The two organizations were asked to explore the possibility of using similar technology so that drivers would be required to carry only one type of card or transponder. Another official credited MPO staff with assisting in opening the lines of communications between the Florida DOT and the Miami-Dade Information Technology Department. Improved communication was necessary to resolve tensions between two agencies that arose when the Information Technology Department balked at the Florida DOT's use of a County building as a closed circuit television camera site for the Intelligent Corridor System.

MPO staff have assisted agencies in determining how to position ITS projects in the regional transportation plan and the TIP by allowing agency staff to informally present preliminary project proposals to the MPO staff. Representatives from the presenting agency benefit from the process because they learn how the project to be deployed should fit in the regional transportation plan and how to position the project for approval and financing within the TIP. MPO staff also provide non-technical support to the Florida DOT and other agencies. One Florida DOT official stated that the MPO staff are more sensitive and in-tune with local concerns and are needed to identify local needs and gaps in ITS plans and deployments.

Once a project is approved for funding, it leaves the MPO oversight for design, bidding, contracting, deployment, and operations within the sponsoring agency. The MPO is kept

informed through presentations made to the ITS Committee and to MPO staff. One interviewee noted if staff time permitted, it would be beneficial if the MPO were involved in certain aspects of project development. Traffic engineers look at ITS projects as an improvement to their maintenance and operations program, while the MPO staff see the project as an investment competing for funds against other worthy projects. Background information may enable the MPO staff to help ITS compete at a higher level for funds.

MPO staff have also been credited with providing a very effective public dissemination role. The MPO stress accountability to the citizens of Miami-Dade County that includes an extensive citizen input mechanism for the TIP. MPO staff conduct meetings with other governments and businesses, such as real estate and insurance companies, who refer to the TIP in their own studies. Staff are also available to answer questions about projects in the TIP.

Finally, MPO staff have been willing to take the lead in coordinating among the three Southeast Florida MPOs for regional efforts, such as the ATIS project. For this effort, MPO staff have worked with the Florida DOT staff to ensure that the Intelligent Corridor System projects are coordinated with the plans for the ATIS deployment.

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 when coordination does not occur. For example, fiber optic cable installed along a highway could be damaged during highway reconstruction because construction crews were not aware of the existence or location of the cable.

In Miami-Dade County, the MPO's creation of the ITS Committee effectively centralized the ITS concept within the MPO's planning process. Several ITS Committee members stated that they typically brief their agencies on the activities and issues being discussed at the ITS Committee meetings. Some interviewees stated that this has resulted in greater communication and coordination at their agencies.

Several efforts are underway by the Florida DOT to improve ITS communication and coordination within the Department. One transportation official noted that all Florida DOT

Districts have an ITS coordinator and that they are responsible for integrating ITS into the planning process. These coordinators ensure that ITS elements are considered well in advance of any project deployment and that ITS projects are included in both the Department's and MPO's planning process.

The Florida DOT's internal efforts also include the development of two ITS plans, the *ITS Strategic Plan* and the *Update of the ITS Planning Guidelines*. Both plans will provide standard guidelines for ITS planning and deployment within the state. The *Strategic Plan* will provide direction for ITS within the Florida DOT and will provide criteria on setting ITS priorities, an ITS business plan, and a recommended ITS organization structure within the Florida DOT and other appropriate agencies. Both of these plans will improve internal coordination and communication by providing direction within the Florida DOT. The two ITS plans, which one Florida DOT staff member referred to as a "harmonious" pair of documents, are being developed concurrently under the supervision of the Florida DOT's Central Office. One interviewee noted that the transportation officials in the Central Office know what projects the Districts would like and their corresponding cost estimates. However, statewide policy must first be defined within the two plans mentioned before each District will proceed with a coordinated approach.

3.3 COLLECTION OF DATA AND USE OF INFORMATION

Reliable data are important inputs into regional transportation project planning and into transportation planning system assessments. 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 on-going 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 projects 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. Planning for ITS products and services in the Miami Metropolitan Area has been underway by various agencies throughout the 1990's. Coordination of ITS deployment efforts, initiated by the Miami-Dade MPO, has been occurring for over three years. However, it has not been until recently that there has been any consideration given to agency data needs and ITS-generated data flows.

