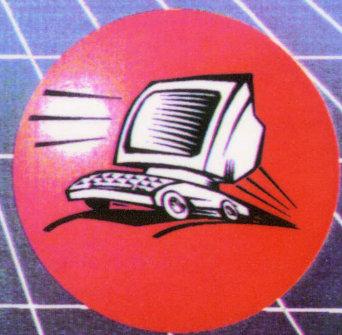
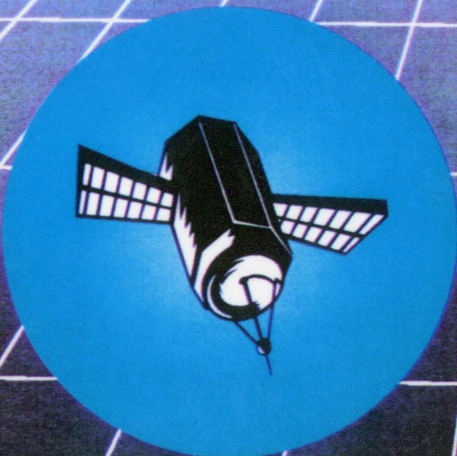
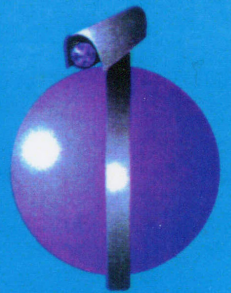


Intelligent Transportation System Plan for Dade County



July 1996

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ITS PLAN FOR DADE COUNTY

EXECUTIVE SUMMARY

The Local ITS Program

The introduction of an Intelligent Transportation System (ITS) element as part of the Transportation Plan of Metropolitan Dade County offers a much-needed complement to existing and planned transportation capacity and safety improvement projects. ITS applies advanced technology alternatives to transportation problem-solving, allowing for enhanced mobility along existing or newly constructed transportation facilities. It offers the precision of real-time information for more efficient and safe trip making.

Some ITS projects are under way in Dade and many more are being planned for the next several years. Metro-Dade's new Advanced Traffic Management System (ATMS), an Automated Vehicle Locator (AVL) System for the county's Transit Agency, the Southeast Florida Intelligent Corridor System (ICS) being developed by the Florida Department of Transportation, Electronic Toll Collection (ETC) facilities to be installed by the Dade County Expressway Authority and the Florida Turnpike, and traveler information kiosks to be located at major travel points such as the Miami International Airport and the Port of Miami, are examples of ITS projects to be locally deployed soon.

Local ITS-related activities must be fully coordinated. In preparing this Plan, the Metro-Dade Metropolitan Planning Organization (MPO), working in partnership with local transportation agencies, has undertaken a leadership role in assuring that the proper level of coordination and accountability is established and maintained in the implementation of the local ITS program. This plan introduces ITS as an important transportation program element and provides preliminary information about the additional projects needed and the estimated costs of implementation.

The ITS Planning Process

As the Plan is regularly updated, the benefits of ITS will be documented and performance measures of specific ITS benefits will be identified. Miami is one of the few truly intermodal cities in Florida and it is important to capitalize on that fact to promote the efficient use of all transportation modes. With Metrorail, MetroMover, Tri-Rail and a fleet of over 600 buses, the Miami area has considerable alternatives to the car available. A goal of the ITS program is to make mass transit modes more attractive to all potential users in addition to facilitating area vehicle traffic.

A common, consistent process for identifying, selecting, and monitoring performance of ITS projects is defined in the Plan. Public-private partnership opportunities and cost-sharing options are identified as well. The Plan identifies implementation strategies for ITS projects, by time



ITS PLAN FOR DADE COUNTY

EXECUTIVE SUMMARY

frame (immediate, short-term, mid-term, and long-term). ITS needs were determined based on area-wide and site-specific (corridor) assessments. The ITS Plan will be integrated with the area's overall transportation planning process and transportation management programs, and as such it will undergo regular updates, and will require extensive public involvement. It should be noted that ITS is not a technology looking for an application, but rather a tool to improve or help maintain existing investments in transportation infrastructure.

To examine the needs and applicable ITS strategies, Dade County was divided into major travel corridors. The focus of the ITS Plan is on immediate and short-term improvement projects which offer the greatest potential benefits. The approved urban area Transportation Plan already outlines a ITS investment of approximately \$300 million for the next twenty years. Most importantly, about 42 percent of this total (\$127 million) has already been programmed in the current 5-Year Transportation Improvement Program.

Potential for Success and Next Steps

The success of ITS deployment in the Miami Metropolitan Area will not only be driven by the level of technological advancement, efficient integration, and cost-effectiveness of projects, but also by the level of community support for such projects. Thus the feasibility, and therefore derived benefits, of ITS projects in Dade County will be highly dependent on support from municipalities and interested local groups. Government agencies are finding it increasingly difficult to fund transportation projects, particularly ITS applications which are relatively new and still attempting to prove themselves worthy of funding. It is also very important to consider the private sector for financial and technical assistance.

Finally, five "action items" are also recommended in the Plan. First, the Metro-Dade MPO Board should formally approve this Plan. Second, the ITS Steering Committee should continue to meet periodically to discuss ITS issues and monitor progress toward targeted goals. Third, several more key constituency members should be recruited to serve on this Committee. Fourth, an ITS education and public involvement program should be initiated by the MPO. Fifth, the initial ITS project description tables, presented in this Plan, should be reviewed and updated (as necessary) at least on an annual basis.

Glossary of Terms

- APTS - Advanced Public Transportation System**
This term encompasses all of the ITS applications as applied to public transportation systems and vehicle fleets, such as AVL on the transit fleet to give dispatchers accurate location information.
- ATIS - Advanced Traveler Information Systems**
Devices to inform travelers in real-time of road conditions, routes to take, construction zones, etc., improving their trips.
- ATMS - Advanced Traffic Management Systems**
Generally, this term indicates applying advanced technologies to the traffic signal system. In particular, computerizing the signal timings and linking major travel corridors so that they are adaptive to traffic. Also includes video monitoring and surveillance and variable message signs.
- AVI - Automatic Vehicle Identification**
The process by which a vehicle is uniquely identified without any action required by the driver or an observer as it passes specific points. Used in conjunction with ETC.
- AVL - Automatic Vehicle Location**
Using various technologies, a vehicle's exact position can be determined in real time. For example, a satellite receiver can be placed on a bus and at any time the transit management center can locate the bus using a global positioning satellite.
- CVO - Commercial Vehicle Operations**
Those ITS activities related to commercial vehicles such as automatic pre-clearance at weigh stations, weigh-in-motion, etc.
- ETC - Electronic Toll Collection**
Using various forms of communication devices, a vehicle's identity can be automatically identified while it drives past a toll booth at highway speeds. The account linked to that vehicle is then debited for the amount of the toll.
- ETTM - Electronic Toll and Traffic Management**
This is an extension of ETC. It includes monitoring traffic using the same communications devices used to collect the tolls. It can yield real-time, highly accurate, traffic data by utilizing transponder-equipped vehicles as traffic probes.
- FHWA - Federal Highway Administration**
Federal Department of Transportation

- HAR - Highway Advisory Radio**
Dedicated radio stations advise travelers of conditions along various routes.
- HAT - Highway Advisory Telephone**
Dedicated telephone services that advise travelers of conditions along various routes.
- HOV - High Occupancy Vehicle**
In a broad sense, any vehicle with more than one person in it.
- ITI - Intelligent Transportation Infrastructure**
The infrastructure upon which ITS user services will be based. An example would be fiber optic cables to carry traffic information from the surface streets to traffic control centers so that the traffic signal timings can be computer controlled.
- ITS - Intelligent Transportation Systems (formerly Intelligent Vehicle Highway Systems-IVHS)**
The use of advanced technologies to enhance the existing transportation infrastructure. Examples include computerized traffic control signal timing and electronic toll collection.
- LOS - Level of Service**
A term that indicates the congestion level on a highway, ranging from A to F. A LOS of A indicates no congestion; a LOS of F indicates the road is over capacity and highly congested.
- LRP - Long Range Plan**
- SOV - Single Occupant Vehicle**
A vehicle with only one person -- the driver -- in it.
- SunPass - Proposed ETTM program for Florida's Turnpike, currently scheduled to begin in late 1997.**
- TIP - Transportation Improvement Program**
- UPWP - Unified Planning Work Program**
- VES - Video Enforcement System**
A system using video cameras to enforce toll payment in ETC toll booths.
- VMS - Variable Message Signs**
Large, programmable signs along the highway that indicate to motorists special incidents, construction, or problems along the roadway.

**Intelligent
Transportation
System Plan
for
Dade County**

1.0 Plan Outline

This document describes the comprehensive plan developed for the future of intelligent transportation systems (ITS) in Dade County. Included in this Plan is an overview of ITS in general, in the U.S., in Florida, and in the Dade County area. ITS projects affecting Dade County planned or underway in Florida, Broward County, or Palm Beach County are briefly described. Section 1 also examines the purposes behind developing this comprehensive plan. Some of these purposes include the need for better inter-agency coordination, public accountability, and public support.

Section 2 explains ITS “themes” / goals in Dade County. Section 3 details recommendations on the organization of ITS in Dade county. This includes ITS program managers, committees and citizen organizations’ roles in the development of ITS in Dade County.

Section 4 examines the required planning process needed in order to incorporate ITS programs into Dade County’s plans, including the Long Range Plan (LRP), Unified Planning Work Program (UPWP), and the Transportation Improvement Program (TIP). It also examines how these planning mechanisms may link to the Southeast Florida Intelligent Corridor System (ICS) Program. Section 5 first examines the critical transportation needs of Dade County, and then examines what ITS user services are most appropriate for use in the county. The area is then broken into roadway corridors and each corridor is examined in depth to determine:

- its predicted level of service (LOS);
- what conventional projects are already slated for the corridor;
- the ITS projects that are already planned for the corridor;
- the time frame for implementing the conventional and ITS projects;
- any further ITS recommendations for each corridor;
- an order of magnitude cost for the ITS and conventional improvements; and
- agency responsibility for the ITS projects.

Section 6 examines the public involvement and education program for ITS in Dade County. Section 7 details some opportunities and methods for encouraging the private sector to become involved in ITS. This section includes ideas to initiate public-private partnerships and has a corresponding appendix listing contacts in the private industry. Section 8 offers a summary, conclusions, and most importantly, recommendations on how Dade County should proceed with ITS projects in the future.

1.1 ITS Plan Objectives

This comprehensive Plan has four main objectives. The first, and most important, is to coordinate ITS project planning and integrate it with the area’s overall transportation planning process. Without this coordination little progress can be made in ITS in the county. It is critical to have an effective way of developing, coordinating and getting ITS projects initiated and deployed as a result of this plan. The exact projects and their details are already examined to an extent in the ICS Program,

therefore an acceptable method of deploying ITS projects is the most important element. In conjunction with this coordination of projects, this Plan will provide general policy planning in ITS.

Related to coordinating the ITS projects, the Plan also seeks to obtain and sustain overall support for ITS, including support from the private sector. The benefits of ITS will be examined so that the agencies involved (public and private) and the general public will be able to clearly see the benefits of ITS. This Plan will also be readily available to the various agencies to show that there is a specific plan of action for ITS in Dade County, further encouraging support and participation.

The final objective of this Plan centers on the public. The MPO must provide accountability to the public for all of its spending, including investments in ITS. This Plan examines how to best invest in ITS and how to inform and involve the public in order to achieve public accountability.

Objectives of This Plan

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

1.2 Overview of Intelligent Transportation Systems

Intelligent Transportation Systems (ITS) -- formerly Intelligent Vehicle Highway Systems (IVHS) -- involve the application of advanced technologies to improve transportation systems. These technologies typically include information processing, communications and electronics. These systems have the potential to significantly reduce traffic congestion, enhance mobility, improve safety, decrease delays, and reduce environmental pollution at a fraction of the price of constructing new highway infrastructure. The FHWA estimates a nationwide investment of \$150 billion in conventional transportation infrastructure is needed over the next ten years to maintain our current roadway levels of service. However, it is estimated that \$10 billion worth of ITS investments will accomplish two-thirds of what is needed.

ITS systems face numerous obstacles in their path to wide scale deployment. Possibly the most common, and most difficult, obstacle is institution issues, which involves the coordination of multiple agencies in multiple jurisdictions, that are part of one transportation region. Coordination between these agencies is critical to the success of ITS due to the unconstrained, open-ended nature of ITS. ITS does not conform to traditional boundaries but is multi-jurisdictional. ITS projects will

typically cross numerous boundaries as they attempt to integrate and communicate traffic information over a large area. Therefore, part of this Plan will be to better coordinate Dade County's ITS plans with National and State ITS activities outlined below.

1.3 The National ITS Program

The Federal Highway Administration's (FHWA) Joint Program Office (JPO) has taken a strong role in the development, and more recently, wide scale deployment, of ITS. The federal role is now focused on the deployment of the communications backbone and the infrastructure required for ITS user services. The USDOT will also encourage public-private partnerships, help to develop the public and private transportation data, partner with the public and private sectors to promote and test ITS, establish an intelligent infrastructure, ensure national compatibility, and manage the national ITS program.¹

1.3.1 User Services

The USDOT has broken ITS into 30 different user service categories to better define and organize ITS spending, research and deployment. These categories are based on the benefits users derive from the various technological applications. Section 5.2 describes these services in- depth.

To foster more public/private partnerships the USDOT, in conjunction with State DOTs and local chapters of ITS America, held six public/private partnership workshops in 1995. These workshops helped the private sector understand the potential benefits of ITS and partnerships. These workshops are a good indication of the importance the Federal Government places on private sector participation in ITS.

A \$20 million, three-year project to develop a national system architecture was completed in the summer of 1996. Four industry teams attempted to produce an open national system architecture. Of these four architectures, the most promising two (by Loral Federal System Group and the Rockwell International teams) were chosen to be integrated and refined in order to produce a final product. This effort is partially complete, with some user service architectures well defined. This effort displays the USDOT's commitment to insuring national compatibility in ITS.

To manage the National ITS program, IVHS America (now ITS America) was created. ITS America acts as a federal advisory committee to DOT on ITS issues. The Joint ITS Program Office was also created to oversee all of the department of transportation ITS activities, including those of the:

- Federal Highway Administration (FHWA);
- Federal Transit Administration (FTA);
- National Highway Traffic Safety Administration (NHTSA); and
- Research and Special Program Administration (RSPA).

1.3.2 Operation TimeSaver

In January 1996, the USDOT announced a new initiative, Operation TimeSaver, which is designed to expedite the process of installing ITS in the nation's metropolitan areas. It will accomplish this goal by encouraging Intelligent Transportation Infrastructure (ITI) be installed in the 75 largest metropolitan areas around the country. The ITI focuses on nine fundamental systems that must be able to communicate with one another. The architecture for this communication is in the development stages now, and is set to be finalized in the summer of 1996. It is critical that the various systems communicate so that the information gathered by each can be used by all systems -- vastly increasing the capabilities of ITS as a whole. These nine systems include:

The Intelligent Transportation Infrastructure (ITI)

- computerized arterial traffic control systems
- freeway management systems
- incident management programs
- emergency response systems
- traveler information systems
- electronic toll collection
- electronic fare payment systems
- transit management systems using automatic vehicle location (AVL) technologies
- advanced warning systems at railroad at-grade crossings

Since Miami is one the 75 largest metropolitan areas, the USDOT will encourage the infrastructure to be in place in Miami to accommodate these systems within ten years. Operation TimeSaver also includes a national ITS model deployment to be showcased in two to three cities. These model cities will install all of the above infrastructure, plus the user services based upon the above, to serve as examples to the rest of the country. Miami was one of two dozen cities to submit an application to be considered as one of these model cities.

Operation TimeSaver also calls for increased outreach to state and local officials to ensure the purchase of forward compatible equipment. As old systems become outdated and obsolete, local governments need to purchase new equipment that will be compatible and will integrate smoothly with ITS, whether or not ITS is already installed. There will also be a professional capacity building program to ensure a trained ITS professional workforce. This service will be provided to municipal and state governments at a cost.

Recently, the Environmental Defense Fund (EDF) along with several other organizations wrote a letter to the DOT. This letter lists several suggestions to help Operation TimeSaver become a reality. The EDF felt that Operation TimeSaver was disconnected from “what is happening in the metropolitan planning and programming process of expending state and local dollars and leveraging federal dollars.”² Several of the suggestions included:

- have the DOT promote fair competition between ITS and conventional highway system expansion strategies;
- withholding funds to conventional transportation infrastructure expansion projects that have not given serious consideration to ITS alternatives;
- highway expansion projects that have been “shelved” for several years should be reexamined with a focus on how ITS could enhance the project;
- the DOT and Environmental Protection Agency (EPA) should take further action to help transportation agencies get credit for using ITS to improve air quality; and
- there should be greater ITS outreach, training, and public involvement. It was also suggested that this training be done through ITS fellowship programs at MPOs.

These suggestions are clearly aimed at increasing the role of ITS in transportation projects through practical methods -- namely funding mechanisms.

1.3.3 Funding

Federal funding for ITS projects is currently focused on deployment and operational tests that lead directly to deployment. Other funds for infrastructure come from Federal-Aid programs like the National Highway System (NHS), the Surface Transportation Program, and the Congestion Mitigation and Air Quality program. ITS funding for fiscal year 1996 includes \$113 million from ISTEA and \$109.78 million from general funds. General funds are categorized in Table 1.

Cities with some, or all, of the nine systems listed under Operation TimeSaver will clearly have an advantage in becoming one of the Operation TimeSaver model deployment sites. Miami is well on the way to having the required infrastructure in place (ATMS, Freeway incident management systems, incident management programs, emergency response systems, ETC, electronic fare payment systems, AVL for transit -- see section 5.4). According to the FHWA, the funding may not come in the first year when only two to three ITS model cities will be chosen, but more funding is expected for the following year and it may be spread among more cities.

Table 1: ITS Federal Funding

ITS Program General Operating Expenses (in millions of dollars)	
Program	FY 1996 budget
Research and Development	24.48
ITS Operational Tests	32.50
Commercial Vehicle Operations	14.50
Automated Highway System	14.00
Advanced Technology Applications	0.00
Program and Systems Support	11.30
Priority Corridors	0.00
Crash Avoidance Research	13.00
Trailblazer initiative	0.00
Total ITS	109.78*

*Of this \$109.78 million, \$40.95 is earmarked for specific projects like the I-10 Mobile, Alabama Causeway (\$3 million) and the Greenlight CVO project, Oregon (\$7 million).

1.4 Florida's ITS Programs

Florida's ITS plan is summarized in the document *Florida ITS Conceptual Plan (Operations Perspective)*. This plan defines both short and long term ITS projects and goals for the state. It summarizes statewide objectives and plans, and details each district's ITS existing and future projects.

The four main recommendations made by the plan include:

The Main Recommendations of Florida's ITS Plan

- For the areas that use computerized signal control systems there is a need to use the information that can be gathered from such a system to better manage traffic on surface streets and even freeways.
- Use advanced communications devices to keep drivers well informed of traffic conditions and incidents.
- Aid commercial vehicle operations (CVO) through a myriad of ITS programs, including electronic pre-clearance, automated roadside safety inspections, and commercial fleet management.
- Develop an electronic toll and traffic management (ETTM) program using automatic vehicle identification (AVI).

1.4.1 District Four's Plan

Due to FDOT District Four's proximity to Metro-Dade (District Four includes Broward and Palm Beach Counties amongst others) it is important to examine ITS projects in this district and what impact they may have on the Metro-Dade area. Existing and committed ITS systems include an advanced traffic control system, incident management, emergency notification and personal security, AVL for transit systems, and en-route driver information.

The traffic signal systems proposed for the more densely developed areas in Palm Beach and Broward Counties will incorporate fiber optic communications technology. This will allow traffic data from the surface streets to be rapidly collected and used for such future ITS services as VMS, ramp metering, and traffic adaptive signal timings. There are also motorist aid call boxes installed on some of the more heavily traveled routes.

Near term ITS plans in this District include freeway incident management teams and service patrols, traffic adaptive signal systems, VMS, advanced public transportation systems (APTS), and ETC on the part of the Turnpike that runs through the district. Palm Beach County has already begun the installation of surveillance cameras along I-95 off-ramps--starting with Belvedere Road. Long term objectives include detour route timing plans, wide-scale CCTV surveillance (90 cameras in Palm Beach County alone), freeway operations centers, ramp metering, increasing the number and coverage area of the advanced traffic management system (ATMS), and a real time public transportation database and user interface.

Although only a limited number of North-South routes carry significant traffic between Broward and Dade Counties (Florida's Turnpike, I-95, US 1 and A1A), it is still critical to ensure

compatibility between ITS systems in the counties. For example, ETC along Florida's Turnpike will be compatible between counties, but for the ease of drivers the systems should also be compatible with those proposed on the Venetian and Rickenbacker Causeways. Other examples of compatibility necessities include:

- traffic data collection and dissemination. Compatibility will be essential when transmitting data to in-vehicle navigation systems, user kiosks, or any data retrieval site as these sites will often require data from all three counties. En-route driver information (VMS in particular) will offer more meaningful messages to motorists if the message displayed can take into account traffic conditions in the entire area;
- incident detection and management. If data on incidents is rapidly disseminated to the proper authorities in the entire area then incidents occurring near county lines can be dealt with more efficiently and in a more timely manner; and
- for the longer commutes, particularly from Palm Beach and Broward Counties to downtown Dade County, all car/van pooling that occurs will significantly reduce total vehicle miles of travel.

The compatibility problem is addressed in Section 3.0 - ITS Organizational Structure and Section 5.4 - Dade County ITS Project Descriptions. Briefly, it is necessary to ensure the correct technical experts involved in each project remain in contact with one another. These experts would ensure that all projects would be compatible and when problems arise bring them up to the project leaders and the ITS Steering Committee.

1.4.2 ITS Florida

As part of the state's commitment to ITS, Florida developed a state chapter of ITS America in April of 1994. ITS Florida was the first official state chapter and has a very active and growing membership. Yearly meetings attract more than 100 attendees with many vendor presentations available for examination. Current efforts include a membership drive throughout the state and organizing an advanced technology seminar on smart cards for Florida transit system operators.

The primary goal of this organization is to distribute ITS information to people and organizations throughout the state including elected officials, transportation professionals, citizen groups, and even school children. In fact:

The mission of ITS Florida, as a chartered state chapter of ITS America, is to foster the application of ITS solutions in Florida by sharing ideas and timely information with our membership, stimulating public-private partnerships, advocating ITS deployment, offering guidance to policy makers, and encouraging interest and support of ITS throughout the state.³

Becoming involved in ITS Florida is therefore important for a representative from Miami, and for the MPO to take full advantage of this service. See Appendix A for information on contacting ITS Florida.

1.4.3 Southeast Florida Intelligent Corridor System (ICS)

The largest ITS effort in the State of Florida is the ICS Program, run by the FDOT District 6 Office. This program encompasses Palm Beach, Broward and Dade Counties and “emphasizes providing integrated user services of travel, traffic, public transportation, and emergency management.”⁴ To date, field testing and deployment has occurred along the I-95 corridor in the Golden Glades area. Nevertheless, the ICS organization is in place and a comprehensive plan has been developed for ITS possibilities in transit, on freeways, and on signalized streets throughout the three county area. The four main goals of the ICS Program are as follows:⁵

ICS Program Goals

- Integration of all major modes of travel to provide users multiple choices.
- Optimization of existing resources in Southeast Florida.
- Establishment of a real time traffic control and traveler information system using ITS and high-tech communication technologies.
- Development of administrative structure for implementing and operating the system.

The ICS has already examined current and future roadway conditions, developed an ITS management structure, listed all applicable ITS user services for Dade County, derived both the costs and benefits for the various ITS activities proposed, detailed how each system should work, and what benefits it is expected to deliver. The ICS is a comprehensive ITS Program for Dade County, but some critical elements need further definition. These elements include multi-agency coordination and responsibility, a public involvement/participation plan, and ITS project selection rationale. This Plan is intended to supplement the ICS Program, particularly in these critical areas.