In the Miami Metropolitan Area, there are several driving forces behind the initiation of a formalized method of data collection, data sharing, and standardized data analysis. The main efforts result from the regional ATIS project. Another critical component is the involvement of the Miami-Dade Information Technology Department staff with the ITS activities in Miami-Dade County. Information Technology staff have greatly aided in determining data needs. Transportation officials in Miami-Dade County have come to realize that with increased deployment of ITS, more data will be generated and there is a greater need to gather the data and to use it effectively, including the coordination and sharing of the data. Many of those interviewed expressed hope that as a result of the ATIS project and the work of the ATIS Subcommittee, data collection and sharing issues would be addressed.

3.3.1 Strategies to Collect Data and Use Information for Planning Purposes

While some agencies in Southeast Florida region, including the Florida DOT, the Miami-Dade County Public Works Department, and the Miami-Dade MPO, have been gathering transportation data for a number of years, coordinated data gathering and use activities are in the planning stages. A number of interviewees, planners and engineers alike, said that there is no need to spend great amounts of time early in the ITS planning process developing strategies for collection and usage of data in the region. Early ITS planning should be directed at getting appropriate projects operational and showing positive results from the ITS deployments. It is the initial responsibility of each agency to understand what they are able to collect and their own data needs. After each agency has conceived their data needs and collection processes, then the area is ready to develop data sharing procedures for the agencies in the metropolitan area. Transportation officials interviewed feel that the Miami Metropolitan Area is just now ready to explore the potential benefits from data collection, sharing, and archiving.

Data exchange is a subject being covered by the ITS Committee, especially the ATIS Subcommittee. The communications study performed by the Miami-Dade Information Technology Department addressed data needs, to the extent that allows Department staff to approximate the communication requirements. Data exchange procedures will be further developed as a component of the public-private partnership with one or multiple information service providers under the Southeast Florida ATIS project.

A number of interviewees highlighted the need to minimize the number of centers that receive and distribute data. Based on his background research and discussions with the ITS Committee members, an information technology specialist noted that there is already an enormous amount of transportation data being generated, but no master plan to develop a data warehouse and outline how to use the data once it is collected. Determining how this data will be distributed and archived will be a major cooperative planning process for all of the agencies involved.

Representatives from a number of agencies noted that their current need for ITS data is to justify ITS projects. Because there have been some negative results from some ITS deployments in the past, a local politician noted that benefits must be presented first, then decision-makers will talk price. However, some of the staff that met with the politicians directly cautioned that the benefits and other information presented should be non-technical and to the point.

Justification of advanced technologies projects before the more technical Transportation Planning Council has proven more difficult for agency staff. A Florida DOT official commented that it is very difficult to compare ITS projects with traditional projects and obtain a high priority within the TIP. Many intangible benefits are associated with these projects, which makes the total benefit from an ITS project difficult to quantify. Instead, staff qualify the benefits to the maximum extent possible on the basis of air quality improvements, moving traffic, and encouraging modal shifts over the next ten years. One project with many intangible benefits that the Council reviewed was the Florida DOT's fiber optic cable lines deployment.

Post-deployment evaluations may prove to be easier than pre-deployment benefit-cost analyses. The Florida DOT, among other agencies, include funds for data gathering and project evaluation costs within each project. The 1996 *Dade County ITS Plan* includes a proposed system to track projects and measure their benefits and costs. However, performance measurements have not been completed.

Some project evaluations have been completed. The Florida DOT provided operations data from HOV lanes on Interstate 95 to the Miami-Dade MPO for the CMS study. The data showed that HOV lanes reduce driving time by as much as 37 minutes along the three-county HOV system. A study by the Miami-Dade Expressway Authority showed its planned electronic toll collection system can move over four times the number of vehicles per lane as a conventional stop-and-go cash token collection system. With the installation of express lanes, the throughput at the tollways can be even greater; however, the added cost of installing the express lanes around the toll plazas would reduce the benefit-cost ratio. The Florida DOT staff have also completed some ITS project and system evaluations without using operational data. A system-wide, benefit-cost analysis for the Intelligent Corridor System program was completed whereby congestion and incident costs were identified over a three-county region. This effort was based on national

experience and expertise, not local engineering judgment. The benefit-cost ratio for the Intelligent Corridor System program was projected to be 3:1; much more conservative than the national results showing a ratio of 25:1.

One concern voiced by the MPO and the Florida DOT staff are the quality and reliability of traditional transportation modeling tools when used to assess ITS projects. The benefit-cost analysis for the Intelligent Corridor System program was completed five years ago. The technical tools available then were not as good as those available today. The Florida DOT Headquarters has already responded by developing the Florida Standard Urban Transportation Model for ITS (known as the "UP Model for ITS"). The local agencies are now using this model to compare highway speeds with and without the ITS technologies. Headquarters staff are also working with District Six staff to gather real-time data from ramp meters and loop detectors that will be installed on Interstate 95 as part of the Southeast Florida Intelligent Corridor System program. The data will be compared with the Florida DOT projections and be used to refine transportation models.

While there are many data issues that need to be resolved, the resolution as to who will manage the historic transportation data and where the data will be kept are issues that will not be finalized in the near future. Similar to many other data issues, resolution of this issue is heavily dependent on who the private ATIS partner(s) will be. Officials from the Information Technology Department, the Miami-Dade MPO, the Florida DOT, and even the Florida Department of Information are involved in preliminary archiving discussions. The Miami-Dade MPO already supplies a number of data sets to a wide variety of agencies, including the Florida DOT and the Miami-Dade Public Works Department. The MPO funds the collection of some data and maintains the traffic volume counts for county and state roads. There is consensus that the agencies involved with these transportation technologies should make as much data accessible to all as possible.

3.3.2 Strategies to Collect Data and Use Information for Operational Purposes

Operational data are characterized as data used daily or on an on-going basis to adjust transportation systems or to provide real-time information to operators or customers of the system. The 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).

There are a number of operating agencies in the metropolitan area that are already using data generated from ITS equipment in the field to monitor and improve their daily operations. Dispatchers and route supervisors at the Miami-Dade Transit Agency rely, in part, on their automated vehicle location system to track the on-time performance of their buses. Staff at the Miami-Dade County Traffic Control Center use the information generated from their traffic signal control systems and loop detectors at intersections to ensure that their signals are operating properly and not creating excess congestion. Engineers and dispatchers at the Florida DOT District Six Traffic Operations Center use information gathered from closed circuit television

cameras and loop detectors to monitor congestion levels and potential incidents along the freeways. A representative from the Florida Turnpike remarked that the Turnpike District probably collects more data than any other agency in the state and they will be augmenting their operations data with additional loop detectors and closed circuit television cameras. The individual added that much of this new data being generated would be made possible through the coordination with the ATIS project in Southeast Florida. Currently, there are few opportunities for the public transportation agencies to share real-time data and information, except through the traditional verbal phone communications.

The ATIS project will require the non-exclusive collection and use of data by the cooperating agencies. The objective of the public-private partnership is to get data to users of the transportation system throughout the region. Each agency that could contribute data to the ATIS project was contacted to determine the type of data (planning and operations) they could supply. For example, the Miami-Dade Public Works Department can contribute operations data from the electronic toll system and the traffic control center. The development of the ATIS will serve as a driving force that will aid in working out data sharing issues for the region. The ATIS Subcommittee has been examining the data collection issues to determine how ATIS can benefit the region through data and information sharing and improve services to citizens. Because of the real-time nature of the operations data, it will be more difficult to agree on how operations data is to be shared and used by each public agency and how data will be applied for planning purposes. It is hoped the private sector partner(s) can help resolve these concerns.

One interviewee highlighted the value of bringing together diverse transportation agencies to discuss how they can improve service based on real-time information provided by another modal agency. The transit authority could use airport data to improve service to the airport, and the seaport could use airport data to understand their scheduling better. A representative from the Information Technology Department added that the county's geographic information system could accommodate many of the static location and system requirements from multiple agencies, which could significantly aid in the sharing of their operations data on a standard database.