1.5 The Local Perspective

A critical step for ITS is to involve all levels of government, especially local governments. “Because state and local governments are directly responsible for construction, operation, and maintenance of the transportation systems in their jurisdictions, they have a major role in how ITS deployment will take shape.”⁶

This reliance on local governments in deployment of ITS technologies has fostered the creation of the *Local Government Intelligent Transportation Systems Program*. This program is administered

by Public Technology Inc. (PTI), which is an arm of the national local-government organizations of the:

- National League of Cities;
- International City/County Management Association; and
- National Association of Counties.⁷

The goal of this organization is to increase local government's awareness and use of ITS. The two year program began in 1994 and is in collaboration with the U.S.DOT. The Metro-Dade MPO has been an active participant in this program.

Metropolitan Planning Organizations also play a strong role in the advancement of ITS as a result of ISTEA. According to National Program Plan for ITS,

*MPOs are responsible for deploying ITS infrastructure based on local needs, priorities, and decisions, particularly in the areas of congestion management and air quality standards management. These broad new assignments place MPOs, working together with state and local governments, in a strategic position to advance ITS.*⁸

Despite the clear need to coordinate ITS at a local level, ITS plans conceived and developed at the local level are extremely rare. Local ITS plans are critical to the success of ITS programs and this position has been reinforced during the creation of this plan. Although the ICS Program was extremely comprehensive, it has met with limited success to date, in great part due to lack of coordination, understanding, and support at the local level.

2.0 Dade County ITS Themes and Performance Measures

The Miami urbanized area is the fourth most congested area in the country and in desperate need of congestion relief. Table 2 shows how the worst congested areas of the country rank (any area with a roadway congestion index value above one has undesirable levels of congestion⁹).

This level of congestion explains why so much time, energy, and money has already been spent on ITS in the area. The State ITS Plan includes a great many more proposed projects for this area than any other, and the ICS Program is one of the larger ITS programs in the country.

Table 2: The Ten Most Congested Cities in America

Rank	Urban Area	Roadway Congestion Index*
1	Los Angeles, CA	1.54
2	Washington, DC	1.36
3	San Fran-Oak, CA	1.33
4	Miami, FL	1.30
5	Chicago, IL	1.28
6	San Bernardino-Riv, CA	1.22
7	San Diego, CA	1.22
8	Seattle-Everett, WA	1.22
9	Detroit, MI	1.19
10	Atlanta, GA	1.17
*An Index that relates the vehicle kilometers of travel on freeways and principal arterial streets to the capacity of those roadways		

Source: D.L. Schrank et al., Urban Roadway Congestion - 1982 to 1992, Volume 1: Annual Report

Transportation projects, and therefore funding, have traditionally been separated into one of three categories; capital (construction of new highways), operational (electricity to traffic signals) and maintenance (pothole repair). It can be argued that ITS can fit into all three categories simultaneously and should therefore seek funding from each category. Since ITS is expected to preserve mobility and safety in over-congested travel corridors, this will be the primary theme for ITS in Dade County. ITS funding can come from a variety of sources for numerous purposes,

including Federal-Aid programs like the National Highway System (NHS), the Surface Transportation Program, the Congestion Mitigation and Air Quality program, ISTEA, general USDOT funds, research funds, FDOT, and local funding options. This array of funding options makes it important for ITS supporters to keep abreast of, and pursue, the many funding possibilities that will become available. Additionally, once ITS projects are deployed, maintenance funding is often overlooked. Including operation and maintenance funding for deployed ITS projects is critical, just as it is for traditional highway infrastructure projects.

The first ITS “theme” for Dade County is preserving mobility and safety. Despite the fact that Dade County is already the fourth worst congested city in America, the streets may become much more congested. Dade County is expected to experience rapid growth over the next few years and simply maintaining the current level of congestion may be difficult. Thus, ITS projects for the area should attempt to preserve mobility and safety.

Since Miami is one of the few truly intermodal cities in Florida, it is important to capitalize on that fact to reduce dependence on the private automobile. Thus the second theme focuses on promoting intermodalism. With Tri-Rail, MetroRail (both conventional rail passenger trains), MetroMover (automated guideway transit) and a fleet of more than 600 buses, the Miami area has considerable alternatives available to the car. One of the goals of ITS must be to make these other modes more attractive to passengers. One way ITS can contribute is to give the traveler real time information on the status/location of the public transit vehicle he/she is interested in taking. This information should be readily available wherever the transit user finds it most convenient, be it in their homes, offices, at transit stops, or on the transit vehicles themselves.

The third theme is again focused on public transportation. Table 3 shows one of the primary measures of effectiveness of transit - passenger trips per capita per year. The table compares Miami and its peer transit organizations. Peer transit systems are based on many factors, including population of the city, density of the population, size of the transit system, modes available, and route miles. From the table it is clear that the Miami transit system has a large potential for ridership growth. ITS improvements to the system must attract new users by making the system better through such things as real time transit information and personalized transit service.

Table 3: Passenger Trips per Capita

City	Passenger Trips per Capita per Year
Atlanta	59.49
Detroit	57.70
Portland	55.37
Pittsburgh	42.55
Baltimore	40.36
Miami	36.44
Dallas	24.78
Average	45.24

Source: 1994 Performance Evaluation of Florida Transit Systems¹⁰

The final theme is focused on a significant part of Miami's economy--tourism. In 1994, fifteen million passengers arrived at Miami International Airport, overnight visitors spent over \$1 million on local transportation, and the total impact of tourists was estimated as \$13.4 billion dollars.¹¹ Due to the large number of tourists it is important to make their travel as smooth and efficient as possible. ITS should make their travels as easy as possible, informing them of the quickest and easiest routes to reach their destinations, preventing the hazardous driving maneuvers often performed when the driver is lost. This will encourage them to return to the area while improving traffic flow. This can be accomplished through the use of in-vehicle navigation devices, some of which are available now at car rental agencies in the Miami International Airport.

Dade County ITS Themes

- Preserve mobility and safety.
- Promote intermodalism.
- Increase the usage of public transportation.
- Enhance transportation for tourists.

There are many methods and statistics that can be used to measure progress on the above themes/goals, yet it will be difficult to determine how much progress is directly attributable to ITS. Despite this difficulty it is important to measure and keep track of certain statistics for the transit oriented themes, such as:

- average number of passengers/ridership on various routes;
- percent of mode transfers to transit;
- average vehicle occupancy along the routes;
- number of complaints stemming from vehicles not being on time;
- park and ride lot usage; and
- average daily traffic along the routes.

Analyzing statistical trends on transit routes that have installed ITS and comparing them to routes that have not installed ITS may be one way to track the success of any ITS improvements. However, growth in transit and automobile usage along a given route is influenced by many factors other than ITS--particularly housing and employment growth.

Despite the above difficulties it is important to measure and keep statistics on transit usage. This allows Metro-Dade Transit Agency (MDTA) and the Tri-County Commuter Rail Authority (TCRA) to set concrete goals and measure progress towards these goals. Two goals that this Plan would like to encourage for those routes are as follows:

- an increase in transit ridership of 15% over the next 3 years; and
- a decrease of 30 percent in the number of complaints from riders due to transit vehicles not being on time over the next 3 years.

AVL will increase MDTA's ability to track the location and corresponding arrival time of transit vehicles at specific stops. This in turn should improve scheduling abilities and improve "on time performance."

To determine the exact impact of ITS on tourism will be difficult. Tourism is affected by a multitude of factors--many more critical than ITS. Nevertheless, since detailed tourism figures are recorded and many tourists are surveyed it may be possible to determine if ITS is making an impact. The main source of information will be the Office of Tourist Research (in the Florida Department of Commerce). This office performs thousands of surveys on tourists every year and may have the capability to ask questions related to transportation and ITS. If this is the case, it would be possible to the general perception of visitors traveling in the Miami area over time and determining if the use of ITS makes a positive impact on their travels.

Other ITS performance measure targets in Dade County could include:

- significant reduction in queuing at all toll plazas that switch to ETC. This reduction will be dependant upon current toll plaza configurations and the ETC configuration chosen. Generally, a goal of 33% ETC usage during rush hours within the first couple of years of

use is obtainable. This can lead to a second goal of a drop in average waiting time of at least 25%.

- at least a 30% reduction in the total recovery time between when an incident occurs and when the incident is entirely removed from the roadway. This will translate directly into saving travelers thousands of hours in congestion due to incidents. This clearance time can be recorded by the freeway incident management team and tracked over time. This goal will be realized in stages as more real time information is available, but should occur within 5 years.
- a reduction in the overall traffic congestion in the county. This can be measured using vehicle travel times on various key roadways in the county. Although dependant on the current congestion of the road, growth and development along the road, and the ITS installed along the route (to name a few), it is critical to obtain these average travel times. This will be one of the best ways to measure the impact of ITS in an area. A minimum of a 10% travel speed increase within 2 years of an ITS improvement on a specific roadway should be set as a goal.

The goals outlined above are realistic and should be measured carefully and tracked over time. Reaching these performance measure targets and proving ITS has improved travel in the county is the key to future funding for ITS projects. It also helps the MPO become more accountable to the citizens as citizens can see, using hard numbers, exactly how their tax dollars are improving transportation.

3.0 ITS Organizational Structure

The proposed organizational structure for ITS in the area can be seen in Figure 1. This chart has no arrows, just lines, as every path is multi-directional. Information and suggested projects can come from any member of any committee or individual and sent to any other for examination. However the general function of each committee or individual is outlined below.

Since the ICS program is envisioned to form the backbone of all ITS activities in the region, it will serve as the focal point for ITS project coordination and integration. At the top of the chart is the ICS Program Manager. This will be a full time responsibility, where this person is in charge of the day to day operations of ITS, other full time ICS employees, as well as having an input into the long term needs and goals of ITS.

The ICS Coordinating Committee will consist of the FDOT District 4, 6 and 8 secretaries, and the executive director of each county's (Dade, Broward, and Palm Beach) MPO. Not on this committee, but in close communication with it, will be representatives from the Federal Highway Administration and Florida's Highway Patrol. This committee makes the ITS decisions for the three county area, and will take advice from the steering committee. This committee will meet only occasionally with the purpose of ensuring that ITS projects and programs in all three counties are proceeding according to plan.

There will be three ITS project steering committees, one for each county. The ITS project steering committee for Dade County has existed for over a year now, but is still missing several key participants. These additional members are being actively pursued to complete the steering committee. These people include the appropriate representative from each of the following groups:

- Airport Authority;
- Seaport Authority;
- Bureau of Tourism (or someone who can represent the interests of tourists); and the
- Dade County Expressway Authority.

The project steering committees will be responsible for many aspects of ITS in their respective counties, including developing the ITS project work schedule, developing ITS projects' cost-effectiveness analyses as required for inclusion in the TIP and UPWP, keeping their organizations informed of ITS activities in their organization and that may affect their organization, informing the other members of the committee of ITS in their organization, keeping the standing committees well informed on all ITS activities, and recommending an ITS plan of action to the Coordinating Committee.

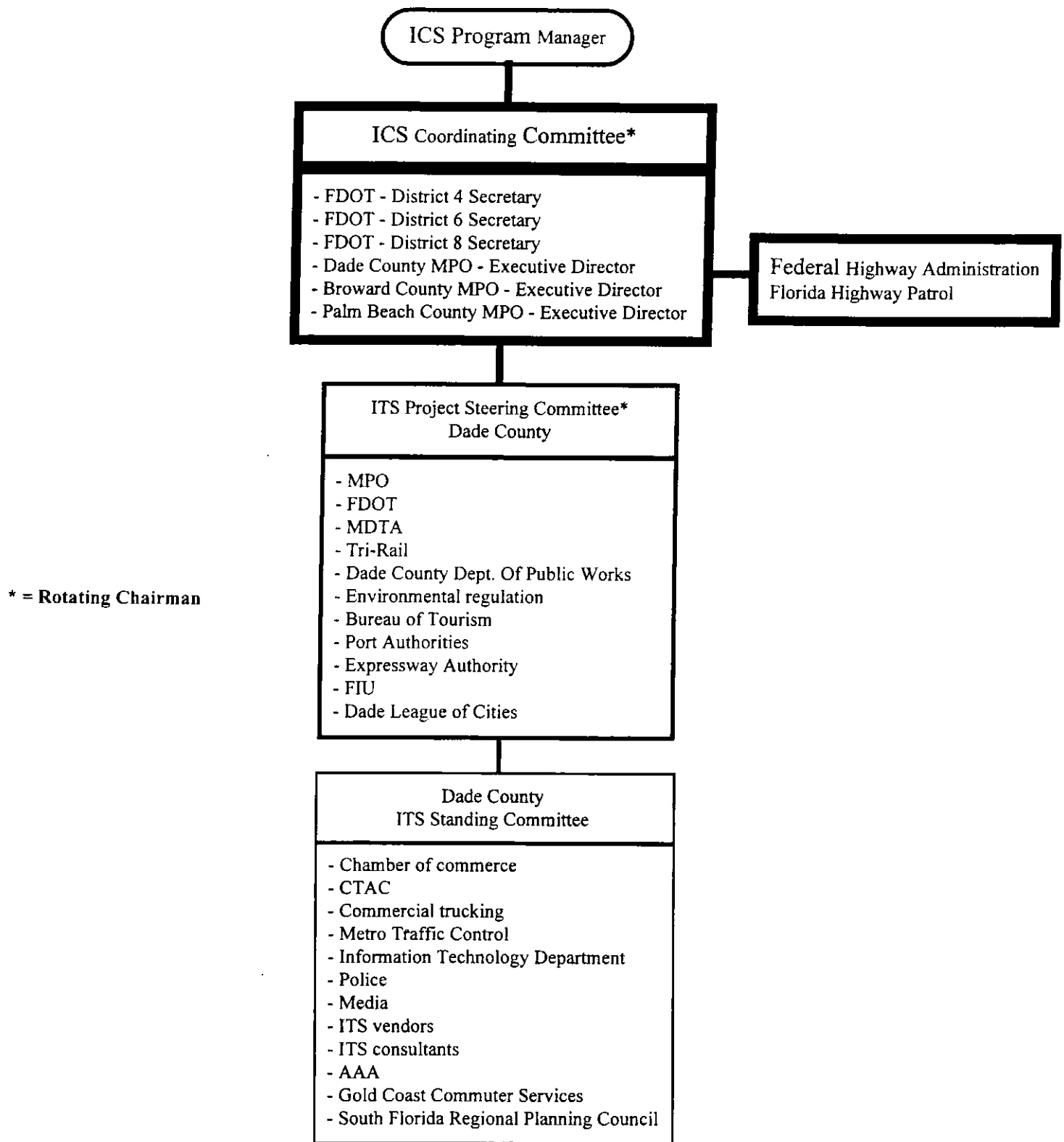


Figure 1: Recommended ITS Program Organization

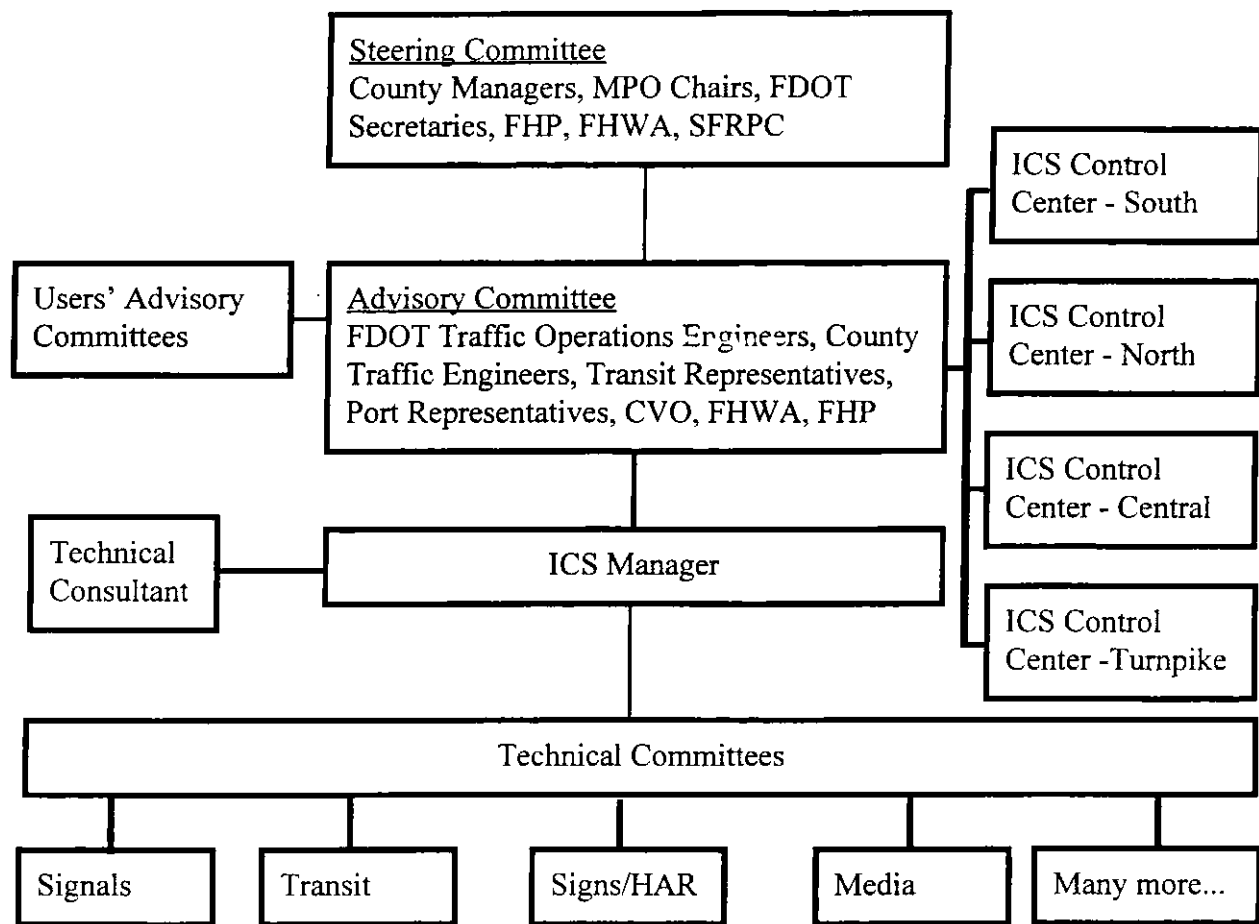


Figure 2: ICS Management Structure

The last committee, the ITS Standing Committee, is made up of a persons representing organizations who need to be kept well informed on all ITS issues. Many of the organizations represented on this group will be directly and highly affected by ITS projects. Also, having these organizations inform their membership about upcoming ITS projects will help to ensure the success of ITS. For example, members from the media will be on this committee, and through their respected medium inform the public of ITS projects, how they work, and their potential benefits.

The ICS Program has already designed an organizational flow chart that includes Dade County. This structure is shown in Figure 2. The program organization developed in this plan follows this structure somewhat with the ICS Program manager an important part of the organizational chart.

4.0 The ITS Planning Process

The most significant underlying feature of ITS project planning is that all transportation agencies within Dade County have acknowledged the importance of ITS. They must also be committed to incorporating ITS project planning into the regular transportation planning process (i.e., not separate ITS project selection), and evaluate and select ITS projects each year, as warranted, in competition with other projects for available traditional transportation funding.

ITS projects are evaluated and selected by consensus of the ITS Steering Committee and the TIP Development Committee. ITS projects are warranted if they have successfully gone through the 5-step process (outlined below). It is anticipated that ITS investment will vary year by year--probably small at first, then gradually increasing the more beneficial ITS proves to be. It is also very likely that in some years no new ITS projects will be warranted.

Initially, ITS project funding will be based on available funds that come from traditional funding sources. As ITS become more acceptable, proven, and widely deployed throughout Dade County, new sources of funding and cost-sharing are expected to be identified (e.g., FHWA Joint Program funds, cost-sharing from private industry, interagency cooperative agreements, congestion impact fees, etc.).

4.1 Five-Step ITS Planning Process

While the ITS project planning process should be conducted at the same time and in the same manner as conventional transportation planning, somewhat different criteria are suggested for project selection. A five-step process, very similar to the TIP project selection process, facilitates the project selection, prioritization, and ranking for stand-alone ITS-related projects or conventional project enhancements with ITS. A rank order listing of ITS projects can be established and individual projects selected for TIP inclusion in direct competition with the conventional projects. These five steps are displayed in Figure 3 and are as follows:

Step 1 - Project Identification

The first step for ITS project consideration stipulates that an ITS project proposal be submitted to the Dade County ITS Steering Committee for review and consideration. This proposal should include but not be limited to a detailed description of the project, cost-effectiveness analysis (compared to conventional alternatives), and cost-sharing opportunities (if any). ITS projects can be submitted for consideration by individuals, public agencies, or private companies.

Step 2 - Project Selection

The project selection step is intended to screen out ineligible ITS projects from those presented in Step 1. In order to pass the project selection process, the Dade County ITS Steering Committee must

consider four different sets of objectives. Specifically, eligible ITS projects must clearly address at least one area in three of the following four ITS plans:

- Dade County ITS themes (see Section 1.5);
- Operation TimeSaver objectives (see Section 1.2.2);
- ICS Program objectives (see Section 1.3.4); and
- State ITS program objectives (see Section 1.3.1).

If at least one objective in three of the four sets of objectives has not been addressed, the project identified in Step 1 is defined as ineligible. Upon successfully passing Step 2, the ITS project should be placed in the Dade County LRP.

Step 3 - Project Prioritization

This step identifies a set of qualitative and quantitative factors that will be applied to each project. Weighting of each set of objectives mentioned in Step 2, times the number of objectives addressed in each set is strongly encouraged. For example, objectives met under the Dade County theme could each be four points, objectives under Operation TimeSaver could each be three points, and so on. Expected benefits must be quantified. Qualitative factors would include consideration of such project characteristics as the project's relationship to specific corridor vs. area wide (general) needs identified in the project summary table, cost-sharing opportunities, level of support (interagency and the general public), time frame of importance, (immediate vs. short-term vs. long-term), etc.

Step 4 - Project Ranking

Factors previously identified in Step 3 would be applied equitably to each eligible ITS project to establish a rank order of importance. Eligible ITS projects would fall under two categories: planning or research, and deployment. Those eligible ITS projects that are related to planning or research of ITS would be ranked for inclusion in the UPWP. Those eligible ITS projects that are related to deployment would be ranked for inclusion in the TIP.