The members of the ITS Committee and the ATIS Subcommittee are discussing a common database. However, there are more efforts than just at the ITS Committee to create compatible databases. The Regional Transit Organization has initiated the creation of a single database among the public transportation providers. The Organization has even designated a database coordinator to assist in the multi-agency effort. The Florida DOT officials have met with signals and traffic engineers from the Public Works Departments in Miami-Dade, Broward, and Palm Beach Counties to discuss system compatibility between the Intelligent Corridor System and the individual county traffic control centers. The Florida Turnpike and Miami-Dade Expressway Authority have likewise begun discussions on how the Expressway can develop a database compatible with the SunPass database. The greater the compatibility among the databases, the easier it will be for outside agencies to use operations data, for both operations and planning purposes.

4. SUMMARY

This chapter presents a summary of what the transportation agencies in Miami-Dade County 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 Miami 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 highlighted in the third section.

The fourth section identifies how the examples from the Miami 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 Miami Metropolitan Area have already experienced many of these actions and do have successes to emulate.

4.1 MAINSTREAMING AND DEPLOYING ITS: WHAT WORKS IN MIAMI

This section briefly examines the factors or activities that aid in planning and deploying ITS in the Miami Metropolitan Area. There were a number of actions cited by the transportation officials from the area as enabling them to mainstream and deploy ITS. ITS efforts in the metropolitan area started with a single agency, the Florida DOT District Six, and a grand project design with the Southeast Florida Intelligent Corridor System. However, in order to gain approval within the transportation planning process, many of the deployments were scaled down. A coordinated ITS planning process has emerged and new players have become involved. The inclusion of these new public entities has greatly assisted in the expansion of ITS applications in the region beyond just freeway and incident management programs to traveler information, electronic toll collection, and transit fleet management. With the inclusion of private sector businesses as information service providers, the next phase of planning, project, and data coordination is about to begin in this metropolitan area. There are four key factors that have contributed to increased coordination and mainstreaming of ITS in the Miami Metropolitan Area:

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

ITS products and services have been deployed in Southeast Florida, primarily by the Florida DOT, since the early 1990s. Because some of these products did not perform as predicted, there was a chilling effect that reduced the political and consumer support for additional ITS deployments. Transportation officials in Miami-Dade County learned that ITS deployments do not naturally lend themselves to cooperative efforts unless an agency leads the coordination and increases the awareness of ITS among key decision makers and the general citizenry.

The Miami-Dade MPO, with the support of the Florida DOT, assumed the role of the local lead and, in 1995, created the ITS Steering Committee (now called the ITS Standing Committee). The ITS Committee was formed as a result of the knowledge gained from earlier ITS deployments; that is, ITS deployments must be cooperatively pursued in order to be successful. The ITS Committee is now working to plan for proper levels of deployment at state, county, and regional agencies to solve transportation issues. The ITS Committee aided these objectives in several ways through its diverse committee membership, the creation of the *Dade County ITS Plan*, and effectively streamlining the ITS process within the MPO.

The ITS Committee includes state, county, and transit agencies that are traditionally involved in transportation and non-traditional agencies and organizations. MPO staff recognized that to ensure ITS deployments are cooperatively pursued both types of agencies and organizations must support ITS. The MPO Director has been an especially strong supporter of ITS and was particularly aware of the need to include key agency officials who are both familiar with ITS and have some decision making authority. Representatives from the Miami-Dade County Information Technology Department, environmental agencies, the airport and seaports, the tourism bureau, and academia were invited to join the ITS Committee. Participation by these agencies, especially the Information Technology Department, has enabled a true countywide needs assessment to be conducted that takes advantage of other expansion plans from other non-transportation agencies, such as the school board and the county court system. The MPO staff have found that ITS deployments with multiple uses, such as the fiber optics communication network, are much easier for politicians and agency administrators to support.

The ITS Committee guided the creation of the 1996 *Dade County Areawide ITS Plan*, which served as a supplement to the Florida DOT's 1994 *Southeast Florida Intelligent Corridor Systems Plan*. The *Dade County ITS Plan* concentrated on tying ITS deployments along the interstates and primary state roads to the local roadway networks. It was generally recognized that ITS applications must include the municipal and county roads and local transit in order to have the full benefits of the systems realized.

The ITS Committee provides a forum for all agencies and organizations to update one another on ITS activities and to identify opportunities for coordination, such as the fiber optics study. The ITS Committee is currently expanding its vision to develop the tri-county Advanced Traveler Information System (ATIS) Program. As a result of this expanded scope, the ATIS Subcommittee was formed to create a regional vision and includes representatives from the Broward and Palm Beach MPOs.

In the Miami Metropolitan Area, ITS projects are being developed on both a regional and local basis. ITS has already been incorporated in the regional transportation plan, and the

transportation improvement program (TIP) contains a number of specialized sections of projects, including an ITS section, that are cross-referenced with traditional TIP sections. However, key transportation officials realize that more work is necessary before ITS can be considered mainstreamed in the Miami-Dade County transportation planning process. Although a regional perspective is now being developed and government agencies are now beginning to consider ITS, support from elected officials has been difficult to enlist in part due to the County government structure. Politicians are elected every four years and represent individual districts within the County, resulting in short-term and geographically limited perspectives instead of the countywide perspective necessary for ITS implementation. Occasionally, an ITS project that is supported by an elected official receives top priority and is funded in the TIP, however, there is no countywide direction.

Officials understand that the lack of support from the policy makers can be a serious roadblock to mainstreaming. To overcome this impediment, an education and outreach section was included in the *Dade County ITS Plan*. The education and outreach program targets both the general public and elected officials using private marketing consultants, as well as transportation center staff from local universities. Educating the general citizenry is considered an especially effective way to influence policy makers in Miami-Dade County due to the existing political structure. Concurrently, top administrators from the Florida DOT and the MPO continue to target their educational efforts to the area's policy makers.

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 Miami Metropolitan Area recommend five 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:

6. Create and use a committee or task force that fosters ITS discussions and opens communications
7. Develop an ITS plan (or ITS plans)
8. Educate elected officials and agency administrators in ITS
9. Make use of ITS advocates in the region to promote ITS applications
10. Use a peer-to-peer network of experts outside of the metropolitan area to gain knowledge regarding ITS technologies and applications.

In Miami-Dade County, transportation professionals did not designate any of the strategies as low priority. Five strategies were deemed most effective, although all of the remaining 12 strategies were considered effective. Transportation officials overwhelmingly judged the creation and use of committees or task forces as the most effective strategy to mainstream ITS. Interviewees cited the formation of the MPO's ITS Committee as being key to mainstreaming ITS within the transportation planning process. The Committee meetings provide a forum for member agencies and organizations to identify areas for cooperative efforts. One interviewee noted that before the Committee existed, projects might have been coordinated on a project level, but were rarely discussed on a regional level.

In contrast to the other metropolitan areas studied, the strategy of educating the general public to mainstream ITS was considered an effective strategy in the Miami Metropolitan Area. In the other metropolitan areas studied, this strategy was considered more effective after ITS products and services are implemented. However, since there is no countywide representation by elected officials in Miami-Dade County, this strategy was utilized to build political support by gaining the support of the general public. Many interviewees also espoused that strong ITS advocates greatly aid in mainstreaming ITS and credited the MPO Director with being a significant catalyst in these efforts. It was further noted that strong ITS proponents in the political arena could do much to promote ITS. Finally, the MPO Director and others credited their interest and knowledge for the use of ITS technologies in the Southeast Florida region to outside experts that either visited the metropolitan area or were contacts through an assortment of professional groups, including the Public Technologies, Inc., the Institute of Transportation Engineers, or the International Bridge, Tunnel, and Turnpike Association.