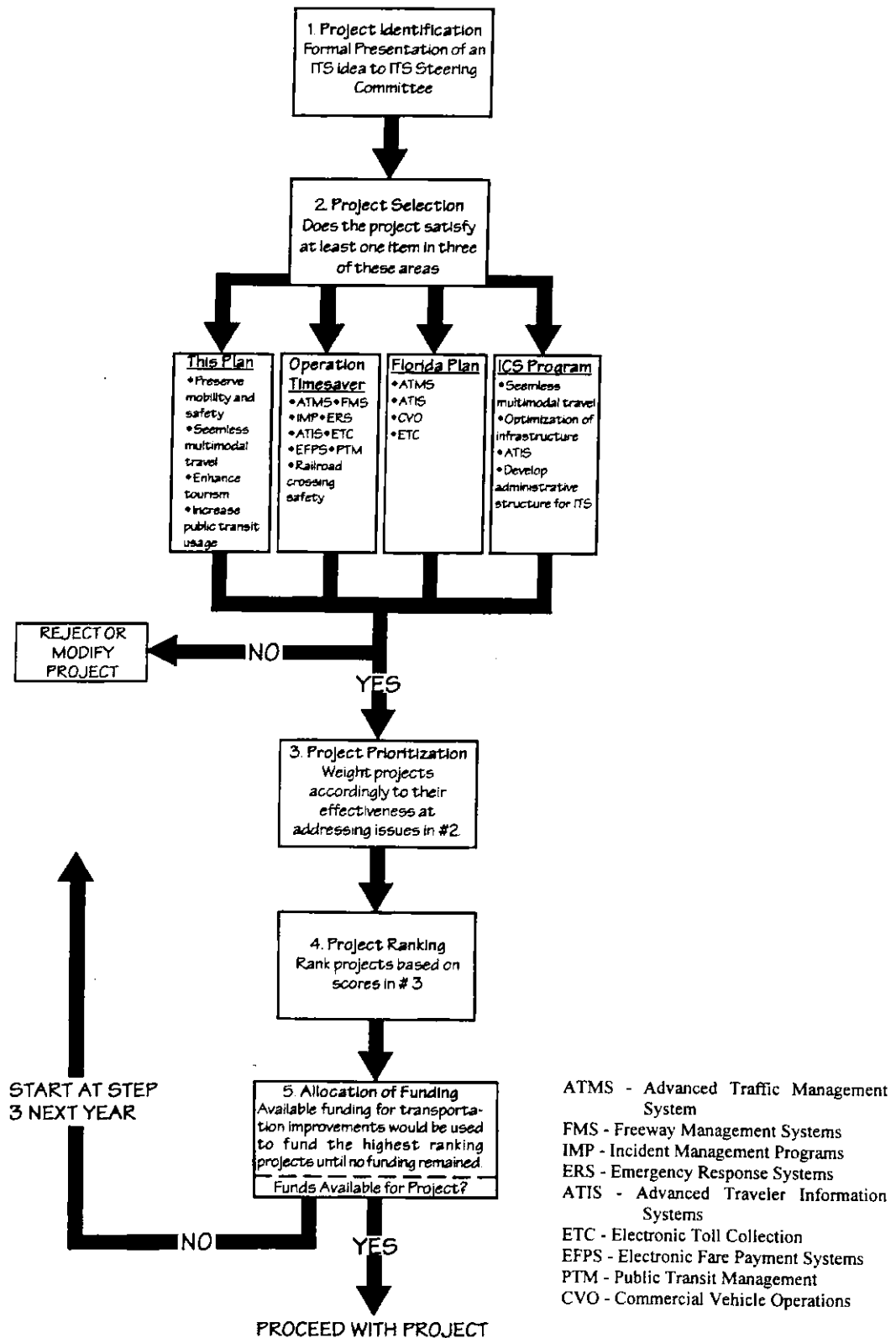


Figure 3: The ITS Planning Process

Step 5 - Allocation of Funding

This step would constitute the final determination of whether an ITS project would be included in the current UPWP or TIP. Available funding and comparative expected benefits would determine how many ITS projects could be added to each year's funding program. Each year the Dade County ITS Steering Committee would present their recommendations for ITS projects to the TIP Development Committee. If a sufficient level of funding is not available or consensus on expected benefits is not reached between the two committees, then no ITS projects would be added for the current year's program. It would be the decision of the Dade County ITS Steering Committee if previously ranked ITS projects, not selected for inclusion into the UPWP or TIP, would have to be re-cycled through steps 3 and 4 for the next year.

4.2 The Grandfather Clause

The ITS projects identified in this initial 1996 ITS Plan Element for Dade County represent completion of steps 1 and 2 (i.e., "grandfathered"). With the exception of those ITS projects already identified in the current TIP, all of the remaining projects must be subjected to steps 3 through 5. Beginning next year, all ITS projects entering the TIP must first be included in the LRP. This implies that these projects have passed through steps 1 and 2 described above.

5.0 ITS Project Priorities

This section of the Plan examines specific roadway corridors, as well as Dade County in general, and identifies ITS and traditional transportation projects that are planned or underway. Some suggestions for future ITS projects are also listed. With each project listing there is information such as the agencies responsible, where the projects are most appropriate and effective, when the projects should be scheduled, and why the projects were selected. The section focuses on current and future ITS projects in Dade County.

5.1 Identification of Congested Roadway Corridors

The project selection and identification process began by analyzing the transportation needs of Dade County. Although ITS user services are applicable and can help almost any part of the transportation process, it is still necessary to apply the technology where it is most needed. ITS is not a technology looking for an application, but rather a tool to improve or maintain existing investment in infrastructure.

To examine the needs and applicable ITS user services, Dade County was divided into logical sections. This helps in dealing with the massive amount of information available on transportation in Dade County. However, ITS by its very nature, does not readily conform to sectioning or artificial boundaries. ITS generally crosses all boundaries and links previously divided jurisdictions. Therefore, Dade was sectioned by roadway corridors, not political boundaries or map sections. Mass transit systems that run alongside these roadways were included with the corridor section. A general category was also developed and it encompasses all the ITS projects which operate on an area/county wide basis. The specific roadways were selected based on:

- their importance to travel in Dade County;
- interview responses from ITS Steering Committee members;
- roadway level of service (congestion level) predictions found in the *Year 2015 Needs Plan*;
- roadways that are over capacity according to 1991 FDOT traffic statistics; and
- the recently published Dade County Mobility Management Process/Congestion Management System.

The following roadways were repeatedly indicated as severely congested:

- I-95;
- SR 976 (Bird Road);
- SR 874 (Don Shula Expressway);
- SR 836 (Dolphin Expressway);
- SR 826 (Palmetto Expressway);
- SR 94 (Kendall Drive);
- SR 90 (Tamiami Trail);
- A1A; and
- US 1 (South Dixie Highway/Biscayne Boulevard).

Three other roads that were not emphasized by the Steering Committee or 1991 FDOT statistics, but will be well overcapacity in the future according to the Year 2015 Needs Report, are:

- SW and NW 27th Ave.;
- Northwest 36th Street; and
- Okeechobee Road.

These twelve highways are examined in depth in this section as they represent the backbone of highway infrastructure in the county and are currently over congested, or will become overly congested in the near future. Figure 4, a map of the Miami area, highlights these corridors.

The steering committee interviews also examined several other critical ITS issues in Dade County, including:

- problems and potential roadblocks to the implementation of ITS in Dade County;
- short and long term goals for ITS in the county;
- the perceived roles of the various public sector organizations involved in ITS;
- the role ITS will play in alleviating Dade County's traffic problems;
- the most promising ITS user services for Dade County; and
- the future role of the ITS steering committee

The guidance given by the steering committee members on the above issues had a great impact on this Plan. Their responses to the interview are summarized in Appendix B.

Dade County has also been examining six mass transit corridors for large scale infrastructure improvement and investment. Table 4 briefly details these corridors.

Table 4: Dade County Transit Corridors

Corridor Name	Description	Corresponding Roadway
South	Dadeland South MetroRail Station to Florida City (19.2 miles)	US1
Kendall	Dadeland North MetroRail Station to SW 137th Ave(7.5 miles)	Kendall Drive
North	Dr. Martin Luther King MetroRail Station to NW 215th Street (8.5 miles)	NW 27th Ave.
Northeast	Downtown Miami to NE 199th Street (13.6 miles)	I-95
Beach	Downtown Miami to 71st Street on Miami Beach (10.9 miles)	A1A
West	Downtown Miami to FIU at Florida's Turnpike(12.1 miles) with a connection to Miami International Airport	SR 836



Figure 4: Congested Roadway Corridors in the Miami Area

The mass transit corridors listed above correspond well with the roadways listed above, which were already selected for in-depth examination. Therefore the mass transit proposals along these routes are included in their corresponding roadway tables in Section 5.3.

These twelve roadway corridors will be examined in depth to determine the ITS needs of each. In addition, general ITS projects underway in Dade County are examined in a separate table. However, ITS user services will be described first in order to determine what user services are most applicable to Dade County and how the user services may satisfy the needs of the twelve critical roadways.

5.2 Identification of User Services Applicable to Dade County

ITS America has developed 30 categories called user services. These categories were developed such that all ITS activities could readily fit into one of them. The categories group similar ITS activities so that their architecture, marketing, and usage activities could be more readily coordinated, and it would be easier to discuss and plan ITS usage. All of the 30 user services listed in Table 5 offer some benefits to the traveling public in Dade County. Some of the advanced vehicle control and safety systems are several years away from wide scale deployment, but increased safety due to those systems is a future possibility for Dade County. The focus in this comprehensive Plan is on near term services which offer the greatest potential benefits.

This section will provide a listing of potential user services, including a brief description of each. At this stage in Dade County's ITS development the user service bundles with the most potential include travel and transportation management, travel demand management, public transportation options, electronic payment and emergency management.

5.2.1 Travel and Transportation Management

The **en-route driver information** user service:

- provides advisories to inform drivers of all traffic conditions
- includes both driver advisory systems and in-vehicle signing
- the information received must be real time, accurate, given in the proper location, and convenient for the public to use. Various mediums exist to get information to the public, including:
 - highway advisory radio (HAR);
 - highway advisory telephone (HAT);
 - variable message signs (VMS);

Table 5: ITS User Services

User Service Bundle	User Service
Travel and Transportation Management	En-Route Driver Information
	Route Guidance
	Traveler Services Information
	Traffic Control
	Incident Management
	Emissions Testing and Mitigation
	Highway-Rail Intersections
Travel Demand Management	Pre-Trip Travel Information
	Ride Matching and Reservation
	Demand Management and Operations
Public Transportation Operations	Public Transportation Management
	En-route Transit Information
	Personalized Public Transit
	Public Travel Security
Electronic Payment	Electronic Payment Services
Commercial Vehicle Operations	Commercial Vehicle Electronic Clearance
	Automated Roadside Safety Inspection
	On-Board Safety Monitoring
	Commercial Vehicle Administrative Processes
	Hazardous Material Incident Response
	Commercial Fleet Management
Emergency Management	Emergency notification and Personal Security
	Emergency Vehicle Management
Advanced Vehicle Control and Safety Systems	Longitudinal Collision Avoidance
	Lateral Collision Avoidance
	Intersection Collision Avoidance
	Vision Enhancement for Crash Avoidance
	Safety Readiness
	Pre-Crash Restraint Deployment
	Automated Highway Systems

The primary benefits of this user service are:

- it allows users to act on real time information to make their commute shorter. In turn, this increases the efficiency of the system as a whole as traffic will be better dispersed throughout the entire road network; and
- it can be particularly effective in diverting vehicles around accident locations. However, this is highly dependent on the availability of alternate routes, the congestion level on these routes, and the willingness of commuters to use these alternate routes or travel at alternate times.

The **route guidance** user service:

- is similar to the en-route driver information but users are also given a suggested route to follow from their origin to their destination; and
- the suggested route should take into account current traffic conditions and local amenities.

The primary benefits of this user service are:

- similar to the en-route driver information service but there is the ability to achieve an even greater efficiency on the road network. This can be achieved through computerized determination of each individual vehicle's preferred path; and
- dependant upon the same factors (like the availability of adequate alternate routes) as with en-route driver information.

A problem with this user service is the possible liability of public agencies suggesting a route to take. If something should happen on this route to the traveler(s) the agency may be held liable.

The **traveler services information** user service:

- gives the traveler any information they need to make any necessary stops; and
- allows "yellow pages" type information to be accessed pre-trip or on-route, in-vehicle or at selected public locations;

The primary benefits of this user service are:

- removes much of the guess work from driving;
- particularly beneficial for tourists;
- allows users to reach their destination quickly and without unnecessary driving. This will reduce total vehicle miles of travel; and
- it will reduce much of the hazardous driving that results from lost drivers looking for particular destination.

The **traffic control** user service:

- controls both surface street traffic using traffic signals and the freeway system by ramp metering, ATMS, CCTV, etc.; and
- attempts to move people through the street system more efficiently and gives priority to high occupancy vehicles (HOVs) and transit whenever possible.

The primary benefits of this user service are:

- it regulates and computerizes the use of surface streets and freeways for maximum efficiency and throughput.

The **Incident Management** user service:

- focuses on responding as quickly as possible to any lane blockage or incidents that occur and dealing with these problems as efficiently as possible;
- detection of these incidents can involve advanced sensors or a simple cellular phone number to alert the proper officials to the problem; and
- roving freeway patrols during rush hour are often part of this user service. This service patrol is often nothing more than a well equipped tow truck.

The primary benefits of this user service are:

- a reduction of incident duration. Freeway service patrols are the most effective means of reducing incident duration. Incidents cause over 1.3 billion vehicle-hours of delay annually.¹² Cities with incident management are reporting benefits to cost ratios of 20:1 to 36:1.

The **Emissions Testing and Mitigation** user service:

- focuses on reducing total vehicle emissions;
- Dade County already regulates vehicle emissions, and due to its status as a maintenance area for air quality status it is an important focus of the county;
- advanced technologies can be used to accurately measure vehicle emissions from the roadside and capture licence plates of polluters on video; and
- emission reduction is an indirect goal of all ITS user services as the reduction in vehicle miles traveled (VMT) and reduced congestion goals of other user services will decrease emissions.

The primary benefit of this user service is simply cleaner, healthier air.

5.2.2 Travel Demand Management

The goals of the travel demand management user service bundle are to reduce the number of vehicle miles traveled and reduce the demand on the roadway. Several methods to accomplish these goals are focused on including reducing single occupancy vehicles (SOVs), increasing transit usage, eliminating trips, reducing trip lengths, or altering the timing of a trip to avoid congested periods.

The **pre-trip travel information** user service:

- helps users easily make informed trip choices; and

- often focuses on transit information so that individuals will not have to travel as a SOV. This information could be provided in numerous manners such as over the telephone, cable TV, on a personal computer or at a kiosk.

The primary benefits of this user service are:

- to reduce the number of vehicles on the road by encouraging transit usage; and
- to reduce the number of vehicles on the road during congested periods by supplying travelers with current congestion information, and allowing them to choose an alternate time to travel.

Maryland, California, New York, and Minnesota have traffic information systems on cable TV. Several areas, including southern California have real-time traffic information on the world wide web. Many cities have traffic information reports on the radio. Operational tests include: Bellevue Smart-Traveler, Boston SmartTraveler, and the California Smart Traveler.

The **ride matching and reservation** user service:

- allows travelers to rideshare more conveniently, worry free, and in real time. A database of trip takers and people needing rides is maintained and these people are matched up in order to reduce the number of SOVs. With a reservation system people can be assured of return trips, or a local authority could set up a guaranteed ride home program where anyone left without a ride could be either vanpooled home or given taxi money.

The primary benefits of this user service are:

- ridesharing is made more convenient and flexible to suit a wider range of travelers, and
- increasing the number of HOVs, decreasing the number of trips and vehicles.

The **demand management and operations** user service:

- applies advanced technology in order to reduce congestion;
- focuses on reducing the number of SOVs during peak periods of travel; and
- methods include varying HOV lane restrictions to account for congestion, congestion pricing, parking management, encouraging telecommuting and alternate work schedules.

The primary benefits of this user service are:

- reducing the number of vehicles on the road during congested periods.

5.2.3 Public Transportation Operations

The four user services in this category include urban, suburban and rural transit both on fixed routes and flexible/responsive routes. It includes all forms of public transportation, including buses, light rail, heavy rail, commuter rail, subways, even shared taxi rides. The goal is to enhance these services in order to make them more attractive and encourage mode shift away from SOVs.

The **public transportation management** user service:

- computerizes, automates and enhances transit operations and maintenance, often through the use of AVL on the vehicle fleet;
- allows better intermodal switching;
- improves response to delays; and
- helps to keep excellent records to improve maintenance scheduling.

The **en-route transit information** user service:

- makes available real-time transit and traffic information on vehicles and at terminals in order to assist people in planning trips and modifying their trip after it has begun.

The **public travel security** user service:

- aims to improve safety and security at all points along the trip; and
- uses advanced sensor systems for monitoring and alarms, Mayday functions on board vehicles and at transit stops.

The primary goal of all the above is to simply increase transit ridership. This will happen because the transit system becomes more convenient, safe, dependable, flexible and 'user friendly'. The primary benefits include decreased congestion and traffic and increased transit revenue.

The **personalized public transit** user service:

- allows for transit links and special services to be provided where fixed route transit is not economically feasible. Two options include flexible routes (fixed route carriers make short detours off their routes) and random route (transit vehicles are assigned routes based on requested service) operations; and
- uses personalized, random route transit vehicles including small busses, taxi cabs, etc.

The primary benefits of this user service is again in attracting more riders to transit. This relieves congestion by reducing the number of SOVs on the road.

5.2.4 Electronic Payment

The electronic payment user service:

- includes parking fees, public transit fares, and highway tolls. However the fare payment media is envisioned to also be used for banking, hotels, car rentals, and most everyday activities; and
- allows payments (tolls, fares) to be paid quickly using electronics.

To date there are many variations of the technology available for electronic payment, from 'dumb systems' with one way communication to advanced systems where the fare card and reader talk to one another.

This user service speeds up transaction times, increases the data collection capability of the collection authority, and reduces the handling of cash, decreasing both security risks and time spent

handling cash while increasing audit capability. It can also allow for easier integration of congestion pricing.

5.2.5 Emergency Management

These user services focus on clearing up roadway incidents or blockages as quickly and efficiently as possible. They speed up the detection, response and removal times to reduce non-recurring congestion.

The **emergency notification and personal security** user service:

- reduces the time required to detect an incident through:
 - ease of reporting the incident and its location (ie. mile markers and cellular phone numbers to contact) ;
 - advanced incident detection mechanisms, algorithms which analyze traffic to determine if an incident has occurred or is likely to occur; and
 - automatic or simple to use Mayday buttons in vehicles equipped with automatic vehicle location devices.

The **emergency vehicle management** user service:

- reduces the time between when notification of an incident is given to when emergency vehicles arrive on the scene;
- will assist dispatchers in more efficiently coordinating the responding vehicles through emergency vehicle fleet management. This would include the use of automatic vehicle location devices;
- has emergency vehicles/dispatchers equipped with route guidance information to get vehicles to the incident and victims to the hospital as quickly as possible; and
- includes signal preemption to speed up the emergency vehicle's trip.

These two user services reduce the time it takes from when an incident occurs to when any injured people arrive at the hospital. This increases their chance of survival. It also decreases the amount of time required to clear an incident from the roadway, reducing congestion.

5.3 Project Tables

This section examines the critically congested corridors, as determined in Section 5.1, to determine what is already planned for these roadway corridors. These plans include the substantial conventional improvements planned (both road and transit), what ITS projects are planned and funded, and what ITS projects are envisioned but not currently funded. The information on these projects was found in the various plans for Dade County including their own TIP, UPWP, LRP, the ICS Program, and the State Program.

ITS projects recommended here for inclusion are listed by corridor. An order of magnitude cost for these ITS projects is included along with the agencies that should participate in each project. The appropriate time frame for completion, and their corresponding user services are also examined.

Some acronyms used in the following tables include:

TIP = Transportation Improvement Plan, 1996

ICSDR = Intelligent Corridor System Design Report

ICSFR = Intelligent Corridor System Final Report

LRP = Long Range Plan (to 2015), page numbers refer to Appendix D- the project listing

EAR = 1995 Evaluation and Appraisal Report

SP = State DOT ITS Plan, 1994

TDP = Transit Development Program

I = immediate, project slated to have already started

S = short range, project to begin before 2000

M = medium range, project to begin between 2000-2010

L = long range, project to begin after 2010

N.A. = Not applicable

MDTA = Metro Dade Transit Agency

FDOT = Florida Department of Transportation

DCPW = Dade County Department of Public Works

DCEA = Dade County Expressway Authority

FHP = Florida's Highway Patrol

TCRA = Tri-County Commuter Rail Authority

Costs (from the ICSFR)

Freeway Service patrols = \$170,000/year

HAR = \$20,000

VMS = \$170,000 to \$150,000 to \$100,000

Ramp Meters = \$40,000 per location

In the associated agencies column the MPO is assumed to be involved in each project listed. All information in the tables is extracted from the source listed along side it, except for those recommended only in this Plan

Table 6: I-95 Project Summary Table

Conventional Improvements				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
Extension of MetroRail along 27th Ave., from MLK Station to Calder Race Track, 8.5 miles	N.A.	L L	TIP, p 182, 221 LRP, p 2	\$592.4 \$450.0
Extension of Tri-Rail to Miami International Airport	N.A.	S	TIP, p 189	
Double tracking of Tri-Rail Doubling the capacity of the rail system in this corridor	N.A.	I,S	TDP	\$203
HOV Lanes (one in each direction) along the highway	N.A.	Finished	ICSFR, p 3-1	
Pavement Reconstruction, U.S.1/S.R.5 to Golden Glades, 13.14 miles	N.A.	S	TIP, p 75	\$13.4
ITS Proposed/Existing Projects				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
ICS Corridor improvement, U.S.1 to Broward County line, VMS, HAR, Ramp metering, incident management	FDOT, DCPW, FHP	S M I	TIP, p 75 LRP, p 3 SP, p 57	\$21.6 \$33.0
Mini Flamingo (at Golden Glades), video image detectors, CCTV cameras, inductive loop detectors, VMS	FDOT	I	SP, p 51 ICSFR, p 3-2	

Table 7: Palmetto (SR 826) Project Summary Table

Conventional Improvements				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
Interchange improvements at NW 25 street, preliminary engineering	N.A.	I	TIP, p 22	\$0.28
Multi-lane reconstruction, add 2 lanes for a total of 10, NW 25 St. to NW 47 St. and FEC Railroad to NW 103 St., preliminary engineering	N.A.	M	TIP, p 22	\$0.3
Multi-lane reconstruction, add 2 lanes for a total of 10, NW 47 St. to NW 62 St., preliminary engineering	N.A.	M	TIP, p 23	\$0.25
Corridor improvement, Project management consultant	N.A.	I	TIP, p 23 TIP, p 81	\$0.5 \$0.36
Multi-lane reconstruction, add 4 lanes for a total of 8, SW 72 St. to SW 32 St.	N.A.	S	TIP, p 54	\$5.45
Multi-lane reconstruction, add 2 lanes for a total of 10, SW 2 St. to NW 25 St., 1.4 miles	N.A.	I	TIP, p 56	\$8.2
Multi-lane reconstruction, add 2 lanes for a total of 10, SW 32 St. to SW 2 St. and NW 25 St. to NW 47 St., preliminary engineering only	N.A.	I	TIP, p 57	\$0.58
Multi-lane reconstruction, add 2 lanes for a total of 10, NW 47 St. to NW 103 St., mainly preliminary engineering	N.A.	I	TIP, p 58	\$3.85

Corridor improvement, add 2 lanes for a total of 6, US 1 to NW 158 St., mainly preliminary engineering	N.A.	I	TIP, p 60	\$3.8
Extend the MetroRail from Okeechobee to Palmetto, total extension of 1 mile, include station and garage	N.A.	I	TIP, p 183	\$170.9
Add an HOV lane in each direction, from SR 874 to I-75	N.A.	M L L	LRP, p 2 LRP, p 4 2015 Plan, p 11	\$301.3 \$328.0
Multi-lane reconstruction, add 2 lanes for a total of 8, NW 103 St. to NW 122 St.	N.A.	S	TIP, p 55	\$42.3
ITS Proposed/Existing Projects				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
IVHS - US 1 to NW 67 Ave. En-route driver information through HAR and VMS, CCTV, service patrols, ramp metering	FHP, FDOT, DCPW, Kendall	S I	ICSFR, p 3-14,29 SP, p 57, 61	\$13.5
IVHS - NW 67 Ave. to Golden Glades En-route driver information through HAR and VMS, CCTV, service patrols, ramp metering	FHP, FDOT, DCPW, Medley, Hialeah, Hialeah Gardens, Miami Lakes, Carol City	I I	ICSFR, p 3-14,30 SP, p 61	\$8.4
Service patrols	FHP, FDOT	I	ICSFR, p 3-28	\$0.17/ yr
Mile markers every 0.1 miles to aid in relaying incident location	FDOT	I	ICSFR, p 3-29	\$0.11 (est.)

Freeway Service Patrol (using Closed Circuit Television (CCTV) to detect incidents)	FDOT, FHP	I	SP, p 61 ICSFR, p3-14,28	\$0.17/yr
Ramp metering at selected locations (19 locations @ \$40,000 each)	FDOT, DCPW	S	SP, p 57 ICSFR, p 3-31	\$0.76
IVHS along entire route	FDOT, DCPW, FHP	I	ICSFR, p 3-28	\$4.0
Diversion route maps	FDOT, DCPW, all cities	S	ICSFR, p 3-1	
Mile markers every 0.1 miles to aid in relaying incident location (\$200 each)	FDOT	I	ICSFR, p 3-29	\$0.11 (est.)
ITS Related Unfunded Needs				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
Service patrols	FDOT, FHP	S	TIP, p 207	\$1.6
ITS technical consultant		I	TIP, p 207	\$0.5
ITS Improvements Recommended				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
Barrier protect the HOV lanes and include automated enforcement (non-tolled initially), 17 miles	FDOT, FTA, FHWA, MDTA, FHP	M	This ITS Plan	\$150 total \$50 ITS
Direct communication linkage between ramp metering system, Dade Co. ATMS/ICS center, and VMS	FDOT, FHP, DCPW	M	This ITS Plan	varies

Initial ITS Plan and Rationale for I - 95

I-95 is a critical road for residents of Dade County as well as Broward and Palm Beach Counties. Responses from the steering committee indicated that this was one of the most congested roadways.

The ICS Design Report indicates it is over capacity on a daily basis. The majority of the highway will be operating at LOS F according to the 2015 Needs Plan. Accidents - especially truck accidents - cause massive delays and backups.

User service priorities:

- Incident Management;
- Emergency notification and emergency vehicle management;

The immediate focus for this roadway should be in the detection and timely removal of incidents. This can be accomplished by improving the way incidents are handled now. All incidents should be reported to, and handled by, a dedicated staff 24 hours a day. This staff could be housed near the MDTA Automatic Vehicle Location (AVL) control center as the communication lines are already in place. In addition, MDTA has over 600 buses that are able to detect and report incidents extremely rapidly as they are in constant contact with the control center. There is now money set aside (\$1.2 million in 1996/1997) to fund roving incident management teams along the highway to improve response time to incidents. There are also accident investigation sites along the roadway so that vehicles can be removed from the roadway while the accident is still under investigation. Already under construction along this roadway are CCTV monitoring for incidents and variable message signs (VMS).

Several ITS items suggested for immediate or short term deployment may work better if deployed after certain basic ITS infrastructure is in place. For example, ramp meters are most effective if they are coordinated with traffic on the side streets. This traffic will only be known once the Traffic Management Center (TMC) and the Advanced Traffic Management System (ATMS) are in place. As well, if the ramp metering does not perform flawlessly the residents of Dade County will see ramp metering as favoring residents from other counties and impeding their travel. This could quickly become a political problem. Also, VMS that are not coordinated with surface street traffic do not achieve their full potential. If an accident occurs on I-95 it is useful for the VMS to display this information, but you cannot inform drivers of alternate routes or modes (TriRail or MetroRail) as the alternative may be even more heavily congested or delayed.

ITS Related Unfunded Needs				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
Service patrols using CCTV	FHP, FDOT	I	TIP, p 207	\$1.6
ICS	FHP, FDOT, DCPW, Medley, Hialeah, Hialeah Gardens, Miami Lakes, Carol City, Kendall	L	LRP, p. 9	\$29.7
ITS Improvements Recommended				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
barrier protect the HOV lanes and include automated enforcement (non-tolled initially), 20 miles	FDOT, FTA, FHWA, MDTA, FHP	M	This ITS Plan	\$180 total \$60 ITS
Direct communication linkage between ramp metering system, Dade Co. ATMS/ICS center, and VMS	FDOT, FHP, DCPW	M	This ITS Plan	varies

Initial ITS Plan and Rationale for SR 826 (Palmetto Expressway)

The Steering Committee indicated that this roadway was severely congested.

According to the ICS Design Report the entire expressway was over capacity in 1991.

According to the 2015 Needs Plan, the northern portion of this roadway (which runs East-West) will be at a level of service of F, with a volume to capacity ratio of between 1 to 1.5 depending on the roadway section. With the large influx of people predicted for the Southern part of the metropolitan area the North-South portion of this roadway will also be under increased demand.

User service priorities:

- Incident Management;
- Emergency notification and personal security;
- Emergency vehicle management;
- En-route driver information;
- Pre-trip travel information.

The long list of conventional projects in the previous table indicates that this road will be expanded considerably and under construction for many years to come. As part of this expansion an HOV lane will be built. This is an excellent way to expand the capacity of this highway.

As mentioned in the comments on I-95, ramp metering and VMS lose some of their effectiveness if not directly tied into traffic on both the arterial and the surface street. However, in this instance, VMS can still be particularly useful in warning drivers of delays due to construction, hazardous driving conditions in construction zones, and construction schedules. Ramp meters would not encounter the same political pressures as on I-95. However, to install ramp meters without ties to surface street traffic, is only semi-effective and is not the best use of ITS money along this corridor.

On this expressway, the best place to begin is with incident management. Service patrols and incident management teams should be present along the roadway, but particularly in construction zones. If VMS are installed they can warn drivers of what delays and lane closures to expect, well in advance of the construction zones. Incident information should also be accessible prior to the trip being made, so commuters can take an alternate route. One effective way of doing this is through a dedicated cable TV station.

Table 8: Don Shula Expressway (SR 874) Project Summary Table

Conventional Improvements				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
Multi-lane reconstruction, add 2 lanes for a total of 6, from SW 112 to SR 826, 7 miles, preliminary engineering	N.A.	S	TIP, p 23	\$3.0
Multi-lane new construction, 6 lane highway, from SW 137 Ave to Florida's Turnpike. 6.3 miles, preliminary work	N.A.	I	TIP, p 56	\$1.0
Multi-lane reconstruction including an HOV lane in each direction, 4 and 6 lanes widened to 8 lanes, from Florida's Turnpike to SR 826	N.A.	L L	LRP, p 5 2015 Plan, p 11	\$36.1
Multi-lane reconstruction, add 2 lanes for a total of 6, SW 112 St. to SR 826, mainly preliminary engineering	N.A.	I	TIP, p 57	\$4.3
ITS Proposed/Existing Projects				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
ETC - Possibly included in the SunPass program	FDOT	?	SP, p 59	
En-route driver information through HAR and VMS	FDOT, PWD, West Wood Lakes, Kendall	I	SP, p 57	
Ramp metering	FDOT, FHP	I	SP, p 57	

IVHS (service patrols, CCTV, ramp metering, HAR, VMS)	FDOT, PWD, FHP, West Wood Lakes, Kendall	L	ICSFR, p 3-33	\$9.8
ITS Related Unfunded Needs				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
Service patrols using CCTV	FDOT, FHP, DCPW	I	TIP, p 207	\$1.6
ICS	FDOT, PWD, FHP, West Wood Lakes, Kendall	L	LRP, p 9	\$10.9
ITS Improvements Recommended				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
Barrier protect the HOV lanes and include automated enforcement (non-tolled initially), 2 miles	FDOT, FTA, FHWA, MDTA, FHP	L	This ITS Plan	\$18 total \$6 ITS

Initial ITS Plan and Rationale for Don Shula Expressway (SR 874)

The Steering Committee indicated that this roadway was already congested and the level of congestion is predicted to worsen. Due to the predicted growth in the southern portion of the metropolitan area, this expressway is predicted to operate at a LOS of F (with v/c ratios from 1.2 to 1.5) in the southern half and at a LOS of E (with v/c ratios of 0.9 to 1.0) in the northern half.

User service priorities:

- incident management;
- en-route driver information;

- route guidance;
- ride matching and reservation;
- demand management and operations;
- personalized public transit;
- public transportation management;
- electronic payment services.

As the above table indicates, this roadway is slated for a great deal of construction, just as SR 826 is. Therefore, similar ITS projects should take place here as on SR826. These include roving incident management teams in construction zones and VMS to indicate congested areas and construction zones.

One ITS activity which may prove useful for travelers is a real-time cost and travel time comparison between:

- a) using this expressway plus one of the east-west routes to travel downtown; and
- b) using Florida's Turnpike and possibly Dolphin Expressway to travel downtown.

If this information is displayed to commuters from South Dade they can decide for themselves which route to take, possibly reducing the congestion on SR 874 as Florida's Turnpike is relatively uncongested. The travel times may be collected through several alternative methods, including loop detectors, cellular tracking, ETTM, and video imaging with automated licence plate reading.

The population in the Southwestern portion of the county (which are served by SR 874) is predicted to double by the year 2015. If programs are developed now it may be possible to influence travelers' commute alternatives before they become single occupancy vehicle (SOV) dependant. Developing ridesharing programs and the installation of kiosks at strategic points to give real time transit information is recommended. Also enhancing public transit and even developing some personalized public transit routes until various areas grow in population where they can sustain dedicated transit.

The toll plaza along this route should be equipped with electronic toll collection (ETC). This ETC system should be compatible with all other systems in the area. The other roads/areas with ETC systems in place or looking into them are Miami International Airport, Florida's Turnpike, SR 836, and the Broad, Rickenbacker and Venetian Causeways. If these systems are compatible it will supplement other traffic management initiatives through the collection of travel times around Dade County.

Table 9: Kendall Drive (SR 94) Project Summary Table

Conventional Improvements				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
ITS Proposed/Existing Projects				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
ITS Related Unfunded Needs				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
ITS Improvements Recommended				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
ATMS enhancement (signal progression, preemption, CCTV surveillance, etc.)	DCPW, FDOT, MDTA	M	This ITS Plan	\$7.0

Initial ITS Plan and Rationale for Kendall Drive

The Steering Committee indicated that this roadway was congested. The entire roadway will be operation at a LOS F according to the 2015 Needs Plan with the worst section, from the Turnpike to Don Shula Expressway, operating at a v/c ratio of 1.2 to 1.5.

This route will also feel the effect of the massive growth predicted in Southwestern Dade. Currently, the long range plan has slated the Kendall corridor for possible premium transit enhancements in approximately 15 years, however this is an unfunded priority. Estimated costs are over \$600 million. In the near term, very little conventional improvements are slated for this corridor. Therefore, it is important to incorporate ITS into this roadway in order to achieve maximum efficiency with the existing infrastructure.

User service priorities:

- en-route driver information;
- route guidance;
- ride matching and reservation;
- demand management and operations;
- personalized public transit;
- public transportation management.

One ITS activity which may prove useful for travelers is a real-time cost and travel time comparison between:

- a) using this road plus US 1 to travel downtown; and
- b) using Florida's Turnpike and one of more northern East-West routes to travel downtown.

If this information is displayed to commuters from South Dade they can decide for themselves which route to take, possibly reducing the congestion on Kendall and US 1, as Florida's Turnpike is relatively uncongested. The travel times may be collected through several alternative methods, including loop detectors, cellular tracking, ETTM, and video imaging with automated licence plate reading.

The population in the Southwestern portion of the county is predicted to double by the year 2015. If programs are developed now it may be possible to influence travelers commute alternatives before they become single occupancy vehicle (SOV) dependant. It is important to develop ridesharing programs and to install kiosks at strategic points to give real time transit information. It would also be beneficial to enhance public transit and even develop some personalized public transit routes until various areas grow in population where they can sustain dedicated transit. Any premium transit constructed should incorporate ITS enhancements such as real-time transit location information, information kiosks, and automated fare payment.

Table 10: Dolphin Expressway (SR 836) Project Summary Table

Conventional Improvements				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
Highway traffic operations improvements, at LeJeune Road, NW 27 Ave., NW 57 Ave and NW 87 Ave interchanges as well as from NW 45 Ave. To NW 72 Ave., preliminary engineering	N.A.	S	TIP, p 68,69	\$1.86
Multi-lane reconstruction, add to the existing 6 and 8 lanes to have 10 lanes, from NW 87 Ave. to NW 37 Ave.	N.A.		EAR, p II-33	
Multi-modal corridor, from Florida International University through Miami International Airport (MIA) to the Port of Miami, preliminary engineering study	N.A.	I	TIP, p 18	\$0.05
East-West corridor and multi-modal facility, fixed guideway system from MIA to the Port of Miami to Miami Beach	N.A.	L L	TIP, p 182 LRP, p 2, 4 & 6	\$1,400 \$500
Add one HOV lane in each direction, from Florida's Turnpike to LeJeune Road	N.A.	L L	LRP, p 4 2015 Plan, p 15	\$73.3
ITS Proposed/Existing Projects				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
ETC - Possibly included in the SunPass program	DCEA, FDOT	?	SP, p 59	

En-route driver information through HAR and VMS	FDOT, DCPW, DCEA	I	SP, p 61	
Ramp metering	FDOT, DCPW, DCEA	I	SP, p 61	
IVHS from Florida's Turnpike to Miami River to Alson Road (HAR, VMS, CCTV?, Service patrols?)	FDOT, FHP, DCEA	S	ICSFR, p 3-31,32	\$20.5
Service Patrols using CCTV	FDOT, DCPW, DCEA	I I	ICSFR, p 3-28 SP, p 61	\$0.17/yr
Mile markers every 0.1 miles to aid in relaying incident location	FDOT, DCEA	I	ICSFR, p 3-29	\$0.11 (est.)
ITS Related Unfunded Needs				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
ICS	FDOT, FHP, DCEA	L	LRP, p 9	\$19.3
Service patrols	FDOT, FHP, DCEA	I	TIP, p 207	\$1.6
ITS Improvements Recommended				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
Barrier protect the HOV lanes and include automated enforcement (non-tolled initially), 7.5 miles	FDOT, FTA, FHWA, MDTA, FHP	L	This ITS Plan	\$68 total \$22 ITS
Direct communication linkage between ramp metering system, Dade Co. ATMS/ICS center, and VMS	FDOT, FHP, DCPW	S	This ITS Plan	varies

Initial ITS Plan and Rationale for Dolphin Expressway (SR 836)

The Steering Committee indicated that this roadway was very congested.

The 2015 Needs Plan predicts the road will be operating at a level of service of F.

User service priorities:

- incident management;
- ride matching and reservation;
- demand management and operations;
- personalized public transit;
- public transportation management;
- electronic payment services.

As can be seen in the above table very few conventional highway improvements are slated for this roadway. However, a large number of transit and ITS related projects are already started or planned. The focus here will be to attempt to prioritize and order the already proposed projects.

Due to the proposed mass transit development it is important to make this option as attractive as possible for commuters along the SR 836 corridor. This would include real-time transit information available to users pre-trip and en-route, transit information kiosks, and automated fare payment. However, this transit system is many years away and these ITS transit enhancement are therefore a low priority, only to start when the transit system starts.

As was outlined earlier--having ramp meters and VMS without real time traffic data significantly limits their potential benefits. Any ETC should be in conjunction with the SunPass program on the Turnpike. The ETC installed should provide discounts to car/van pools and other high occupancy vehicles. The East-West corridor and multi-modal facility is slated for the long term as it should be. The following projects are therefore a higher priority for this corridor:

- the construction of an HOV lane in each direction which will encourage car and van pooling;
- service patrols and incident management to reduce the effect of nonrecurrent congestion;
- extending the MetroRail to SR 826 to alleviate some of the traffic on the western end of SR 836; and
- mile markers for better incident management location identification.

Table 11: A1A Project Summary Table

Conventional Improvements				
Description		Time Frame	Source	Projected Cost (\$mil)
Highway traffic operations improvement at MacCarther Causeway E. Bridge	N.A.	S	TIP, p 20	\$0.6
Multi-lane reconstruction, add 2 lanes for a total of 6, from 5th street to 26th Street, preliminary engineering, 2 miles	N.A.	M	TIP, p 58	\$0.9
ITS Proposed/Existing Projects				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
ITS Related Unfunded Needs				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
ITS Improvements Recommended				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)

Initial ITS Plan and Rationale for A1A

The Steering Committee indicated this is a congested roadway.

The road is particularly congested north of J.F.K. Causeway where the 2015 Needs Plan predicts a LOS of F with v/c ratios of between 1 and 1.5.

Primary user services:

- pre-trip travel information;
- public transportation management;
- en-route transit information;
- electronic payment services;
- en-route driver information.

The road has a great deal of dense residential and tourist areas.

Therefore, getting transit, travel time, and destination information to those unfamiliar with the area will be critical for the improvement of traffic along this corridor. This information should be received by the travelers both pre-trip and in-vehicle to have the greatest impact.

Pre-trip information can be received in the travelers home via a dedicated radio station, telephone line, cable TV station, and computer. For transit users, information can be obtained at the transit station through kiosks, signboards, or personal communications device. This pre-trip information will serve several purposes, including:

- a) Those travelers unfamiliar with the area and typical travel patterns in the area will be well informed of when rush hours occur. With this knowledge it is likely that they will plan travel to avoid peak times - thereby reducing rush hour problems along A1A.
- b) Tourists who normally would not use the unfamiliar transit may see it as a viable alternative to their personal vehicle if the system is designed to accommodate them. If they can see that transit vehicles run along A1A and stop at many of the tourist spots and malls, then transit becomes a very attractive travel method. This information must be readily available to them through kiosks, signboards, etc.

In-vehicle information is also important in reducing congestion along this corridor. Instead of slowly cruising along the road searching for the restaurant/hotel you want, an in-vehicle navigation device can alert the driver when they near their destination. This will allow the

driver to travel faster and keep attention on the roadway, reducing incidents and congestion. In vehicle navigation aids are primarily the responsibility of private sector companies. It is important for the public sector agencies (like the MPO, Miami International Airport, and tourist bureaus) to encourage their use through advertising their benefits to the public.

Table 12: Bird Road (SR 976) Project Summary Table

Conventional Improvements				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
Multi-lane reconstruction, widen to 3 lanes, from US 1 (near 36 Ave.) To SW 27 Ave., 0.7 miles	N.A.	I I	EAR, p II-34 TIP, p 130	
ITS Proposed/Existing Projects				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
ITS Related Unfunded Needs				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
ITS Improvements Recommended				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
ATMS enhancement (signal progression, preemption, CCTV surveillance, etc.)	DCPW, FDOT, MDTA	M	This ITS Plan	\$7.0

Initial ITS Plan and Rationale for Bird Road (SR 974, SW 40 St.)

The Steering Committee indicated that this roadway was congested. The entire roadway will be operating at LOS E to F according to the 2015 Needs Plan with v/c ratios of 0.9 to 1.2. This is another route that will feel the effect of the massive growth predicted in Southwestern Dade. It will likely be used as an alternate route to SR 836 and Tamiami Trail to travel to the downtown area. In the near term, very little conventional improvements are slated for this corridor. Therefore, it is important to incorporate ITS into this roadway in order to achieve maximum efficiency with the existing infrastructure.

User service priorities:

- en-route driver information;
- incident management;
- route guidance;
- public transportation management;
- electronic payment services;

To maximize efficiency of the entire roadway system, VMS should be installed on and near Tamiami Trail, SR 836, Bird Road, NW 36th St., and Florida's Turnpike. These VMS would warn drivers of incidents along any of the major East-West routes and allow them to take an alternate route if they so choose. VMS might also be used to display a real-time cost and travel time comparison between (a) using this road plus US 1 to travel downtown; and (b) using Florida's Turnpike and one of more northern East-West routes to travel downtown. If this information is displayed to commuters from South Dade they can decide for themselves which route to take, possibly reducing overall congestion. The travel times may be collected through several alternative methods, including loop detectors, cellular tracking, ETTM, and video imaging with automated licence plate reading.

The population in the Southwestern portion of the county is predicted to double by the year 2015. If programs are developed now it may be possible to influence travelers commute alternatives before they become single occupancy vehicle (SOV) dependant. Ridesharing programs should be developed and kiosks should be installed at strategic points to give real time transit information. Also enhancing public transit and even developing some personalized public transit routes until various areas grow in population where they can sustain dedicated transit. Any premium transit constructed should incorporate ITS enhancements such as real-time transit location information, information kiosks, and automated fare payment.

Table 13: Tamiami Trail (SR 90) Project Summary Table

Conventional Improvements				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
P. D. & E., Study and Design and ROW support	N.A.	S	TIP, p 54	\$4.7
Multi-lane reconstruction, add 2 lanes for a total of 6, from SW 127 Ave. To SW 152 Ave.	N.A.	L L	2015 Plan, p 12 LRP, p 3	\$2.9
ITS Proposed/Existing Projects				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
ITS Related Unfunded Needs				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
ITS Improvements Recommended				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
ATMS enhancement (signal progression, preemption, CCTV surveillance, etc.)	DCPW, FDOT, MDTA	M	This ITS Plan	\$7.0

Initial ITS Plan and Rationale for Tamiami Trail (SR 90, US 41, SW 8th St..)

The Steering Committee indicated that this roadway was congested. The section East of SR 826 is predicted to be particularly congested, with a LOS of F and a v/c ratio of 1.2 to 1.5+ according to the 2015 Needs Plan.

This is another route that will feel the effect of the massive growth predicted in Southwestern Dade. It will likely be used as an alternate route to SR 836 to travel to the downtown area. In the near term, very little conventional improvements are slated for this corridor. Therefore, it is important to incorporate ITS into this roadway in order to achieve maximum efficiency with the existing infrastructure.

User service priorities:

- en-route driver information;
- incident management;
- route guidance;
- public transportation management; and
- electronic payment services.

To maximize efficiency of the entire roadway system, VMS should be installed on and near Tamiami Trail, SR 836, Bird Road, NW 36th St., and Florida's Turnpike. These VMS would warn drivers of incidents along any of the major East-West routes and allow them to take an alternate route if they so choose. VMS might also be used to display a real-time cost and travel time comparison between (a) using this road to travel downtown; and (b) using SR 836 or Bird Road to travel downtown.

If this information is displayed to commuters from South Dade they can decide for themselves which route to take, possibly reducing overall congestion. The travel times may be collected through several alternative methods, including loop detectors, cellular tracking, ETTM, and video imaging with automated licence plate reading.

The population in the Southwestern portion of the county is predicted to double by the year 2015. If programs are developed now it may be possible to influence travelers commute alternatives before they become single occupancy vehicle (SOV) dependant. Ridesharing programs should be developed and kiosks should be installed at strategic points to give real time transit information. It would also be beneficial to enhance public transit and even develop some personalized public transit routes until various areas grow in population where they can sustain dedicated transit. Any premium transit constructed should incorporate ITS enhancements such as real-time transit location information, information kiosks, and automated fare payment.

Table 14: US 1 Project Summary Table

Conventional Improvements				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
Multi-lane reconstruction, from SR 860 to SR 856, 0.5 miles	N.A.	S	TIP, p 23	\$0.5
Multi-lane reconstruction, add 2 lanes for a total of 6, from SE 6 St. to SE 4 St., 0.3 miles	N.A.	S	TIP, p 54	\$0.35
Multi-lane reconstruction, add 4 lanes for a total of 8, from NE 163 St. to Miami Gardens Drive, 1.5 miles	N.A.	I	TIP, p 55	\$1.3
Multi-lane reconstruction, from Miami Gardens Drive to WM Lehman Causeway, 0.5 miles	N.A.	S	TIP, p 55	\$1.7
Multi-lane reconstruction, add 2 lanes for a total of 4, from just North of the county line to STR S-18 Road, 5.9 miles	N.A.	I	TIP, p 55	\$27.6
Multi-lane reconstruction, add 2 lanes for a total of 6, from SW 344 St. to SW 112 Ave., preliminary engineering, 7.5 miles	N.A.	I	TIP, p 58	\$0.25
Resurfacing and repaving, Riviera St. to SW 27 Ave and SW 112 Ave. To SW 152 Ave., 6.3 miles	N.A.	S	TIP, p 59	\$2.9
Multi-lane reconstruction, add 2 lanes for a total of 8, from SR 856 to NE 209 St., 1 mile	N.A.	S	TIP, p 61	\$15.5

Construct new 2 lane roadway from Florida City to S. Dadeland MetroRail Station, preliminary engineering, 9 miles	N.A.	I	TIP, p 60	\$1.75
Multi-lane reconstruction, add 2 lanes for a total of 4, from ST S-18 Road to Card Sound Road, 7.8 miles	N.A.	S	TIP, p 62	\$40.4
ITS Proposed/Existing Projects				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
Dedicated busway - include ITS enhancements for enforcement, signal preemption and links to traffic control center)	FDOT, MDTA, DCPW	M		\$54
ITS Related Unfunded Needs				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
ITS Improvements Recommended				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
Direct communication linkage between ramp metering system, Dade Co. ATMS/ICS center, and VMS	FDOT, FHP, DCPW	M	This ITS Plan	varies

Initial ITS Plan and Rationale for US 1

The entire roadway is predicted to be operating at varying degrees of LOS F. From the Turnpike North to where it intersects SR 826 in the South, v/c ratios will be between 1 and 1.5, from SR 826 to the downtown area v/c ratios will be over 1.5, and from the downtown area North to the edge of the county v/c ratios will be between 0.9 and 1.5 according to the 2015 Needs Plan.