Table 2. Assessment of Strategies by Agencies in the Miami Metropolitan Area

Strategies Used to Increase ITS Awareness, Increase ITS Deployments, and Integrate ITS Activities within the Transportation Planning Process	MPO Mngmnt	MPO Staff	FDOT Ops	FDOT Planning	Florida Turnpike	Miami-Dade Expressway Auth.	MDTA-Transit	M-D PWD Design	M-D PWD Signals	M-D Info Tech	Academics	ITS Plan Com.	Area Consensus
Use or create MPO or non-MPO Committees/Task Forces	H	H	H	H	H	M	M	H	H	H	H	H	**H**
Develop ITS plans	M	H	H	H	H	-	H	-	H	H	H	M	**H**
Educate elected officials, top management of area transportation providers	H	M	H	H	L	H	H	H	M	-	H	H	**H**
Use ITS advocates in the region (at the MPO and other agencies)	H	H	H	M	H	H	H	H	M	H	-	M	**H**
Use peer-to-peer networking (experts outside metropolitan area)	H	H	M	H	H	-	M	-	H	H	H	-	**H**
Include ITS, or a reference to ITS, in the Regional Transportation Plan	M	M	H	M	-	-	-	H	M	-	-	-	**M**
Include ITS projects in the TIP	M	M	H	M	-	M	H	M	M	-	-	-	**M**
Include ITS in other MPO planning documents (CMS, MIS, etc.)	M	M	M	M	M	M	-	-	M	-	-	-	**M**
Determine data collection needs	L	L	M	-	H	M	M	L	L	H	-	M	**M**
Use data for planning and operations improvements (applying the data)	L	L	M	-	H	M	M	L	L	H	-	M	**M**
Educate other stakeholders (emergency response services, trucking)	M	M	M	-	L	-	H	M	M	M	M	H	**M**
Educate MPO staff	M	H	M	H	L	H	-	M	H	-	-	M	**M**
Educate general public	M	M	H	-	L	-	H	-	L	-	H	H	**M**
Conduct field trips for upper management (scanning reviews)	M	H	M	-	H	M	-	-	L	-	-	-	**M**
Develop a regionwide and program of ITS projects	L	M	H	-	M	M	M	M	M	-	-	M	**M**
Utilize the National ITS Architecture or develop a regional architecture	M	M	M	-	-	-	-	M	-	-	-	-	**M**
Involve academia	-	M	M	-	M	-	-	-	-	-	H	H	**M**

Ratings of Strategies:

H – High Priority. Most effective strategy. Interviewees recommend spending time and funds on this strategy.

M – Medium Priority. This strategy is recommended if the agency or region has time and funds.

L – Low Priority. This strategy is not recommended for areas just initiating ITS efforts due to time or funds.

"-" No response provided

M-D: Miami-Dade County

PWD: Public Works Department

Source of Ratings: Interviews conducted with representatives of transportation agencies in the Miami Metropolitan Area in August 1998

4.3 ROLE OF THE MPO IN THE ITS EFFORTS IN MIAMI-DADE COUNTY

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 projects. 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. This includes the role of the MPOs. Often this role depends on the MPO's responsibilities in the allocation of funds and application of these funds to projects, and their level of involvement with transportation operations within the area. Although the Miami-Dade MPO is one of the exceptions, MPOs generally play a supportive role more than a central one for mainstreaming ITS.

In Miami-Dade County, the MPO is especially powerful. The MPO covers one county and controls all federal, state, and local funds provided to the County, with the exception of National Highway System funds. Interviewees outlined a number of viable roles for the MPO in the mainstreaming and deployment of ITS projects, products, and services in the metropolitan area. There was agreement among the transportation officials interviewed that the MPO staff can have little effect unless the MPO staff members are knowledgeable of ITS.

Representatives from all of the transportation agencies in Miami-Dade County involved in ITS deployments and operations saw the MPO as the centralized lead coordinating agency. The MPO's Transportation Planning Council also viewed the MPO as the lead organization and greatly aided the mainstreaming of ITS into the planning process through the formation of an ITS Committee within the MPO structure. The MPO staff have been instrumental in creating a regional perspective by providing a forum for transportation professionals to meet, discuss ITS projects, identify areas for cooperative efforts, and develop the *Dade County ITS Plan*. The Florida DOT officials were among the many that noted the value of the MPO staff to think regionally, yet understand the parochial concerns of the multitude of agencies, elected officials, and citizenry involved.