Primary user services:

- en-route driver information;
- pre-trip travel information;
- incident management;
- public transportation management; and
- electronic payment services.

As can be seen in the long list of conventional projects in the previous table, this road will be expanded considerably and under construction for many years to come. Pre-trip information (through telephone radio, computer, TV, etc.) or VMS placed well in advance of construction indicating the current state of construction will be important. This may encourage people to use transit and avoid rush hour travel. Also important will be incident management teams in place around the construction areas.

Due to the nature of the development and land use along this roadway, in-vehicle information is also important in reducing congestion along this corridor. Instead of slowly cruising along the road searching for the restaurant/hotel you want an in-vehicle navigation device can alert drivers when they near their destinations. This will allow the driver to travel faster and keep attention on the roadway, reducing incidents and congestion.

Table 15: NW 36th Street Project Summary Table

Conventional Improvements				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
Multi-lane reconstruction, add 1 lane for a total of 5, from North River Drive to NW 17 Ave., 2.2 miles, preliminary engineering	N.A.	I	TIP, p 55	\$0.14
Multi-lane reconstruction, add 4 lanes for a total of 6, from NW 102 Ave. to NW 87 Ave., 1.5 miles	N.A.	Finished	TIP, p 127	
Multi-lane reconstruction, add 2 lanes for a total of 6, from NW 87 Ave. to NW 77 Ave., 1 mile	N.A.	I	TIP, p 127	\$2.1
Multi-lane reconstruction, add 2 lanes for a total of 6, from NW 82 Ave. to SR 826, approximately 0.25 miles	N.A.	I	TIP, p 166	\$0.34
ITS Proposed/Existing Projects				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
ITS Related Unfunded Needs				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
Express Street (Grade separations, ITS, etc.), from NW 42 Ave. to Florida's Turnpike		L L	LRP, p 8 2015 Plan, p 13	\$194

Initial ITS Plan and Rationale for NW 36th St.

This road was not singled out by the Steering Committee as overly congested. However the 2015 Needs Plan clearly indicates this road will be extremely congested. A LOS of E to F with v/c ratios of 0.9 to 1.5 are predicted from just west of SR 826 to Julia Tuttle Causeway. Therefore it was necessary to single out and examine this road.

Primary user services:

- en-route driver information;
- route guidance;
- incident management;

This road also serves as an alternative to SR 836, from SR 826, past Miami International Airport and to the downtown area. To maximize efficiency of the entire roadway system, VMS should be installed on and near Tamiami Trail, SR 836, Bird Road, NW 36th St., and Florida's Turnpike. These VMS would warn drivers of incidents along any of the major East-West routes and allow them to take an alternate route if they so choose.

Table 16: Okeechobee Road (US 27) Project Summary Table

Conventional Improvements				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
Multi-lane reconstruction, widen to 6 lanes, from SR 112 to SR 826, 4.6 miles	N.A.	L L	2015 Plan, p 12 LRP, p 7	\$36
Extend the MetroRail from Okeechobee to Palmetto, total extension of 1 mile, include station and garage	N.A.	I	TIP, p 183	in SR 826
ITS Proposed/Existing Projects				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
ITS Related Unfunded Needs				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
ITS Improvements Recommended				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
Install 3 VMS	FDOT, DCPW	L	This ITS Plan	\$0.51

Initial ITS Plan and Rationale for Okeechobee (US 27)

This road was not singled out by the Steering Committee as overly congested. However the 2015 Needs Plan clearly indicates this road will be extremely congested. A LOS of F with v/c ratios of 1.2 to 1.5 are predicted from SR 826 to SR 112 (Airport Expressway). Therefore it was necessary to single out and examine this road.

Primary user services:

- en route driver information;
- route guidance;
- incident management.

Recommendations for this corridor include incident management, CCTV cameras, and when the LOS decreases to F, roving incident teams. Also, this road can be connected to the VMS information system suggested for most of the major East-West roadways. In this way drivers can get real time information to compare using this road and SR 826 then SR 836 to get downtown.

Initial ITS Plan and Rationale for NW/SW 27th Ave.

This roadway was not singled out by the Steering Committee, but was indicated by several reports as severely congested. The congested section runs from US 1 in the south to NW 79th Street in the north. This section of roadway will be operating at a LOS E or F according to the 2015 Needs Plan and was labeled as highly congested by the Mobility Management Process/Congestion Management System Plan.

In the near term, very little conventional improvements are slated for this corridor. Therefore, it is important to incorporate ITS into this roadway in order to achieve maximum efficiency with the existing infrastructure. As well, MetroRail runs beside the northern section of this corridor. Attracting users off the highway and onto MetroRail through enhancing transit should be a high priority for ITS in this corridor.

The final table presented in this section (Table 17), lists the ITS projects already underway, planned or proposed for Dade County but not for any specific corridor. These projects are more general in nature and will improve travel conditions in general for all residents of Dade County. For example, the first project listed and one of the most capital intensive, is the development of the Dade County ATMS. This system will improve travel throughout Dade County for all travelers. However, many of these projects are merely proposed by the ICS Program and do not have funding secured. The final few items listed here are recommendations for additional non-roadway specific projects developed entirely by CUTR.

Table 17: General Projects Summary Table

ITS Proposed/Existing Projects				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
Advanced Traffic Management System (ATMS) for all signals in Dade County	DCPW, FDOT	S S S S	SP, p 52 ICSFR, p 3-14 RFP from MD TIP, p 64	\$18.5
Cellular tracking demonstration project	FDOT, FHWA, private sector	S	SP, p 61 ICSFR p 3-27	\$1.5
Travel time estimates using ETTM stations	FDOT, FHWA, private sector, DCEA	S	ICSFR, p 3-27	\$1.7
Public Information Dissemination	FDOT, MDTA, TCRA, DCPW	S	ICSFR, p 3-27	\$0.5
MDTA - control center overhaul Focus on buses = Focus on rail =	MIA, FTA	I S	TIP, p 94 TIP, p 95	\$32.7 \$33.6

Golden Glades interchange - Misc. Construction	FHWA, FDOT	S	TIP, p 68	\$3.3
Park and Ride Program = New construction =	MDTA, FTA, FDOT, TCRA	S I	TIP, p 94 TIP, p 181	\$0.4 \$4.1
Smart card feasibility and pilot study	FTA, MDTA, TCRA, Private sector	I	ICSFR, p 3-26	\$2.35
Transit routing/ traveler information system.	FTA, MDTA, TCRA	I	ICSFR, p 3-26	\$2.3
HOV video enforcement development/pilot study	FHWA, FDOT, MDTA, TCRA, private sector	I	ICSFR, p 3-26	\$1.0
Tie ICS to FHP's 911	FDOT, FHP	I	ICSFR, p 3-26	\$1.2
Florida highway patrol - computer assisted ticketing to reduce time	FDOT, FHP	I	ICSFR, p 3-27	\$1.7
Freeway management team/incident management support contacts	FDOT, FHP	I	ICSFR, p 3-29	\$.09/year
System designer/ Integrator of the ICS implementation	FHWA, FDOT, MDTA, DCPW, TCRA	I	ICSFR, p 3-30	\$4.50
Tie the ICS to Dade traffic control center	FHWA, FDOT, DCPW	I	ICSFR, p 3-30	\$0.14
Miami international airport - HAR, VMS, etc.	MIA, FHWA, FDOT, MDTA, DCPW, TCRA	I	ICSFR, p 3-27	\$0.63
VMS at Seaport and Airport exits	MIA, FHWA, FDOT, MDTA, DCPW, TCRA	I	ICSFR, p 3-30	\$0.50
Transportation operations center building and hardware	MIA, FHWA, FDOT, MDTA, DCPW, TCRA	I	ICSFR, p 3-30,31	\$5.3

Traveler information in public buildings	TCRA, FHWA, FDOT, MDTA	S	ICSFR, p 3-31	\$0.66
Hardware/ systems software upgrade and support for Dade signal system	DCPW, FDOT	I	ICSFR, p 3-31, 32, 33	\$7.05
Area-wide surveillance for arterial streets	FHWA, FDOT, DCPW	S	ICSFR, p 3-31	\$0.80
Traffic signal system, system manager	FDOT, DCPW	S	ICSFR, p 3-31	\$2.60
For SR 112 (Airport Expressway) IVHS from Miami International Airport to I-95	FHWA, FDOT, MIA	M	ICSFR, p 3-32	\$7.30
For arterial streets - VMS, CCTV, Detectors and Trailblazers	FHWA, FDOT, MDTA, Tri-rail	M	ICSFR, p 3-32	\$2.90
Maintenance of ICS during reconstruction	FHWA, FDOT, DCPW	S	ICSFR, p 3-32	\$3.60
For I-75 - IVHS from SR 826 to Broward County line	FHWA, FDOT	M	ICSFR, p 3-32	\$7.70
IVHS for Snapper Creek Expressway (SR 878) - from SR 874 to US 1)	FHWA, FDOT	L	ICSFR, p 3-33	\$3.90
Florida's Turnpike - service patrols	FDOT	I	ICSFR, p 3-34	\$0.4/year
Florida's Turnpike - IVHS from Culter Ridge to NW 41 St., and from Golden Glades to Broward County line	FDOT	M	ICSFR, p 3-34	\$24.0
Smart card common fare collection for transit	FTA, MDTA, TCRA, private sector	I	ICSFR, p 3-35	\$0.96
Smart kiosks at bus stops	MDTA, FDOT, TCRA	S	ICSFR, p 3-35	\$0.58

Miami Intermodal Center - just east of MIA	FTA, FHWA, FDOT, MIA, DCPW, TCRA, MDTA, DCEA	L	LRP, p IV-9	
ITS technical consultant (for SR-926, SR-836, SR-874, SR-112, I-95, I-75)	FHWA, FDOT	I	TIP, p 207	\$0.63/ yr
ETC for Rickenbacker and Venetian Causeways	DCPW	I	DCPW	\$3.5
Additional ITS Projects Proposed				
Description	Associated Agencies	Time Frame	Source	Projected Cost (\$mil)
Smart kiosks at park and ride lots, malls, pedestrian areas, and rail stations (particularly in Southwest and Northwest Dade County)	MDTA, FDOT, TCRA, various cities	S	This ITS Plan	\$0.04/kiosk
Kiosk location feasibility study	MDTA, FDOT, TCRA, private sector	I	This ITS Plan	\$0.05
Marketing campaign for in-vehicle navigation aids	MIA, tourism, chamber of commerce	S	This ITS Plan	\$0.2
Feasibility study for ITS intermodal needs at Miami's Seaport	Seaport	I	This ITS Plan	\$0.05
ETC for private toll road	DCEA, private sector	L	This ITS Plan	
ITS Feasibility studies for Kendall Drive, Bird Road, Tamiami Trail, NW 36th St., and Okeechobee Road	FTA, FHWA, FDOT, DCPW, MDTA, DCEA	M	This ITS Plan	\$0.43

Table 18: Summary of ITS versus Conventional Investments

Roadway/Corridor	Conventional \$ (1)	Total Planned ITS \$ (2)*	1996 TIP Planned ITS\$	Total \$ (1+2)
I-95	\$605.80	\$29.87	\$21.60	\$635.67
Palmetto	\$866.07	\$25.41	\$0.00	\$891.48
Don Shula	\$44.40	\$9.80	\$0.00	\$54.20
Kendall	\$0.00	\$0.00	\$0.00	\$0.00
Dolphin	\$1,475.21	\$24.01	\$0.00	\$1,499.22
A1A	\$1.50	\$0.00	\$0.00	\$1.50
Bird Road	\$0.00	\$0.00	\$0.00	\$0.00
Tamiami Trail	\$7.60	\$0.00	\$0.00	\$7.60
US 1	\$92.25	\$0.00	\$0.00	\$92.25
NW 36th St.	\$2.58	\$0.00	\$0.00	\$2.58
Okeechobee	\$36.00	\$0.00	\$0.00	\$36.00
General		\$211.90	\$105.20	\$211.90
Totals	\$3,131.41	\$300.99	\$126.80	\$3,432.40

* This column does not include "additional" ITS recommendations outlined in this plan. These recommendations total \$215 million over the next 20 years.

5.4 Dade County ITS Project Descriptions

This section examines ITS projects that are in place or being constructed now. The sections will follow along the Operation TimeSaver priority user services. The first presented here is an examination of the proposed Miami Intermodal Center (MIC) and how the many autonomous traffic control centers proposed for the area will communicate. Next there is an in-depth look at the existing traffic signal control system and the proposed (the contract to build the system has been awarded) advanced traffic control system. Some of the following information has been taken directly from the ICS program reports.

5.4.1 Integration of Autonomous Control/Management Centers

A major investment study and draft environmental impact statement are currently being prepared for the MIC concept. The MIC would be the multimodal hub for the Miami area. Extensions of the current transit system (MetroRail, Tri-Rail, Metrobus, Amtrack) along with future transit systems (a high speed rail line, an East-West Corridor rail line, and an automated guideway transit system that is connected to MIA) would connect at the MIC. The MIC would be located somewhere between MIA to the west, NW 27th Ave. to the east, SR 112 to the north, and SR 836 to the south.

The goals of the MIC are to “provide for a safe, efficient, economical, attractive and integrated multimodal transportation system that offers convenient, accessible, and affordable mobility for all people and for the movement of goods.”¹³ This goal can be best achieved through the integration of ITS and the MIC. A wealth of real-time travel information should be available to commuters at the MIC through kiosks, message boards, personal communications devices, and VMS.

The MIC should not only disseminate real-time travel information but collect it as well. Thus it would be another one of several emerging autonomous transportation management centers. However, it is critical that these centers do not remain entirely unconnected but share all transportation information with other centers in real time. This will require a great deal of planning in advance of the design and construction of these centers. Fortunately, in most cases the design and construction of these TMCs has not begun, allowing for this advanced planning. This Plan recommends that an ITS Coordinating Committee be established. This committee would be very small, consisting of a technical/communications expert from FDOT, DCPW, MDTA, TCRA, DCEA, and Metro Traffic Control. These experts would meet regularly to ensure the method of data collection and transmission for each TMC is compatible and interoperable.

5.4.2 Advanced Traffic Management System

Current System Configuration

The hub of the system is the Traffic Control Center (TCC), which was designed and built at 7100 NW 36 Street in Miami in 1974. Its 5,000 square feet include a system control room, engineering offices, power and back-up power supply rooms, and a communications room.

A professional staff is employed to operate the TCC that includes the Traffic System Manager, Assistant System Manager, Computer Programmer, five Signal Operation Engineers, and four Computer Operators. A maintenance crew consisting of one foreman and four technicians maintains the system interface equipment in the local control-cabinets, the communication modems, and the central hardware excluding computers and their peripheral equipment.

Hardware

Systems that are operated and maintained in the building include the traffic control system (TCS), back-up control system, communications system, air conditioning system, fire and gas detection systems, diesel generator power back-up and battery-based uninterruptable power supply systems, and an alarm system.

The central computer is a Modular Computer Systems, Inc. (ModComp) Classic II/85 CPU. A ModComp Classic II/55 CPU serves as a backup. The CPU communicates with the field units using a ModComp Parallel Interface Controller (PIC). The PIC interfaces with the Central Communications Unit (CCU) by way of the computer's selector channel I/O bus.

The system has four large LED maps which show status of the individual system signals. It has a UTCS-type of Operator Console. It has a dozen workstations in the TCC and several in adjacent buildings connected via fiber-optic cable.

Central Software

The central software is a version of the first generation of Urban Traffic Control System (UTCS). It is written in approximately 80 percent Fortran and 20 percent Assembly programming languages. Timing plans are imposed on the system on a traffic engineering "section" basis. There are no restrictions on coordinating signals based on their assignment to a communication channel or other artificial barrier.

Since its original installation, many software enhancements have been made to enable variable phasing, Reversible Lane Control System operation, isolated signal control, multiple yields per cycle, remote preemption, recovery from local preemption, scheduling, handling of new and

enhanced databases, use of new and enhanced engineering support programs, and presentation of numerous new and enhanced readouts and printouts.

A background program called DCTAPS exists and is a version of UTCS 1.5 Generation software. It enables engineers to make simulation and optimization runs on intersections and arterials in the system.

Communications

The TCS sends a 16 bit data stream consisting of address bits, standby synch bits, and five command bits (Hold, Advance, Flash, Skip, and Test) to each controller every second. It receives back a 16 bit data message consisting of sensor data and six controller status bits (A, B, C, and D Phase Greens, Flash, and Local Preempt) every second. The CCU Time Division Multiplexes (TDMs) the data onto their respective communications channel. Each channel is capable of addressing eight Remote Communications Units (RPU's). Each channel is Phase Shift Key (PSK) modulated via a communications modem. All of the TDM/PSK communication channels are connected to telephone company switches. The telephone company repackages the data for transmission on their network which consists of fiber-optic cable leaving the TCC and two copper wire pairs into each controller.

Almost three hundred (300) miles of County-owned signal interconnect conduit exist along County arterials. Most of it is empty. However, approximately five percent of the system signals are "comm-slaved" to nearby signals through this conduit, thereby eliminating the need to lease a Southern Bell drop to those locations. The existing interconnect conduit was installed as part of roadway reconstruction projects during the past 15 years. The older conduit is in poor to good shape. The newer conduit is in good to excellent shape. Several years ago, the County's Information and Technologies Department (ITD) installed the existing fiber optic loop.

The Dade County ITD owns fiber-optic cables which make a loop through the center of the County. The loop will be modified to pass through the TCC Communications Utility Room in early 1996. The fiber network has been defined as a dual fiber-bi-directional Sonet transmission ring. The network protocol and access methodologies to the fiber network will be standard telecommunication interfaces such as DSO, DS1, DS3, etc.

The County, in conjunction with a local cable company, has the rights to twelve fibers which run from the Dadeland area along the Metro Rail structure to its north end. The plans are then to extend it south on NW 72nd Ave. to the Traffic Control Center (which is at NW 72nd Ave and 36th St.) It will then continue down NW 72nd Ave. to 25th Street, then go west on 25th Street to the main headquarters of the Metro-Dade Police Department which is near NW 102nd Ave. and 25th St. It will then wrap back to NW 87th Ave. and then go south to the Metro-Dade emergency management center at SW 87th Ave. and 50th Street (more or less). From there it will continue south and eventually get back to its starting point near Dadeland creating a fairly long loop.

Also, the fiber network contains nine (9) nodes at these County government locations:

- ITD Headquarters at 5680 S.W. 87 Avenue
- Metro Dade Police Department Headquarters at 9105 N.W. 25 Street
- DPW S&S Division at 7100 N.W. 36 Street
- TGK Correctional Facility at 7051 N.W. 41 Street
- MDTA's MetroRail Maintenance Yard at 6601 N.W. 72 Avenue
- MDTA's Bus Maintenance Yard at 3300 N.W. 32 Avenue
- Aviation Department at Miami International Airport
- SPCC Downtown Government Center at 111 N.W. 1 Street
- Civic Center at 1351 N.W. 12 Street

Florida's Turnpike has started to examine the possibility of having a private company install fiber optic cable along 1,800 miles of their right of way. Several other states have done this and at minimal to no cost. The potential arrangement has yet to be developed, but in any agreement the Turnpike will require some of the fibers for their own use. In Dade County, the Turnpike right of way runs very close (within 3 miles) of ITD's fiber optic line. When the Turnpike does have fiber optic cable installed along their right of way, it would be beneficial to connect it to ITD's fiber optic loop.

Intersection Controller Hardware and Software

The existing intersection controllers are mostly NEMA-type microprocessors from assorted manufacturers installed in DC4T cabinets. About eight hundred (800) relatively new Type D170 controllers are also installed throughout the County in DC552A cabinets. They operate under system control utilizing basic NEMA functions for control purposes.

DCPW department owns the rights to use BiTrans Type-D170 Software #233 Version 2.5 in its D170 controllers. Its Time Base Coordinator (TBC) can store 9 standard timing plans with 3 offsets each, 1 isolated timing plan, and 32 Time of Day/Day of Week (TOD/DOW) schedules. Controller timing data can be modified manually from the face of the controller or from a laptop PC plugged into the controller. The Department also owns the rights to use the BiTrans Quickload program in laptop PCS to transfer data to and from the controllers. Several hundred of the system sensors (6' x 6' loops) originally installed with the TCS remain operational.

Planned ATMS Upgrade

The ATMS must be capable of working with the planned FDOT Intelligent Corridor System (ICS), the Robbie Stadium Reversible Lane Control System, and other ITS component systems which will be installed at the TCC, the FDOT Intelligent Corridor System Control Center (ICSCC), or elsewhere in Dade County. The system must be able to monitor and control 4000 traffic signals, with the possibility of also communicating with several thousand other field sites of as-yet, unspecified types.

The ATMS should place no more demand on the existing operations and maintenance staff than does the current TCS. The ATMS also must place no more demand on the existing operations and maintenance budget than does the current TCS. The only exception may be that existing funds for leasing the communication line network may be diverted toward supporting an alternative line network as long as the overall budget for this purpose decreases. The design life of the system will be twenty (20) years.

Approximately 800 Type D170 controllers have already been installed and will require minor modifications in Project Phases Two through Four to enable them to operate in the ATMS. Modifications are expected to include removal of old RCUs and Controller Adapters, installation of new modems, and minor wiring changes.

At approximately 1,600 other locations, new Type D170 controllers, or an advanced, downward compatible version thereof, will be installed in the latter project phases.

5.4.3 Freeway Management/Ramp Metering Systems

Dade County does not currently have any ramp meters installed. Ramp meters are most effective if they are coordinated with traffic on the surface streets. This coordination will be more readily achieved once the new Advanced Traffic Management System (ATMS) is in place. As well, residents of Dade County will likely see ramp metering on I-95 as favoring residents from other counties and impeding their travel. This could quickly become a political problem. Therefore in the short term (by the end of 1997) very few, if any, ramp meters will be installed. High Occupancy Vehicle (HOV) lanes are in place along I-95 and are being installed along SR 836 and SR 826. The HOV lanes on I-95 include a flyover ramp so that these vehicles can avoid the congested and accident prone Golden Glades Interchange.

5.4.4 Regional Characteristics

Two HOV lanes are in place, or under construction on I-95, from SR 112 (Airport Expressway) in Dade County to Linton Blvd in southern Palm Beach County, with plans for ultimately extending these lanes north to PGA Blvd. Effectively, this covers the entire length of I-95 within the study corridor. Freeway management teams exist and actively meet on a regular schedule in all three counties, including participation by representatives of Florida's Turnpike. Diversion route maps have been developed or are under development for I-95 in all three counties.

Park 'n Ride lots were constructed during the 1970's at the Golden Glades Interchange (approximately 1350 spaces available in two lots). Lots also provide parking for the Tri-Rail Golden Glades station and an intermodal transfer point. Location is serviced by buses with 16 routes/destinations, including express bus service to both downtown Miami and the Civic Center area. Lots are serviced by direct connector ramps to/from the I-95 HOV lanes.

Construction of the initial freeway management system at and around the Golden Glades Interchange (I-95, at the Dade-Broward county line) involves a series of three projects, all currently under construction, and includes the following:

- a six camera closed-circuit television system within the Golden Glades with video feeds back to the District 6 Traffic Operations office and to FHP.
- a detector system comprised of a combination of in pavement loop speed detector assemblies and video-image detection (VIDS) equipment.
- ten variable message signs in and around the Golden Glades Interchange controlled out of District 6.
- an interim control room within the District 6 Traffic Operations Office for the Golden Glades systems.
- Installation of a dedicated communications line between the FDOT and FHP offices.

Plans for a Miami Intermodal Center and related SR 836 corridor improvements continue forward slowly. SR 836 improvements include potential for extension of MetroRail along the corridor between the area of the Florida International University campus adjacent to the Turnpike and Miami Beach, exclusive lane(s) on SR 836, and other highway operational improvements.

5.4.5 Incident Management Programs

Calls to 911, regardless of whether they are cellular originated or landline, are currently received at the Public Service Answering Point (PSAP) responsible for the exchange from which the call came. Calls that are the responsibility of the FHP are then transferred directly to the FHP station responsible for the area. Calls from cellular phone users on the roadway will be a principal method of incident detection and will use *FHP.

FHP responsibilities focus principally on preservation of life and property, and management of traffic in the immediate area of the incident and include all existing responsibilities related to law enforcement, coordination with fire/rescue, call-out of wreckers from the rotational lists, and accident investigation.

Operations Center responsibilities include verification of the existence of the incident, implementation of VMS messages (including activation of arterial VMS and dynamic trailblazers), any necessary adjustments to ramp metering rates if ramp metering is in effect (or implementing it if required by the circumstances of the incident, and notification of the local traffic signal control center (which will be done electronically) if signal timing adjustments at ramp termini or parallel arterials are required. At the request of FHP or the System Operator, an indication to archive the taping of the camera image being received will be initiated to document the extent and handling of an incident. This should be controllable remotely from the System Operator's console. The system display should be designed to allow videotaping of up to the maximum number of images which the Operators Console (OC) can receive simultaneously.

Immediately after accepting an incident from FHP and confirming the existence of an incident, the System Operator would be presented with a series of hierarchical pull-down menus for entering data related to the incident via an on-screen display. Data entered would include the following:

- Type of incident - accident, fire, disabled vehicle?
- Types of services required - wrecker(s), fire/rescue (should have already been dispatched by FHP handling original call), service patrol vehicle, FDOT maintenance?
- Lane blockages - which lanes are blocked?
- Anticipated duration of the incident?

Based on the responses entered by the operator, current traffic conditions as determined from system sensors and the AVI system, and a continuously updated historical data base, the system would seek out-pre-engineered responses stored in its data base and generate an on screen proposed traffic response. This consists of proposed VMS messages and trailblazer actions, ramp meter rate adjustments (this could be done without operator concurrence), response vehicles to be dispatched, and signal timing adjustments proposed to be sent to the local traffic control computer for implementation. Upon acceptance of the proposed menu of action, the system will automatically implement the actions selected and send the message to the traffic signal control center. If no predetermined responses exist in the data base for the circumstances entered, the traffic engineer on call would be contacted--it is that individual's responsibility to determine and approve appropriate response.

Once an incident has been cleared from the roadway, the console operator will declare the incident complete, and the system will automatically perform the necessary record keeping for future generation of incident summary reports. Periodic logs of system operation, and particularly incidents, are critical to preplanning of incident response scenarios, and will be generated by the system on a daily, monthly, and annual basis.

The software of the system should be designed to multitask between incidents, allowing a single operator to handle multiple incidents simultaneously. During major incidents, the situation room (a large conference room proposed for each of the OCs) is activated and staffed with traffic engineering personnel, FHP and traffic signal system representatives, and additional support personnel as the size of the incident dictates. In addition, ring-down telephones should be available between the different OCs, local traffic signal control center, and FHP office.

The management of incidents and the resultant non-recurring congestion along the various highways is critical. There are three aspects of incident management which need to be recognized in an overall system level operations plan such as this: service patrols, freeway incident management teams, and incident response teams. These are in addition to incident detection, verification, and response from each of the involved agencies according to their own individual operating plans.

Currently, the Dade County Incident Management Team is meeting monthly and working to produce an incident management plan. This plan is still being carefully drafted to include much of the above and will greatly improve incident clearance times in the county.

5.4.6 Traveler Information Systems

Metro-Dade Transit Agency has a comprehensive static transit data base available to users through modems or through a telephone call. Travelers first modem to the bulletin board site and then enter in their origin and destination. The origins and destinations are typed in using simple terms such as S.W. 16th Street and 64th Avenue, so that the system is easy for new users. The user can also put in their preferred times for the start and end of their trips. The system will examine the database on the transit system and return the best route and transit vehicles to take in an easy to understand format to the user. This information can also be obtained by phoning the agency.

This system needs to be enhanced through appropriate coordination and communications to the AVL transit information and traffic information already being collected. This enhancement is not currently scheduled for before 1998, but if funds become available this will be a priority objective.

The ITS subsystems are in place now, the funding will be for linking the information and disseminating it to other agencies and the general public through:

- information kiosks (some of which are currently scheduled to be in place with static information this year);
- the Turnpike has already issued a request for proposals for vendors to install kiosks at their service centers;
- smart transit stops;
- enhancing the current bulletin board service;
- the internet (this, the bulletin board service, and the kiosks will look and work the same to make the entire system easier to install and more user friendly);
- telephoning a human operator who has access to the information.

There are currently three kiosk deployment initiatives in Dade County. The first is by Florida's Turnpike and was listed above. The second initiative is through the Federal Transit Agency (FTA) and MDTA. This \$400,000 project is designed to deploy kiosks tailored towards the transit user. These will be located at major transit transfer points around the county. The third project involves the detailed study of kiosks designed for tourists. This study will examine potential locations for the kiosks, the information required to be placed on them, costs of kiosks, and possibly set up an agreement with a kiosk vendor to supply the kiosks.

Florida Turnpike's current ITS program includes ATIS, SunPass and Fiber Optics which will all be deployed in the Dade County Area of Florida's Turnpike District. The Phase I ATIS project which is being coordinated with the Intelligent Corridor System (ICS) in South Florida (Dade, Broward, and Palm Beach County) will be deployed from Golden Glades to Cypress Creek. The full deployment of ATIS Phase I is estimated at \$3 million dollars. ATIS phases 2-5 are predominantly planned in Dade County to help ease congestion problems and increase patron safety. An estimated value for the deployment of these phases is approximately \$12-15 million. The full deployment of ATIS on the Turnpike is estimated at \$30 million. The Turnpike District's total ATIS budget for

Dade County is estimated at \$12-15 million or close to 50 percent of the budget. The projected implementation date for Phase I ATIS is the end of 1997.

Phase A of the ICS will include 30 cameras, 12 VMSs, detector system, fiber trunk along I-95 in Dade Co., and freeway management software. The phases B and C will provide the new control center, ramp metering, accident investigation sites, additional VMSs, kiosks, additional software and for integrating all the tri-county agencies for data collection and providing uniform travel advisories, through multiple media including TV, radio, phone, fax, Internet, kiosk, etc. The 30, 000 sq. ft. control center will provide about 10,000 sq. ft. to FHP, which will participate in the operation (FHP has agreed to pay a proportionate amount for matching and operating costs). The control center design has provision to give office space for key ICS participant agencies such as transit, Tri-rail, Dade Co. Signals, Florida's Turnpike, FDOT District 4, and other public sector agencies, if these agencies share the responsibility of operation with FDOT. In addition to the ICS VMS, both Rickenbacker Causeway and Miami International Airport (MIA) both have VMS running now. The Seaport will be installing VMS shortly as well.

NavTech has mapped the entire area for use with the in-vehicle navigation devices. This mapping system allows travelers renting cars the option to get an in-vehicle navigation device, or car buyers to get it as an option. With increased usage of these devices traffic should flow more smoothly, since users will not travel around lost and confused.

The area also has 3 working highway advisory radio (HAR) stations relaying traffic information to commuters. A fourth is planned and ready for use on the Rickenbacker Causeway pending FCC approval.

5.4.7 Electronic Toll Collection (ETC) Systems

Currently there is only one ETC facility in operation in the area - that is on Broad Causeway. However, there is a great deal of work going on to introduce ETC on many of the toll roads and causeways within Dade County. These ETC systems will, of course, pay strict attention to the privacy principles set out by ITS America. These principles include recognizing and respecting the individuals interest in privacy, being visible to the public, only collecting the data necessary, ensuring the data is secure and protected, and balancing all these with the legislation set out in the freedom of information act.

Rickenbacker and Venetian Causeways

Dade County is installing a computerized toll collection system to replace manual toll operations at its Rickenbacker and Venetian Causeway facilities that should be operational by December 1996. The heart of the system is an Automatic Vehicle Identification (AVI) subsystem which reads the identity of passing vehicles equipped with transponders through a special antenna installed in each

lane. Also included are: central computer equipment in the Rickenbacker Toll Plaza Administration Building, computer equipment at Venetian plaza, equipment in toll lanes, equipment at Government Center for remote control, and a communication infrastructure of fiber optic data lines and conventional phone lines linking elements. Lane controller computers within toll lanes provide for processing of in-lane activities. Central computers within the Rickenbacker administration building provide for communications with the lane controllers and retain database account transaction information. The Rickenbacker plaza computer also provides a user interface to access the data and prepare toll management reports. The entire system is provided by Technicon with surveillance via video cameras located in each lane comprising a video enforcement system (VES). Violators are automatically issued citations as the system is networked to the Florida Department of Highway Safety and Motor Vehicles. This department controls the database on drivers licence and tag information.

Within the 14 lanes, tolls may be collected by conventional attendant operations, unmanned Automatic Coin Machines, Causeway Cards, or a Causeway Pass. The Causeway Pass capability utilizes the AVI equipped lanes for frequent users who will establish prepaid accounts. It is estimated there will eventually be 25,000 Causeway Pass users. When a transponder-equipped vehicle is automatically detected as it approaches a toll plaza, the appropriate toll transaction charge is debited against the users account. Cards will be issued to vehicle fleets such as county vehicles which will use swipe card readers in the lanes to debit accounts. Since lanes can have one or several different configurations, Variable Message Signage is provided above each lane to direct patrons to the proper lane. There will be dedicated Causeway Pass lanes and other multiple use lanes which can also be configured for dedicated Causeway Pass use exclusively or in combination with other modes.

Lanes will contain a vehicle preclassification system that detects the number of axles for each vehicle. Tolls will be charged based on the number of axles detected. A vehicle audit system (post-classification) is also provided as an audit mechanism for the lane transactions.

The Causeway Pass (AVI) system consists of an overhead MARK IV Roadcheck antenna that transmits a narrow beamwidth signal from a registration unit to a vehicle mounted, MARK IV Roadcheck (interior/exterior) transponder. Transponders then emit coded signals at 500 Kbits/second that are received back by the antenna and registration unit. These transmissions occur at the 915 MHZ frequency. The 256 bit, manchester keyed carrier signal is decoded and fed to the lane controller and the plaza computer, linking it with user account information for account transaction processing.

Lane controller software contains interfaces for the Causeway Pass (AVI) system, the preclassification system, the Video Enforcement System, the automatic coin machines and variable message signs. Toll collectors interact with the system through the lane controller using touch screen terminal in booths. The screen is used to initiate a work shift (log on), input the method of payment (cash, card, pass, or account replenishment), to issue receipts, to print directions for motorists, to alert the system of unusual occurrences and trigger a VES event (insufficient funds,

emergency vehicles, u-turn) among others. Interfaces to the lane controller are also provided to control the card readers, receipt printers, patron fare display, traffic control gate and traffic signal/violation alarm.

Florida's Turnpike

The SunPass program, the ETC program for the Florida Turnpike, is now scheduled to have a number of sites up and running in south Florida by early 1998. Between December of 1997 and May of 1998:

- 67 toll lanes will be equipped with ETC on the Turnpike's Southern System;
- 63 toll lanes will be equipped with ETC on the Homestead Extension of Florida's Turnpike; and
- 20 toll lanes will be equipped with ETC on non-Turnpike expressways such as SR 924, 112, 836, and 874.

This system will greatly reduce the traffic queuing at the toll booths along the Turnpike in Dade County. The operating frequency has not been selected yet, but it must be either 915 MHZ or 2.45 GHZ.

The Turnpike District is planning to invest approximately \$8.5 million in SunPass equipment in Dade County to reduce congestion at toll plazas and also provide another detection element of the ATIS system for traffic management. SunPass estimates were based on the 1994 SunPass request for proposals for Southern/HEFT, Sawgrass and non-Turnpike system deployments. The projected finish of Phase I installation of SunPass is at the end of 1997.

The communication infrastructure to support these ITS projects is anticipated to be fiber optics. The deployment of fiber optics in the Dade County area including installation, fiber and end equipment is estimated at \$10-15 million. The fiber optic estimate is based on data from similar fiber optic deployments. The Implementation date for Phase I of this system should be available by August 1996. The total ITS program investment (including the planned ATIS, see Section 5.4) by the Turnpike in Dade County is estimated at \$30.5 - \$38.5 million, upon completion of both the SunPass and ATIS programs.

As part of the SunPass program, the Turnpike is also examining the possibility of using Type IV transponders - also known as smart cards. If this does happen, it will be beneficial to integrate these smart cards with Dade Counties public transit system. This would allow Turnpike commuters to more easily use Park-and-Ride facilities and transit for part of their commute.

The Dade County Expressway Authority

The newly formed Dade County Expressway Authority will coordinate, maintain, and operate all the non-FDOT ETC systems in the region. This could include tolls on the Causeways, Turnpike, State Roads 112, 836, 874, and any private toll road that may emerge in the near future. It is critical that these ETC systems are compatible to assure: (1) the highest level of user participation possible through increased ease to use the system and simple billing procedures across multiple agencies and roads, and (2) ease in collecting traffic data using AVI.

Miami International Airport (MIA)

In an effort to reduce congestion at MIA the airport installed an AVI system for hotel and rental car company courtesy vans. As one of these vehicles enters the restricted lanes at the airport, it is identified and assessed a congestion impact fee. This has reduced congestion in the airport and increased airport revenues. Previously, the extent of trip making by these types of vehicles to the airport was reported on an honor system.

5.4.8 Electronic Fare Payment Systems

A strategic plan for Advanced Public Transportation Systems (APTS) for the Metro-Dade Transit Agency was developed in late 1993. This plan identified the five highest priorities for ITS technology application in Dade County, and one of the five priority areas was "smart cards", or advanced fare payment media.

Smart cards are currently being considered for multi-modal (bus, rail, and people mover) and possibly multi-jurisdictional fare payment, plus payment at related parking facilities. Results of two previous studies ("Fare Cross Elasticities and Allocation" and "Transit Fare Policy and Strategies") will be integrated into an operational test of smart card technology being planned by MDTA. This operational test will evaluate suitability for multi-mode usage, time-based flexible fare schedules, distance-based fares, increased passenger convenience, increased data collection capability, ridership growth, and improved accounting accuracy and revenue security. If the Turnpike also chooses to use smart cards with their ETC system it would be beneficial to ensure the two systems are completely compatible.

5.4.9 Transit Management Systems

The Metro-Dade Transit Agency (MDTA) is well underway with its installation of a system wide automatic vehicle location and control center. As part of a countywide project to install an 800MHz digital radio system, MDTA is also installing GPS-based Automated Vehicle Locating (AVL) technology on all of its revenue, supervisory and some maintenance vehicles. The AVL subsystem

will communicate through a dedicated channel of the 800MHz communication network to a new central dispatch facility, featuring bus, rail and MetroMover Computer-Aided Dispatch (CAD) control consoles.

The entire undertaking is a countywide project involving several operating departments. MDTA's share of the total project funding includes its specific 800MHz radio requirements (\$6.34 million), the AVL/CAD installation for the entire fleet (\$6.78 million), and a proportional share of the total system infrastructure and project management costs (\$1.08 million). All of MDTA's project contributions are from Federal Transit Administration (FTA) Section 9 allocations plus local and state matching funds.

The project is currently (Spring 1996) undergoing operational acceptance testing. All central control consoles are in place, with the 600+ buses outfitted with radios and AVL equipment. By Summer, 1996, the rail and MetroMover fleet will be brought into the network, along with supervisory and maintenance vehicles, during the final project phase. This capability will allow the existing major transfer (bus-rail and park-n-ride) stations to operate in a much more coordinated fashion, increasing the willingness to transfer between modes. Transit-related incident management is also expected to be significantly improved as well.

6.0 Public Involvement and Education Program

The development and content of this section of the Plan was provided by the Lehman Center at Florida International University in Miami and the Stein Gerontological Institute. This section is designed to provide analysis and recommendations in two areas:

- a) Development of a public involvement and community educational campaign, and
- b) Identification of institutional issues germane to Dade County. As expected, The primary focus of the research was placed on the public education and involvement plan.

Community support for ITS applications in Dade County is essential. The community at large must be convinced of the need for those services to ensure their acceptance and success. Public input is critical for decision makers because it is the principal source of information about how the public values the nature, functionality and usefulness of their transportation systems. The "best" use of transportation resources is never evident from the resources themselves. There are wide variations in the ability of transportation systems to address the needs of the public. Public involvement will not only promote acceptance of new transportation technologies, it will also ensure an effective translation of potential users' needs /desires into appropriate services. This is particularly critical in a setting where thousands of immigrants of diverse ethnic, culture, and language groups compete for resources, and where a large number of active elderly users of transportation reside.

ITS promises to enhance the mobility of drivers, users of public transportation, and pedestrians in our community. However, the success of the new system will depend as much on the technological acumen of designers and builders as it will on the various communities' degree of acceptance.

6.1 Objectives

Identification of Existing Mechanisms for Public Involvement in ITS Related Programs and Projects

ITS programs and projects in Dade County are a fairly new phenomenon. Specifically, all of the existing projects, such as the Golden Glades Interchange Closed Circuit Television (CCTV) project or the Metro-Dade Transit Agency's (MDTA) Automatic Vehicle Locator (AVL) program, were created within the last three years. Under the 1991 Intermodal Surface Transportation Efficiency Act (ISTEA), public agencies are responsible for providing planning and operational leadership for ITS programs and projects. As a result, researchers concentrated their efforts on identifying ITS public involvement mechanisms in existence at the following public agencies; Florida Department of Transportation District 6 (FDOT), MDTA, Dade County Metropolitan Planning Organization (MPO), Tri-Rail, Port of Miami (Seaport), Miami International Airport (MIA), and Dade County Department of Public Works (DCPW). Additionally, because of their respective cities' relative population size and economic power, Public Works departments in Miami and Coral Gables were also included in the investigation.

The process of gathering data on ITS community involvement and education was implemented as follows:

* *Identification of key personnel responsible for public involvement and education at each agency:* This step was achieved by compiling lists of official positions and names, usually the public relations director or its designated representative, for each agency.

* *Telephone surveys:* Following identification of responsible officials, telephone surveys were conducted to solicit information on a) the existence of ITS related public involvement and education mechanisms, and b) the procedures for their implementation.

Level of Awareness and Understanding of ITS Issues

In this phase of the study, the primary task was to find out what and how much people knew about ITS. In developing this section of the research plan, an advisory task force was created to provide suggestions and guidance to researchers. This task force consisted of a community activist in an immigrant community, an elementary school teacher, a trucking operations expert, a financial analyst specializing in privatization of public infrastructure, MDTA, and FDOT representatives. The members of the task force represented the ethnic diversity found in Dade county and had responsibilities in transportation related matters in addition to their other professional activities. This task force served as a temporary mechanism, and is not to be viewed as the suggested Dade County Task Force.

To assess the level of awareness of ITS, two types of survey questionnaires were developed: the "Organization Survey", and the "Individual Survey." They were designed with a different objective. The goal of the Individual Survey was to determine whether the persons interviewed had any knowledge of ITS at a global level and to identify ways in which they perceived that ITS would be useful to them. The goal of the Organization Survey was to gather detailed information about awareness of ITS as well as the organization's preferred means for acquiring and disseminating information. The end result of these fact finding exercises provided a basis for identifying the stakeholders, their needs and the structure for implementing specific public education and involvement strategies. Researchers proceeded as follows:

- 1) *community and civic (secular and religious) organizations:* collectively these entities represent part of an active citizenry with experience and commitment to public, sectarian, issues.
- 2) *professional groups/societies:* these organizations are able to contribute specific knowledge, opinions and/or skills to this multidisciplinary process.
- 3) *community organizations (ethnic):* they represent the kaleidoscope of cultures, languages and lifestyles which greatly influence Dade County's quality of life and political processes.

4) *chambers of commerce/business associations*: these entities have a critical role to play as representatives of the private sector, particularly in issues of joint-partnerships.

5) *government entities*: these public agencies usually have the responsibility for establishing the agenda for planning and implementation of public programs.

6) *educational institutions*: the research and training capabilities of schools, colleges and universities, as well as their relationship with practically every sector of Dade County, provide an excellent mechanism for a public involvement and education campaign.

7) *transportation providers*: these organizations are the mechanisms which effectuate the movement of people and commodities, thus rendering them a necessary part of the process.

In addition to the above, and as mentioned earlier, a separate survey was conducted on persons 65 and older to determine their level of awareness of ITS. This population was selected because the elderly represent a substantive portion of the population of Florida and are users of the roadways and various means of transportation.

* *Selection of specific community organizations, professional organizations and transportation stakeholders groups to participate in mail survey*: This process was completed in two steps. First, a list of community organizations already involved in the public transportation arena was requested from the public transportation agencies identified previously. Given the level of contact of these groups with transportation agencies, it was speculated that they might have a higher level of awareness of ITS than other groups surveyed and might be more willing to participate in an ITS public involvement campaign. Thus, past or current involvement with a transportation agency was one of the criteria used to identify potential survey respondents. Secondly, agencies or institutions with a strong representation in the various economic, ethnic and geographical arenas, e.g., Greater Miami Chamber of Commerce (GMCC), Florida International University (FIU), Miami Dade Community College (MDCC) and Dade County Public Schools (DCPS) were also asked to submit a list of organizations. Most of the selected organizations are acknowledged to be among the top 15 largest employers in Dade County.

The underlying rationale for involving these institutions is based on the premise that achieving the primary ITS goals--i.e., safety on the roadway and full deployment of a network--depends on appropriate education of drivers and joint partnerships with the private sector in creating and operating the technologies used in the network. In addition, involving educational institutions in this process allows researchers to reach the group of drivers most frequently involved in highway fatalities (15-24 year olds).

Information Dissemination

In order to successfully design and implement a public involvement and education campaign, it is important to identify the various tools used by organizations to acquire and disseminate information. As such, the Organization Survey solicited information regarding the most popular or preferred mechanisms used to achieve these ends. Responses to these questions--in addition to the researchers' familiarity with other research regarding various groups' (e.g., immigrant populations) preferred means for obtaining information, as well as discussion with subject matter experts--will guide the development of effective methods for dissemination of information about ITS.

Recommendations for Development of an ITS Public Involvement and Education Plan

Recommendations will be provided based on the results of the surveys, focus groups and the other techniques used for assessing public awareness of ITS issues. These recommendations will identify unique strategies, mechanisms, techniques and tools which will optimize dissemination of ITS related information, and maximize the participation of the Dade County's various ethnic, social and economic groups.

6.2 Survey Results and Discussion

6.2.1 Survey of Organizations

Key public information personnel were identified and contacted at a total of 9 public transportation agencies. Although 8 of the 9 organizations had rather sophisticated public involvement/education mechanisms in place (the only exception was DCPW which seemed to rely primarily on MPO's resources), only 3 entities acknowledged having some type of ITS related information package for the public at large. The MPO, FDOT and MDTA information materials are mostly descriptions of on-going projects, e.g., Golden Glades Interchange, Venetian Causeway's ETC, transit pre-trip planning and Automated Vehicle Locator. Most of these materials (with the exception of the March 1996 MPO pamphlet on ITS) may not be appropriate for a public that needs basic ITS information. Furthermore, no agency reported having a functional ITS involvement/education program in place; consequently individuals and/or organizations, would not be expected to have learned about ITS from formal sources.

Table 19: Survey Respondents

TYPE OF ORGANIZATION	
Community Organizations	20
Professional/Trade Groups	12
Chambers of Commerce	14
Government	3
Educational	2
Transportation	2
Ethnic Groups	2
Total	55

Table 20: Respondents Familiarity with ITS

Technology	Were the respondents familiar with the various technologies?			
	Yes	Somewhat*	No	Total Responses
ITS, High-Tech Highways or Smart Highways	15	38	2	55
ATMS	10	--	45	55
CVO	14	--	41	55
APTS	16	--	39	55
ATIS	13	--	42	55
ETC	19	--	36	55

*This option was only available for ITS in general

6.2.2 Survey of Elderly

The Stein Gerontological Institute (SGI), while using the Individuals survey, conducted an interview of twenty-three older persons, twelve of whom had been invited to attend the Town Meeting organized by the FIU Lehman Center, specifically for the purpose of informing the public. The remainder (i.e., 11) had not, to the researchers' knowledge, received any formal presentation on ITS. The data obtained from the interview of the 23 elderly persons were also complemented by other information derived from focus group interviews and other mobility-related research conducted at the Institute.