Many interviewees cited the importance of the MPO staff as ITS educator and marketer, especially for the outreach efforts to the general public. Others noted the role the MPO staff play in elevating the awareness of ITS to the policy makers by including ITS into the regional transportation plan and the TIP, thereby showing these technologies as integrated projects, not just individual projects.

The Miami-Dade MPO staff were applauded for selecting the right mix of participants in the region's ITS efforts, including on the ITS Committee; for educating both itself and other agencies on ITS; and for the thorough consideration of ITS applications for Miami-Dade County

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

Interviewees in the Miami Metropolitan Area generally agreed on a wide range of roles and responsibilities that the 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 metropolitan planning documents
- Marketer of ITS to the Miami-Dade County elected officials, local agency and the private sector
- Sponsor of 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
- Impartial third party with a strong regional perspective
- Initiator and/or coordinator of the ATIS project.

In summary, the Miami-Dade County MPO staff have proven to be very effective undertaking the leadership role and promoting a regional perspective for deploying ITS. MPO staff recognized that they had to first learn more about the advanced technologies that comprise the ITS program in order to effectively undertake this leadership. Interviewees credited the MPO staff with taking the initiative to learn more about ITS, through a number of efforts such as attending ITS seminars, peer-to-peer reviews, and initiating studies. Almost all of the interviewees credited the MPO's formation of an ITS Committee with fostering a spirit of cooperation and coordination among the agencies. With the support from the Florida DOT, Miami-Dade MPO staff are now expanding their role to be the lead coordinator not just within Miami-Dade County, but among the three counties that comprise the ATIS project.

4.4 APPLICABILITY TO OTHER METROPOLITAN AREAS

Regardless of size, political composition, funding mechanisms, and relationships between stakeholders, metropolitan areas can attain the three conditions mentioned throughout this report that help facilitate mainstreaming ITS into the regional planning process by applying an assortment of strategies works for their area. Of the 341 MPOs, almost half are one-county MPOs like the Miami-Dade MPO. However, the MPO jurisdiction of Miami-Dade County is unique in many regards. There are natural barriers to continued urban expansion in the form of the Atlantic Ocean and the Everglades. Politically, although there is a strong county

government, the elected officials represent one of 13 districts and, therefore, there is not a strong political influence for regional initiatives. In addition, the Florida DOT has set a policy that limits new highway construction and expansion. While these characteristics present a unique climate in which the Miami-Dade MPO and other transportation agencies must operate, in many regards the actions that the transportation officials in this area have taken to mainstream ITS into the metropolitan planning process can be applied to other areas with their own set of unique characteristics.

In the Miami Metropolitan Area, the inclusion of a wide variety of key transportation and other public agencies has been pivotal in getting ITS products and services mainstreamed. The Miami-Dade County Information Technology Department is probably the most critical agency that has been added to the ITS Standing Committee. With the inclusion of communications experts from this department, discussions about ITS applications are now being tied to other government functions, including schools and courts. Transportation officials in Miami-Dade County have found that in order to gain the attention of the politicians, it is imperative to expand the scope of ITS projects beyond transportation and make the application as local as possible, without compromising the regional benefits.

Other areas can learn by the Miami experience and use as many local and national advocates as possible to increase the knowledge of and support for ITS applications. Another important lesson that can be emulated in areas outside of Miami-Dade County is that in the absence of countywide political representation, education and outreach should include efforts targeted to the general public before ITS projects are deployed. The general public can be instrumental in influencing transportation decision makers to support ITS.

In addition, as the transportation professionals in the Miami Metropolitan Area have found, it may be necessary to create ITS plans for different levels of government and types of operations to demonstrate to policy makers how regional programs and projects can provide positive impacts to each local community. The MPO staff are using short summaries of approved projects to show each elected official how TIP projects impact their specific district. The summaries are provided for each political district and by the type of project, which includes ITS projects. Planners have said this has simplified the method by which they communicate with the policy makers.