Information gathered during the interview included the frequency of use of various means of mobility (i.e., driving patterns, use of public transportation, and walking habits), likes and dislikes of these means, as well as ways in which ITS can enhance them. The results will be presented in Appendix C.

Information About ITS

As might be expected, the majority (91%) of respondents had not heard about ITS nor were they aware of the various implementations of ITS in Dade county. Those who attended the FIU Town Meeting rated it highly and thought of it as very informative. They expressed surprise upon learning of ITS technologies in current use as well as implementations of various ITS elements (e.g., automatic toll collection, changeable message signs) in Dade. However, they perceived these technologies as potentially helpful to them. Individuals who did not attend the Town Meeting perceived these technologies as futuristic until they were informed of the current implementations of ITS in Dade.

This seems to highlight the need for educating the elderly driver who constitute a substantial population of Florida about ITS and the ways it will enhance their mobility. Furthermore, the contribution of ITS technologies to drivers' performance should be continually evaluated and feedback obtained should guide the design of such elements. From a design perspective, feedback from older persons is especially important since they are more likely to suffer deficits that would greatly impact upon their performance as drivers, pedestrians, and users of public transportation. The translation of elderly consumers' concerns into good ITS design will not only promote acceptance of such technologies by these users but will also ensure the success of ITS.

6.3 Summary of Results

In summary, the research results have crystallized three major findings:

- public agencies need to not only implement a thorough ITS public education and involvement campaign, but must also coordinate their efforts;

- organizations and individuals (i.e., community organizations and the public at large) appear not to have an appreciation of ITS concepts or projects; and,
- methods for disseminating ITS information must be flexible and varied enough to match the preferential tools of the constituency to be reached.

The study clearly reveals that Dade County's communities have not had the opportunity to develop an understanding of, or an appreciation for, Intelligent Transportation Systems. Yet, since national, regional and local ITS programs and concepts are still, by and large, in a state of flux, this state of affairs does not necessarily imply a shortcoming in the public education and involvement programs at public transportation agencies. Rather, what the research uncovered was an opportunity for the transportation sector to marshal the resources available within the various ethnic, political, and business communities.

Reaching out to the multicultural, multigenerational and economically diverse communities of Dade County, will not only facilitate the planning and implementation process, but will also validate the needs for the services provided by the new technologies. As the results of the survey indicates, both the business communities and the neighborhood/civic associations are willing to participate in the public education and involvement process. The public agencies responsible for the planning and implementation of ITS projects and programs must take a leadership role in developing a coordinated plan which allows for the integration of these spatially, culturally and economically distanced communities.

6.4 Identification of Dade County Institutional Issues

The institutional barriers identified with regards to ITS deployment in Dade County can be placed in three main categories. These major headings, which are for the most part unavoidably interrelated are as follows:

1. Multi-jurisdictional issues which include intergovernmental as well as multi-agency issues.
2. Private Sector/Public Sector issues in ITS implementation and privacy issues pertaining to the users of ITS services.
3. Privacy issues related to users of ITS services.

Multi-Jurisdictional Issues

The success of a large public project such as ITS deployment is not typically driven by the level of technological prowess but rather by the level of political support for such projects. Thus the potential benefits of an ITS project in Dade County, given the regional fragmentation, may be highly dependent on the political support elicited from several county governments, cities and municipalities.

In addition to Dade County's political institutions, cooperation from governments of Broward, Palm Beach and Monroe Counties must be secured. Areas where possible jurisdictional conflicts may arise must be identified and recommendations offered to remove any obstacle which may impede the success of ITS implementation.

Multi-Agency Issues

While ITS planners must deal with local and regional governments for political and financial support they must also contend with the multitude of local agencies which often share overlapping responsibilities. One of the difficulties for a system which will rely so heavily on information provided by a variety of sectors will be to navigate successfully through the different sets of bureaucratic requirements. Hence, there must be a system or agency which facilitates the breaking down of jurisdictional barriers. This issue will be revisited later in the section dealing with private sector participation.

In addition to conflicting or cumbersome bureaucratic regulations one of the issues which must be studied is the ability of local agencies to perform required operations and necessary maintenance of the infrastructure. Another identifiable issue may be the unevenness of capabilities among local jurisdictions. This imbalance must be addressed for a unified approach to ITS implementation.

Several governmental agencies located within the tri-county area are responsible for the planning, design, construction, maintenance, and operation of new and existing transportation facilities. Most of these agencies are located in Dade County or have local involvement facilities:

1. Public Works Department is responsible for the design, installation, maintenance and operation of county roads and all traffic control devices. However, most municipalities maintain local streets.
2. Metro-Dade Transit Agency is responsible for the planning design, construction, operation and maintenance of transit facilities.
3. Department of Public Safety is responsible for the traffic related incidents on roadways in unincorporated areas. The roadway network within municipalities are policed by the municipality.
4. County-wide Metropolitan Planning Organization (MPO). The Metropolitan Planning Organization insures compliance with federal regulations requiring highways, mass transit, and other transportation facilities and services to be properly deployed. It is also the MPO's responsibility to insure that transportation plans and services be consistent with the overall urban development plan.
5. The Florida Department of Transportation (FDOT), is the agency responsible for the design, construction, maintenance and operations of the Interstate and State-owned facilities. FDOT

is also responsible for all traffic control devices on facilities under their jurisdiction. Two FDOT Districts are in the affected area, Districts 4 and 6.

6. The Florida Turnpike of the Department of Transportation is responsible for the planning, operations and maintenance of the numerous toll facilities.
7. The Florida Highway Patrol is responsible for law-enforcement on limited access facilities and state facilities in various jurisdictions. The degree of responsibilities varies with the jurisdictions.
8. Tri-County Commuter Rail Authority (Tri-Rail). The Tri-Rail Authority is responsible for the planning, operations and maintenance of the 67 mile north-south commuter rail service with 17 stations located in the service area.

Private Sector Issues

Over the past years, the deployment of ITS technology in the public realm has usually taken place within the context of private/public partnerships. The roles assigned to each sector usually follow a relatively traditional path. The public sector assumes responsibility for infrastructure and the private sector steps in to supply what the public sector cannot provide.

Private sector interests have not encountered major problems in working with engineering and operations staff. However, implicit to the notion of working within a multi-agency, multi-jurisdictional context is the perception that the private sector will have to deal with several sets of purchasing, accounting and administrative staffs whose requirements often conflict.

There are several issues which must be explored with regards to private sector involvement with publicly funded ITS infrastructure:

1. Multiple agency involvement
2. Private sector accountability to the tax-paying public, and degree of public participation allowed in this private/public venture
3. Technological instability- Technology is constantly changing.
4. Public benefit versus private benefits. Private sector profit driven incentives are fairly straight forward, whereas public sector incentives particularly with multi-agency participation are much more complex.
5. Private sector reluctance to invest in politically "unstable" (fractional county commission) or uncertain regulatory climate.

Legal Issues

In addition to the usual contractual agreements binding public and private sectors, there are specific legal issues which must be addressed with regards to ITS deployment.

1. Tort Liability: In case of tort related lawsuits, which sector assumes financial responsibility?
2. Privacy issues. One example of ITS implementation is Electronic Toll Collection technology (ETC). ETC technologies, monitor and control vehicle operation and trajectories. The public, and more particularly, participants in the ETC program need to know whether information gathered by the system may be used legally against them. Other privacy issues include concern over the use by law enforcement agencies to monitor movement of certain program participants in certain localities.

6.5 Recommendations for Public Involvement and Education

The following policy recommendations are intended as corrective measures for problems and deficiencies identified by this study.

Public agencies need to develop a coordinated effort.

Recommendation: As a general recommendation, the Plan advocates adopting a three-tiered public involvement policy which includes the private sector, transportation agencies and community organizations. This Citizens Task Force for the Dade County ITS Plan must be reflective of Dade County's rich cultural and ethnic and social diversity. It should be composed of a healthy mix representing the private and public sectors, commuters who are either car or transit dependent, and other specific groups, such as the non-English speaking residents of Dade, the elderly and the young. The primary role of the task force will be to provide advice and information about the concerns/needs of the communities they represent and to serve as a sounding board for political feasibility and community acceptance of intended projects. This coordinated plan of education and public involvement would be administered by the MPO.

Organizations and individuals for the most part do not seem to have any understanding or appreciation of ITS.

Recommendation: Facilitate and provide for ITS site visits by community groups and associations. Distribute the type of pamphlet developed by the MPO to community organizations, schools, at specific rail stations, toll booths, and churches, develop workshops for specific organizations, and groups of individuals, train bus drivers and train operators to highlight (e.g., PA system) specific ITS applications relevant to their mode of transportation. Because of the diverse nature and level of interest of the constituencies, specific efforts will have to be made to market special components of the ITS to specific groups, i.e., a form of market segmentation. Involve colleges, universities and high schools in the process.

Methods for disseminating information must be flexible and selective.

Recommendation: Select specific media for targeted populations. Research has shown that immigrants groups rely heavily on ethnic press for information. This suggests both printed press and radio. The latter will facilitate dissemination of information among communities that may have high levels of illiteracy but whose input, nevertheless is crucial. Select themes (e.g., ITS components) and produce leaflets/newsletters on these themes giving examples as implemented in Dade County

projects. Needs assessment of specific groups made of users of transportation related systems need to be conducted regularly to determine the following: a) issues to be addressed, and b) the effectiveness of specific applications. This information will help to guide the development of public education material that are appropriate for specific groups. Examples of the format of two potential educational events, a seminar/workshop for college students and a call-in radio show for an immigrant group, are provided in the Appendix. With minor changes in all components, similar formats can be developed for other targeted populations.

Organize school technical fairs around ITS.

Recommendation: The multidisciplinary aspects of the subject should be used to cross technical and social boundaries.

As stated earlier, in preparing the public education and involvement campaign, materials will have to be designed to accommodate various constituencies. Such materials might include basic information on ITS in general and on Dade County ITS projects in particular. Materials used can range from the traditional, e.g., radio, television, newspaper articles, newsletter, surveys, seminars and workshops, to the non-conventional, e.g., Internet, world wide web, co-sponsorship of events, sponsorship of competitions, promotional skits at educational, artistic and/or athletic events. To the extent possible, community wide efforts should be focused through the less expensive and free tools, public television, radio and community/neighborhood based newspapers.

The primary sources of information for developing local ITS promotional campaigns within Dade County should be the target groups themselves (e.g., elderly, non-english speakers, transit rail riders). The ideas and format for the educational materials can be obtained through such approaches as focus groups and/or workshops. Additional input can be obtained from professional marketing consultants, MPO staff and others.

7.0 Public-Private Partnerships

Government agencies are finding it increasingly difficult to fund transportation projects. This includes ITS projects which are new and untested, and are therefore still attempting to prove themselves worthy of funding. This has resulted in the need to look to the private sector for financial and technical assistance in order to pursue many projects.

Public-private partnerships work because both agencies have something the other wants or needs. Often a government agency will have something (i.e., right of way or data) which members of the private sector deem valuable. The private sector will offer something (i.e., the installation of equipment) to the public sector in exchange for what the government agency has, or rights to what the government agency has. In order for the private sector to deem anything of value they must see a possible profit resulting from its use.

One example happening in several states is the leasing of highway right of way to companies who install fiber optic lines along the roadway. The public sector is given the right to use several of the fiber optic cables installed and, after a period of time (typically around 30 years), all cables and right of way reverts back to the public agency. The private companies install the cable along the right of way, and the ability to do this is extremely valuable, since it would be much more difficult and expensive to install the cable anywhere else, particularly in urban areas. The private company then has the use of the majority of cables it has installed. This is so attractive to private companies, that they actually bid on the right to do this, with the highest bidder winning the contract and the public agency getting the money.

7.1 Partnerships Objectives

For public sector agencies, partnerships allow them to get more accomplished while using the same, or less, amount of public money. The public agency often:

- receives free infrastructure or infrastructure for a reduced cost;
- receives free information;
- receives contributions towards the cost of the public service (i.e., private companies pay for the right to use traffic data collected from the advanced traffic management system); or
- receives free services, technology and/or equipment.

For private sector companies, partnerships are another method of making a profit. This profit is obtained through:

- reduced cost advertising (ie. on a VMS, on HAR, or on service patrols);
- reselling advertising space to other private sector companies (ie. install a VMS for the public sector to use and lease advertising on the sign to other private sector companies); and
- selling value-added information or a specialized service to the public.

The basic objective is to lessen the financial burden on public agencies while still offering the public a high level of service. This high level of service is important for the public agency to ensure when it negotiates any public-private partnership agreement. It is therefore important that the general public have a strong voice in what public property and rights the public agency sells or rents. Some items may prove difficult to privatize or partnership in simply because the public does not trust a private sector agency to run what was always a public sector operation. The public may also resent the fact that what was once seen as a “free” public service (paid by general taxes), will now be user-pay. The public must be well informed of the benefits of this partnerships, why things are changing, and how it will benefit them.

Each public private partnership should be reviewed by the Citizens Transportation Advisory Commission (CTAC) and/or the Transportation Policy Commission (TPC). At least one of these agencies should have a significant amount of responsibility in approving or rejecting any public-private partnership.

A listing of technology vendors, integrators, and consultants is included in Appendix A. This list focuses on companies in the Dade County area and to a lesser extent on those in Florida. This list is far from comprehensive, and is designed to help readers find some initial contacts in the ITS industry. This list will help public sector agencies better target RFIs/RFPs, or letters of interest solicitations regarding ITS development, procurement, and deployment. Also included in Appendix A is a listing of local, state and national contacts.

7.2 Participation Incentives

Seek Request For Information (RFI)

The public sector agency simply asks vendors to supply it with information so that the agency can plan future endeavors more accurately. The agency has no obligation to award the contract to the responders. This can provide an excellent amount of “free” vendor knowledge. One method is to ask for written responses. Another is to hold an open forum discussion with vendors/system integrators (e.g., SunPass Open Forum held in Tampa during November 1995).

Conduct Field Evaluation/Operational Tests Prior to Deployment

Vendors typically participate at their own expense (or at significantly reduced rates) in return for “exposure”. Again, no mandatory participation is required and there is no guarantee of formal contract award. Participation can be sole-source or conventionally advertised. Citizen Advisory Groups can participate in the evaluation process to gain confidence in the technology.

Provide for Design, Build, Operate & Maintain Options

The consultant/technology vendor designs, builds, operates and/or maintains the infrastructure. In return they get all, or a portion of, the revenue generated by that infrastructure for a fixed period of time (e.g., private toll roads, real-time mobility information service).

Provide Free Advertising Space

A company which provides ITS “devices” at a reduced rate could be permitted to sell advertising space on the “device” (e.g., transponder, G.P.S. unit, kiosks, etc.).

Add Contract Incentive Clauses

If ITS deployment reduces congestion (i.e., reduces the need to build more capacity), the agency will provide financial incentive, (savings in capital expenditures) back to the consultant/technology vendor.

Allow for Performance-Based Specifications

Allow flexibility in detailing “hybrid” technical specifications, and do not focus on details. Instead, identify performance needs up front which allow for more open competition and creativity in consultant/technology response.

Clearly Identify ITS Marketplace

The public sector agency needs to document potential market size/usage for the private sector so that it can gauge local investment opportunities in ITS.

Actively Sponsor and Participate in ITS “Town Meeting” Events

The public sector agency should encourage and promote dialog between all interested/potentially impacted parties (i.e., traveling public, public agencies, educators, consultants/technology vendors) to stimulate knowledge transfer and discussion of perceived and real benefits.

7.3 Information Technology Department (ITD)

Many public-private partnerships will be and need to be founded to facilitate efficient, cost-effective ITS deployment in Dade County. One example involves Dade County’s ITD that is in charge of wire network connectivity in Dade County. This effectively gives them control over Dade County’s fiber optic network. Under their guidance the county has a significant amount of cable in the ground and operating now (see Section 5.4 for description of the current cable network). To accomplish this task ITD developed an innovative public/private partnership agreement with a private company who installs and then leases/sells the fiber-optic cable.

ITD allows the company to install the cable along any of the county road rights of way. In return the county gets the use of 12 strands of fiber-optic cable and is paid a nominal fee per unit length of cable installed. This fee is indexed to the annual growth rate in the area. The private company gets the use of the right of way, and the ability to choose when and where to install the cable. To date over 50 miles of cable have been installed and is connected to nine county buildings. This is one example of a highly effective ITS public/private partnership performed by Dade County.

8.0 Conclusions and Recommendations

The Dade County area has many ITS projects currently underway or slated to begin in the near future. These are highlighted in Section 5.4 and include:

Current Projects

- Advanced traffic management system for all of Dade County's signalized intersections.
- Planned freeway management system along I-95, and installed part of this system already at Golden Glades interchange..
- HOV lanes along I-95 now, and planned lanes along SR 826.
- Incident management teams and programs in place.
- Traveler information systems using kiosks and smart bus stops planned for the near future.
- Electronic toll collection on Broad Causeway now, soon on Venetian and Rickenbacker Causeways, and on Florida's Turnpike in late 1997.
- Consideration of smart cards for public transit.
- MDTA has installed an advanced transit management system using AVL, and is in the final testing phase of the project.

These projects represent an excellent foundation for ITS in Dade County. They cover most of the ITI categories outlined in Operation TimeSaver--which are the building blocks for ITS deployment. However, there are a great many more ITS projects Dade County could deploy that would prove extremely beneficial. The following text box indicates some of the top priorities that were not funded or officially proposed prior to this document.

Priority Projects

- Communication linkages and compatibility between the ITS information sources (ATMS, ETC, etc.) and dissemination points (kiosks, VMS, etc.)
- Incident management teams and automatic incident detection systems on those roadways most affected by congestion due to incidents.
- Enforcement (preferably automated) of HOV lanes.
- VMS at strategic locations that display real time congestion information on several alternate routes, allowing travelers to choose between these routes based on the congestion.
- Enhancing the transit system (particularly in Southwest Dade County) through the use of real time transit information to travelers.
- Inform and encourage tourists to use in-vehicle navigation aids and "Mayday" devices.

In order to sustain the current level of ITS development and deployment it is important for several action items to occur.

First, it is important that the ITS Steering Committee and Metro Dade MPO Board adopt this Plan. In doing so it gives them clear directions on how to examine and choose future ITS projects for funding and submittal to the TIP. Second, it is important that this ITS Steering Committee continue to meet and discuss ITS issues. This committee represents the majority of the people in Dade County that are the best informed individuals on specific ITS projects run by their organization. Presently, it does not represent all of the best informed individuals and this leads to action item three--recruit several new members to join the committee that are critical to ITS success in Dade County (see Section 3.0). It is important that this committee continues to meet and discuss relevant issues, particularly the compatibility and coordination of projects. Chairmanship of this committee should be rotated periodically.

Fourth, it is vital that someone at each appropriate agency monitor the performance of the ITS projects that are deployed, regarding the objectives outlined in Section 1.5. These results will build support from the public for ITS spending. Support for ITS projects should also be obtained through and public involvement and education program as outlined in Chapter 6. Educating the public on the potential of ITS and its successes in their own community will yield substantial support and is action item number five. Finally, action item six involves annually updating the project tables (Tables 6 to 18) presented here. Having updated versions of these tables will simplify ITS project selection and also show ITS and traditional transportation spending in Dade County at a glance. These tables will generally contain a lot of the data found in the ITS section of the TIP and therefore these two tables can be created together.

Action Items

- The ITS Steering Committee and Metro Dade MPO board adopt this Plan.
- The ITS Steering Committee continue to meet and discuss ITS issues.
- Recruit several new members (listed in Section 3.0) to the ITS Steering Committee.
- Keep track of the progress of ITS projects towards objectives as set out in Section 1.5.
- Educate the public on the potential of ITS and its successes in their own community (as set out in Section 6).
- Annually update the project tables (Tables 6 to 18).

In summary, Dade County has a strong ITS program, with much of the critical ITI in place or being installed. In order to continue this success the six action items listed above should be instituted and effected as soon as possible. This will ensure a strong ITS presence in the county, greatly improving mobility, increasing productivity, improving safety, reducing congestion, enhancing transit, and improving air quality at a fraction of the cost of building traditional transportation infrastructure.

Endnotes

1. U.S. Department of Transportation. *Implementation of the National Intelligent Vehicle Highway Systems (IVHS) Program Plan*, Report to Congress, Washington, D.C., June 1994, pp. 1-8.
2. "EDF Suggests Teeth to Add to Gears of Operation TimeSaver." *INSIDE ITS*, Vol. 6, No. 14. Washington, D.C., July 1, 1996, pp.1-5
3. ITS Florida Membership Form, Gainesville, FL, 1996.
4. *Intelligent Corridor System*, Informational brochure provided by the Florida Department of Transportation, Florida, USA, November, 1995.
5. *Intelligent Corridor System*, Informational brochure provided by the Florida Department of Transportation, Florida, USA, November, 1995.
6. *National Program Plan for Intelligent Transportation Systems (ITS)*, Final Draft, developed by the U.S. Department of Transportation and ITS America. Washington, D.C., November, 1994, p. 39.
7. "Program Links Local Government with ITS", *The Urban Transportation Monitor*, Lawley Publications, Vol. 9, No. 2, February 3, 1995.
8. *National Program Plan for Intelligent Transportation Systems (ITS)*, Final Draft, developed by the U.S. Department of Transportation and ITS America, Washington, D.C., November, 1994, p. II-14.
9. Schrank, D. et al., *Urban Roadway Congestion - 1982 to 1992 Volume 1: Annual Report*, Research Report # 1131-7, Texas Transportation Institute, September, 1995.
10. Center for Urban Transportation Research, *Performance Evaluation of Florida Transit Systems: Part II Peer Review Analysis, Final Report*, Tampa, Florida, 1996.
11. Strategy Research Corporation, *Visitor Profile and Tourism Impact: Greater Miami and the Beaches*, 1994 Annual Report, prepared for Greater Miami Convention and Visitors Bureau, Miami, Florida, June, 1995.
12. Ogden, M., et al., "An Informational Report: Guidelines for Establishing Freeway Service Patrols," *ITE Journal*, Vol. 66, No. 2, February, 1996, p. 31.
13. *Metro-Dade Transportation Plan and Improvement Priorities: Long Range Element (to the Year 2015)*, Metro-Dade Metropolitan Planning Organization, Miami, Florida, December, 1995, p. IV-10.

Bibliography

- Barton-Aschman Assoc., Inc. et al. *Dade County Transportation Demand Management and Congestion Mitigation Stud.* Metro-Dade Metropolitan Planning Organization. Miami. 1995.
- Batra, A. et al. *IVHS-Organizational Structure and Staffing.* Pacific Rim Conference - 1, 1993.
- Booz-Allen & Hamilton. *Institutional Impediments to Metro Traffic Management Coordination.* A report prepared for Volpe National Transportation Center, 1993.
- Carp, F. *Transportation in an Aging Society: Improving Mobility and Safety for Older Persons. Significance of Mobility for the Well-Being of the Elderly.* Special Report 218, Vol 2. Technical papers, Transportation Research Board, National Research Council. Washington, D.C., 1988.
- Carty, P. Lessons Learned from the Oakland County IVHS Project. Proceedings of the IVHS AMERICA 1993 Annual Meeting, Washington, D.C., April 1993.
- Carvell, J.D., E.J. Seymour, R.L. Peterson and G. Human. "Interagency Communications: A Vital Element in the Dallas MultiJurisdictional Environment." *ITE Journal* (April 1994): 12-16.
- Center for Urban Transportation Research. *Performance Evaluation of Florida Transit Systems: Part II Peer Review Analysis, Final Report.* Tampa, March 1994.
- Dade County Metropolitan Planning Organization. *Dade County Transit Corridors Transitional Analysis, Executive Summary.* Miami, 1993.
- "Deployment: A Contentious Issue." *INSIDE IVHS*, Vol. 5, No. 7. Washington, D.C., March 27, 1995.
- "DOT Seeks Comments on ITS Deployment." *INSIDE ITS*, Vol. 5, No. 16. Washington, D.C., August 14, 1995.
- Dunn, R. *Cooperative Government-Industry Relationships to Develop and Commercialize Technology.* ITS America, Washington, DC, 1995.
- "EDF Suggests Teeth to Add to Gears of Operation TimeSaver." *INSIDE ITS*, Vol. 6, No. 14. Washington, D.C., July 1, 1996.
- "Federal ITS Program Seeks Agreement on Path Toward Wide Deployment." *INSIDE IVHS*, Vol. 5, No. 1, Washington, D.C., December 19, 1994.