The act of mainstreaming ITS in the metropolitan planning process will require the coordination and cooperation of many agencies, especially between the lead planning agency, the MPO, and the lead deploying agency, usually the state DOT. The two principal institutions that are leading the ITS effort in the Southeast Florida region, the Florida DOT District Six and the Miami-Dade MPO, clearly demonstrated the cooperation that is necessary to get ITS mainstreamed. While the Florida DOT initiated the ITS program in the region through its Southeast Florida Intelligent Corridor System program, they have learned that support from local agencies, administrators, and elected officials are necessary to move forward. The District Six staff is still leading the deployment efforts throughout the three-county region, but have deferred to the Miami-Dade MPO staff to coordinate the ITS planning efforts and gain local support, including support from critical local agencies outside of Miami-Dade County.

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.

APPENDIX A
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APPENDIX B
ACRONYMS AND ABBREVIATIONS USED BY TRANSPORTATION OFFICIALS

General Acronyms and Abbreviations

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

CMF	congestion mitigation funds
CMS	congestion management system
CMS	changeable message signs (same as variable message signs)
CORSIM	micro-simulation model for freeway systems operations
CVISN	Commercial Vehicle Information Systems and Networks
CVO	commercial vehicle operations
DDS	data distribution service
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
FHWA	U.S. Department of Transportation Federal Highway Administration
FMS	freeway management system
FOIA	Freedom of Information Act
FOT	field operational test (ITS demonstration project)
FREQ	University of California at Berkeley freeway traffic flow simulation model
FREE-SYM	freeway simulation model
FTA	U.S. Department of Transportation Federal Transit Administration
FY	fiscal year
GHz	gigahertz
GIS	geographic information system
GPS	global positioning system

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

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

SAE	Society of Automotive Engineers
SDO	standards development organizations
SIP	state implementation plan
SOS	scope of service
SOV	single-occupant vehicle
SPR	statewide planning and research
S.R.	State Highway Route
STIP	state transportation improvement program
STP	Surface Transportation Program
STP-MM	Surface Transportation Program – Metropolitan Mobility
STP-XA	Surface Transportation Program – Any Area
STP-XU	Surface Transportation Program – Areas greater than 200,000
T-1	hard wire communications line
T-3	hard wire communications line
TCC	transit control center
TCC	traffic signal control center
TCIP	Transit Communications ITS Protocol
TCM	transportation control measure
T-DAD	Transportation Data Acquisition Display, a planning tool
TDM	transportation demand management
TEA-21	Transportation Efficiency Act for the 21st Century
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 (includes TDM, TSM, and ITS)
TMS	transit management system
TOC	traffic operations center
TP	transportation plan (also known as the regional transportation plan)
TRANST	computer model used to evaluate benefits from freeway management systems
TRB	Transportation Research Board

TSC	traffic systems center
TSCS	traffic signal control system
TSM	transportation system management
TSP	transportation system plan
Type 170	California/New York Type 170 traffic signal controller standards
UPWP	Unified Planning Work Program
U.S. DOT	United States Department of Transportation
UTCS	urban traffic control system
UZA	urbanized area
VMS	variable message sign
VMT	vehicle-miles of travel (or vehicle-miles traveled)
Volpe Center	U.S. Department of Transportation John A. Volpe National Transportation Systems Center
VTDS	video traffic detection system
WIM	weigh-in-motion
WWW	world wide web

Miami Metropolitan Area

BCT	Broward County Transit Division
CTAC	Citizen's Transportation Advisory Committee
CUTR	Center for Urban Transportation Research at the University of South Florida
DCEA	Miami-Dade County Expressway Authority, former name of MDEA
DCPW	Miami-Dade County Department of Public Works
DEP	Florida Department of Environmental Protection
DERM	Miami-Dade County Department of Environmental Resources Management
DMS	Florida Department of Management Services
FDOT	Florida Department of Transportation
FDOT-District 4	Florida DOT District covering Palm Beach and Broward Counties
FDOT-District 6	Florida DOT District covering Miami-Dade County
FDOT-District 11	Florida Department of Transportation's Turnpike District (statewide)
FFN	Florida Fiber Optics Network

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