- Florida Media Affiliates, Inc. *Miami Business Profile 1995-1996*. The Beacon Council, Miami, 1995.
- "FHWA to Offer Grants to State, Local Agencies for IVHS Strategic Plans." *INSIDE IVHS*, Vol. 3, No. 7, Washington, D.C., March 27, 1993.
- Ficke, R.C. *Digest of Data on Persons with Disabilities*. U.S. Department of Education. National Institute on Disability and Rehabilitation Research. Washington, D.C., 1992.
- Guerrier, J.H. *Mobility Issues of the Older Person*. Submitted to the White Conference on Aging, World Conference on Independent Living Technology, Care, and Living Environments, Orlando, November 5-10, 1994.
- "House-Senate Compromise Gives ITS \$222.78 Million." *INSIDE ITS*, Vol. 5, No. 22, Washington, D.C., November 6, 1995.
- Institute of Transportation Engineers. *Proposed Initiative on ITS Model Deployment in Metropolitan Areas*. Washington, D.C., August 1995.
- Institute of Transportation Engineers. *Request for Information on ITS Deployment Issues*. Washington, D.C., August 1995.
- ITS America. *ITS America 1995 Membership Directory*. Washington, D.C., 1995.
- ITS Online. *ITS Yellow Pages Directory* (www.itsonline.com). January 1996.
- ITS America. *Society to Increase Local Legislative Efforts*. Washington, DC, 1995.
- ITS America. *1995 Who's Who in ITS*. Washington, DC, 1995.
- ITS Task Team. *Florida ITS Conceptual Plan (Operations Perspective)*. Florida Department of Transportation, Florida, November 1994.
- IVHS America. *Strategic Plan for Intelligent Vehicle-Highway Systems in the United States--Executive Summary*, Report No. IVHS-AMER-92-3. Washington, D.C., May 1992.
- JHK and Associates. *Florida Department of Transportation Southeast Florida Intelligent Corridor System (ICS) Design Report*, December 1994.
- JHK and Associates. *Southeast Florida Intelligent Corridor System Final Report*. A report prepared for Florida Department of Transportation Districts 4 and 6, December 1994.

- JHK and Associates. *Southeast Florida Intelligent Corridor System Design Report*. A report prepared for Florida Department of Transportation Districts 4 and 6. December 1994.
- Kay, J. et al. *IVHS Strategic Planning for Washington State*. Pacific Rim Conference - 1. 1993.
- Lo, H.K. Hall and J.R. Windover. *California Transportation Management Centers Part 1: Assessment of Existing Capabilities*. PATH Working Paper 93-17, 1993.
- Markowitz, J. and J. Georgevich. *San Francisco Bay Area IVHS Early Deployment Plan*. Proceedings of the IVHS AMERICA 1994 Annual Meeting. Atlanta, April 1994.
- Metro-Dade Metropolitan Planning Organization. *Dade's Future Rides on Mass Transit*. Miami, 1995.
- Metro-Dade Metropolitan Planning Organization. *Metro-Dade Transportation Plan and Improvement Priorities: Long Range Element (to the Year 2010)*. Miami, November 1994.
- Metro-Dade Metropolitan Planning Organization. *Metro-Dade Transportation Plan and Improvement Priorities: Long Range Element (to the Year 2015)*. Miami, December 1995.
- Metro-Dade Metropolitan Planning Organization. *TIP Project Selection Criteria: A Concept Report*. A report prepared for The TIP Development Committee. Miami, September 1993.
- Metro-Dade Metropolitan Planning Organization. *Transit Development Program 1994*. Miami, June 1994.
- Metro-Dade Metropolitan Planning Organization. *1996 Transportation Improvement Program*. Miami, May 1995.
- Metro-Dade Metropolitan Planning Organization. *1996 Unified Planning Work Program for Transportation*. Miami, May 1995.
- Metropolitan Planning Organization. *Metro-Dade Transportation Plan to the Year 2015: Countywide Summary*. Miami, May 1995.
- Metropolitan Transportation Commission. *Multi-modal Project Application for Surface Transportation Program Funds*. California, September 1995.
- Minnesota Guidestar. *Guidelines Manual*. St. Paul, May 1993.
- Minnesota Guidestar. *Strategic Plan*. St. Paul, June 1994.

- Morrissey, S. "High-tech Monitors Move in off I-95," *Vero Beach Press Journal* (January 1996): 9-10.
- "New IVHS JPO to Stress 'Mainstream' Deployment." *INSIDE IVHS*, Vol. 4, No. 19, Washington, D.C., September 26, 1994.
- Neudorff, L. *A Regional Architecture for Implementing IVHS in the Boston Metropolitan Area*. Proceedings of the IVHS AMERICA 1994 Annual Meeting, Atlanta, April 1994.
- Ogden, M., et al. "An Informational Report: Guidelines for Establishing Freeway Service Patrols." *ITE Journal* Vol. 66, No. 2 (February 1996): 31.
- Patel, R. *Dealing with IVHS Issues in Urban Areas*. Proceedings of the IVHS AMERICA 1994 Annual Meeting, Atlanta, April 1994.
- Peterson, C.N., and D.S. Olson. *Institutional Barriers to IVHS: Sample Contractor List*. A report prepared for FHWA, U.S. Department of Transportation, and Volpe National Transportation Systems Center, Cambridge, November 1993.
- Pietrzyk, M., and R. Yettaw. *Finding the Right IVHS Partnership on a Local Level*. Proceedings of the IVHS AMERICA 1994 Annual Meeting, Atlanta, Georgia, April 1994.
- Pittenger, J., et al. *IVHS-Ohio: A State Initiative*. Proceedings of the IVHS AMERICA 1994 Annual Meeting, Atlanta, April 1994.
- Plummer, David, and Associates. *Dade County Mobility Management Process/Congestion Management System, Final Draft Report*, Metro-Dade Metropolitan Planning Organization, 1996.
- Polk, A., et al. *Strategic Plan for Advanced Public Transportation Systems for the Metro-Dade Transit Agency*. Center for Urban Transportation Research, Tampa, December 1993.
- "Program Links Local Government with ITS," *The Urban Transportation Monitor*, Lawley Publications, Vol. 9, No. 2, February 3, 1995.
- Proposed 1995 Evaluation and Appraisal Report for the Land Use Element, Part I, Comprehensive Development Master Plan*. Metropolitan Dade County, Miami, June 1995.
- Proposed 1995 Evaluation and Appraisal Report for the Mass Transit Element, Part III, Comprehensive Development Master Plan*. Metropolitan Dade County, Miami, June 1995.
- Proposed 1995 Evaluation and Appraisal Report for the Traffic Circulation Element, Part II, Comprehensive Development Master Plan*. Metropolitan Dade County, Miami, June 1995.

Proposed 1995 Evaluation and Appraisal Report for the Port and Aviation Element, Part IV, Comprehensive Development Master Plan. Metropolitan Dade County, Miami. June 1995.

Rosenbloom, S. The Mobility Needs of the Elderly. In Special Report 218. *Transportation in an Aging Society, Improving Mobility, and Safety for Older Persons.* Vol 2, Technical papers. Transportation Research Board, National Research Council, Washington, D.C. 1988.

Schrank, D. et al. *Urban Roadway Congestion - 1982 to 1992 Volume 1: Annual Report.* Research Report # 1131-7. Texas Transportation Institute, September 1995.

Smith, S., et al. *ITS Implications for Local Municipalities: City of Santa Ana's Traffic System Management Initiative.* Proceedings of the ITS AMERICA 1995 Annual Meeting. Washington, D.C., March 1995.

Smith, B. *The Virginia Department of Transportation's Strategic Plan for an Intelligent Vehicle-Highway Systems Program.* Proceedings of the IVHS AMERICA 1993 Annual Meeting. Washington, D.C., April 1993.

Strategy Research Corporation. *Visitor Profile and Tourism Impact: Greater Miami and the Beaches.* 1994 Annual Report. A report prepared for Greater Miami Convention and Visitors Bureau, Miami. June 1995.

Sucher, P. *The IVHS Early Deployment Planning Program. Obstacles to Successful Completion -The New Jersey Experience.* Proceedings of the IVHS AMERICA 1994 Annual Meeting. Atlanta. April 1994.

Survey of Dade County ITS Steering Committee. Conducted by Center for Urban Transportation Research personnel, November 1995.

The 1996 International ITS Index. Transport Technology Publishing, New York, N.Y., January 1996.

Urban Mobility Corporation. "Operation TimeSaver: A New Direction for Federal ITS Program," *Innovation Briefs*, Vol.7, No. 1. Washington, DC, February 1996.

U.S. Department of Transportation. *Implementation of the National Intelligent Vehicle Highway Systems (IVHS) Program Plan,* Report to Congress, Washington, D.C., June 1994.

U.S. Department of Transportation and ITS America. *ITS Architecture Development Program. Phase I Summary Report.* Washington, D.C. 1994.

U.S. Department of Transportation. *ITS AMERICA Coordinating Council Meeting.* Federal Report, Washington, D.C., July 1995.

- U.S. Department of Transportation. *IVHS Strategic Plan*. Report to Congress, Washington, D.C., December 1992.
- U.S. Department of Transportation and ITS America. *National Program Plan for Intelligent Transportation Systems (ITS)*, Final Draft. Washington, D.C., November 1994.
- U.S. Department of Transportation. *Nontechnical Constraints and Barriers to Implementation of Intelligent Vehicle-Highway Systems*, Washington D.C., 1994.
- U.S. Department of Transportation. *Public and Private Sector Roles in Intelligent Vehicle-Highway Systems (IVHS) Deployment*. A Policy Discussion Series Number 3, April 1992.
- Varaiya, P. *Smart Cars on Smart Roads: Problems of Control*, IEEE Transactions on Automated Control, Vol. 38, 1993.
- Wilson, J. Q. *Bureaucracy: What Government Agencies Do and Why They Do It*, Basic Books, 1989.
- Wright, J. and E. Ofstead. *Minnesota Guidestar - Progress Towards a Statewide Intelligent Transportation System*, Pacific Rim Conference - 1, 1993.
- Wright, J. *Minnesota Guidestar - Reaching Towards a Twin Cities ATMS*. Proceedings of the IVHS AMERICA 1993 Annual Meeting, Washington, D.C., April 1993.

Appendix A

ITS Vendors, Consultants and Contacts

ITS Contacts: (Note: This list is far from comprehensive, and is designed to help readers find some initial contacts in the ITS industry)

Organization	Section	Phone Number
ITS America 400 Virginia Ave, S.W. Suite 800 Washington, D.C. 20024-2730 (202) 484-4847	Executive Director	202-484-2890
	Publications	202-484-2909
	Clearinghouse	202-484-4582
	ITS library	202-484-2907
	Legislative affairs	202-484-4589
	State and local government outreach	202-484-4665
	Legal and institutional issues	202-484-2895
	Committee on communications and outreach	202-484-2893
	State Chapter Program	202-484-4669
FHWA (ITS) Joint Program Office	Director	202-366-9536
	ATIS/ATMS	202-366-2199
	Technical Program Coordinator	202-366-2835
	Program Assessment	202-366-6503
	Systems Architecture	202-366-8048
	Legal and institutional issues	202-366-8707
	Regulatory and Legislative Coordinator	202-366-2202
FHWA Regional Office 120 Peachtree Road N.W. Suite 200 Atlanta, GA 3036	ITS Engineer	404-347-4075

FHWA Division Office 227 N. Bronough Street Room 2015 Tallahassee, FL 32301	ITS Engineer	904-942-9693
Florida DOT Traffic Engineering Office 605 Suwannee Street, M/S 36 Tallahassee, Florida 32399	ITS Contact Turnpike District's ITS Director	904-922-7292 904-488-4671
ITS Florida P.O. Box 116585 Gainesville, FL 32611-6585	President	904-922-5820
	Membership	813-974-9815
Public Technology Inc.	A program that links local government with ITS	202-626-2465

Technology: Travel and Traffic Info			
Company Name	Phone Number	Address	Description
American Automobile Association (AAA)	407-444-4137	Heathrow, FL	Advanced Driver and Vehicle Advisory Navigation Concept, TravTeck. Kiosks.
Maxwell Laboratories, Inc. S-Cubed Division	619-453-0060	California	Advanced Traveler Information Systems. Maintains a World Wide Web server.
Metro Traffic Control	305-621-6387	Miami, Florida	Provides real-time traffic and transportation information for use in projects and commercial ventures
Technology: Navigation and Route Planning			
Company Name	Phone Number	Address	Description
Motorola	708-714-7307 305-475-5766	Northbrook, Illinois Plantation, FL	Developed a prototype in-vehicle navigation/route guidance system, GPS and dead reckoning map matching.
Rockwell International Corporation	714-762-8111	Anaheim, California	Rockwell addresses a broad range of transportation electronics markets including mobile communications systems, on-board computers, automatic location systems, automotive electronics, etc.

Siemens ITS America	810-253-1000	Auburn Hills, Michigan	Vehicle Navigation/ Advanced Traveler Information System (ATIS). Advanced traffic management system (ATMS).
Technology: Map Data			
Company Name	Phone Number	Address	Description
Etak Inc.	415-328-3148	Menlo Park, California	Map databases for GPS/navigational software
GeoSystems	717-293-7500	Lancaster, Pennsylvania	Core mapping, locating and directional software, automated, cross country travel planning system, custom cartography
Navigation Technologies Corp (NavTech)	408-737-3200	California	Creation of comprehensive, navigable, value-added map databases.
Technology: Vehicle Positioning			
Company Name	Phone Number	Address	Description
ACCQPOINT Communications Corporation	800-982-5861	Irvine, California	Differential Global Positioning System (DGPS), Universal Receiver.
PacTel Teletrac	714-897-0877 305-484-1300	Garden Grove, California Ft. Lauderdale, Florida	Offers a variety of location and data messaging service products, including "MayDay".
Spectra Systems	407-998-3160	Boca Raton, Florida	Supplier of laser-based traffic sensors, GPS/DGPS products.
Technology: Fleet Management			
Company Name	Phone Number	Address	Description
PacTel Teletrac	714-897-0877 305-484-1300	Garden Grove, California Ft. Lauderdale, Florida	Commercial fleet management product for location and two-way data Messaging, automatic roadside assistant, stolen vehicle recovery, nearest yellow pages information.
Auto-Trac, Inc.	214-392-1300	Dallas, Texas	Provides real time fleet tracking and management systems utilizing GPS as a navigational aid.
Marconi Communications Inc.	703-620-0333	Reston, Virginia	Vehicle location and fleet management system, ETC technologies.

Motorola	305-475-5766	Plantation, Florida	AVL, real-time vehicle maintenance monitoring
Technology: Communications			
Company Name	Phone Number	Address	Description
AKL Group, Inc.	1-305-567-0084	Miami, Florida	Communications Consultants
ARN Communications Group	1-305-820-9223	Miami, Florida	Communications Consultants
AT&T Telecommunications	305-232-2730	Miami, Florida	Smart cards, telephone information systems, passenger information displays.
Aptek Communications Products	407-883-4424	Palm Beach, Florida	Personal service communicator, wireless computer terminals.
BellSouth	1-305-820-8800	Miami, Florida	Communications Consultant
GTE International	1-305-470-7511	Miami, Florida	Communications Consultants
Motorola	407-739-3880	Boynton Beach, Florida	Communications products, paging technology, OEM transmitters and receivers, RF data communications, prototype in-vehicle navigation/route guidance system.
PacComm Packet Radio Systems, Inc.	813-874-2980	Tampa, Florida	Designs and manufactures packet radio modems and custom systems use in telemetry, GPS tracking, DGPS transmission, point-to-point data links, etc.
Racal-Datacom	305-846-1601	Sunrise, Florida	Fiber backbone system for many communications applications, including highway traffic monitoring.
Telecom Engineering Consultants	1-305-592-4328	Miami, Florida	Communications Consultants
Telecommunications Advisory Service, Inc.	1-305-442-2600	Miami, Florida	Communications Consultants
Technology: Vehicle Control			
Company Name	Phone Number	Address	Description
Delco Electronic Corporation	317-451-1921	Kokomo, Indiana	Develops and market Forewarn radar-based object detection systems and side detection systems.

Eaton VORAD Technologies, L.L.C.	619-674-1200	San Diego, California	Eaton VORAD EVT-200 Collision Warning System, adaptive cruise control, automatic braking
Laser Atlanta Optics, Inc.	404-446-3866	Norcross, Georgia	Provide laser optics system for commercial use, collision avoidance systems, vehicle classification and navigation industries.
PJT Highways Systems, Inc.	407-998-0060	Boca Raton, Florida	Vehicle control systems, roadside-to-vehicle communications, AVL, AVI, AHS.

Technology: ETC Integrators

Company Name	Phone Number	Address	Description
Amtech Systems Corp.	214-733-6600	Dallas, Texas	Intellitag 2000 ETC system, ETTM, congestion pricing, smart cards
Lockheed Martin IMS	305-377-1899	Miami, Florida	ITS systems integrators for a variety of applications, including ETC.
MFS Network Technologies, Inc.	402-233-7700	Omaha, Nebraska	Integrator for ETC, electronic payment, and ETTM
Science Applications International Corporation (SAIC)	703-821-4468	McLean, Virginia	Wholly-owned subsidiary of JHK & Associates and Syntonic.
Syntonic Technology, Inc.	717-561-2400	Harrisburg, Pennsylvania	ETC, video traffic/safety enforcement, worked on Advantage I-75

Technology: AVI Vendors

Company Name	Phone Number	Address	Description
Amtech Systems Corp.	214-733-6600	Dallas, Texas	Intellitag 2000 ETC system, ETTM, congestion pricing
Intellitag Products	602-441-7116	Scottsdale, Arizona	A Motorola-Amtech Partnership, produces the K-TAG for the Kansas Turnpike ETC system.
LazerData Corporation	407-324-1230	Sanford, Florida	Optical bar code labels and laser-based line scanners for AVI.
Mark IV Industries Ltd.	905-624-3025 305-670-6907	Mississauga, Ontario Miami, Florida	Design and manufacture tags and readers for AVI and variable message signs.

Technology: Smart Cards			
Company Name	Phone Number	Address	Description
Cubic Automatic Revenue Collection Group	619-268-3100	San Diego, California	Designs and manufactures automatic revenue collection systems for rail and bus transit, tollway and major parking facilities; toll collections systems, automated fare collection (AFC). Provide security, reliability, cash accountability, management reports and passenger flow data..
Digital Equipment Corporation	305-262-4817	Miami, Florida	Smart cards, telephone information systems, passenger information displays
Novus Services, Inc.	708-526-3095	Riverwoods, Illinois	Provides a low-cost method of payment and the ability for patrons to pre-pay amounts on their toll tags in ITS applications..
Technology: Traffic Management			
Company Name	Phone Number	Address	Description
3 M Traffic Control Systems	612-736-2588	St. Paul, Minnesota	Optical communication offers temporary control over traffic signals to public safety vehicles to improve emergency response times.
Peek Traffic-Transit	904-562-2253	Tallahassee, Florida	Focuses on traffic and field data systems, adaptive traffic control systems (SCOOT), incident detection, parking managements systems, etc.
Signal Service Industries, Inc.	305-254-7702	Miami, Florida	Traffic signs and signals.
SmartRoute Systems, Inc.	617-494-8100	Cambridge, MA	Public and private sector traffic operations centers including digital databases.
Traffic Control Devices, Inc.	305-592-7096	Miami, Florida	Traffic signs and signals.
TRW Transportation Systems	619-592-3000	San Diego, California	ATMS, ATIS, APTS, advanced vehicle safety systems

Technology: Variable Message Signs			
Company Name	Phone Number	Address	Description
American Electronic Sign	800-727-9111	Spokane, Washington	Light-emitting, retro-reflective changeable message signs
Lake Technology Products, Inc.	800-771-1799	Tavares, Florida	Design, manufacturing and maintenance for traffic control systems, surveillance systems, and visual information systems.
Skyline Products, Inc.	800-759-9046	Colorado Springs, Colorado	Variable and changeable message signs.
Technology: Traffic Detectors			
Company Name	Phone Number	Address	Description
Peek Traffic-Components	800-245-7660	Sarasota, Florida	Detect: speed, occupancy, headway, incidents, queue detection system, classification, and weigh in motion.
Schwartz Electro-Optics, Inc.	407-298-1802	Orlando, Florida	Designed Autosense I, II, and III - a pulsed laser range finder for vehicle detection and classification.
Spectra Systems, Inc.	407-998-3160	Boca Raton, Florida	GPS, laser-based sensors for vehicle and pedestrian detection, analysis and control.
Technology: Advanced Transit Systems			
Company Name	Phone Number	Address	Description
American Automated Transport Systems Corp.	904-335-3967	Gainesville, Florida	Developing a fully automated transit system using a dedicated roadway.
Digital Recorders, Inc.	919-361-2155	Research Triangle Park, North Carolina	Manufactures digital audio products for use in highways and mass transit. Talking Bus, traveler information stations, and HAR.
International Business Machines Corporation (IBM)	301-564-2535	Armonk, New York	Advanced Public Transportations Systems (APTS), Commercial Vehicle Operations (CVO), Electronic Toll Collection (ETC) and Advanced Traffic Management Systems (ATMS).
Mark IV Industries	305-670-6907	Miami, Florida	Traffic signal preemption for transit vehicles, in-vehicle information systems.
Modular Computer Systems, Inc.	305-974-1380	Ft. Lauderdale, Florida	Advanced passenger transportation systems.

Transcomm	407-729-3672	Melbourne, Florida	AVL and computer aided dispatch for commercial and transit fleets. Developing MDTA's AVL system.
Consultants/Engineers Firms			
Company Name	Phone Number	Address	Description
Automatary, Inc.	407-575-0773	Tequesta, Florida	CVO, TDM, ETC, emergency management, advanced vehicle controls and safety systems.
Boca Technology Group	407-479-1493	Boca Raton, Florida	Automatic toll collection and interstate permit issuance via radio frequency collection devices. Two-way satellite messaging.
Control Technologies of Central Florida	407-330-2800	Sanford, Florida	
F.R. Aleman and Associates	305-591-8777	Miami, Florida	Advanced traffic control and communication system design.
Frederic R. Harris, Inc.	305-826-0606	Miami Lakes, Florida	ITS research, planning, design, development, installation and operation. Focuses are ATMS, ATIS, APTS and advanced traffic control equipment.
HNTB	407-592-5930	Orlando, Florida	ITS Early Deployment Studies, traffic management systems, commercial vehicle operation.
ICF Kaiser	813-281-5909	Tampa, Florida	Updated version of Caltran's DTIM (Direct Travel Impact Model). Mass transit systems.
JHK & Associates	407-422-8813	Orlando, Florida	Advanced traffic management, ISTE management systems, traveler information systems.
J. D. Gerdeman Associates	305-753-5358	Coral Springs, Florida	Radio frequency identification systems and high technology gate systems. Installed fleet management applications and access control monitoring systems.
Kimley-Horn & Associates	305-739-2233	Ft. Lauderdale, Florida	Transportation management, communication hardware/software, traveler information systems.
Lockheed Martin IMS	305-377-1899	Miami, Florida	CVO operations including work with the HELP project, ETC systems integrator, automated highway system work, ATMS, National ITS Architecture, kiosks, ITS strategic plans.

Positive Identification, Inc.	305-274-7841	Miami, Florida	Onboard computer systems for commercial and transit vehicles. Location management services and communications management systems.
Post, Buckley, Schuh & Jernigan, Inc.	407-647-7275 305-592-7275	Winter Park, Florida Miami, Florida	Engineering and consultancy services in fields of: Electronic toll and traffic management, highway advisory radio, security and surveillance, etc.
Vanasse, Hangen, Brustlin, Inc.	407-839-4006	Orlando, Florida	Focus on traffic control, ATIS, incident management and travel demand management.
Research Facilities			
Name	Phone Number	Address	Description
Air Force Development Test Center (AFDTC)	904-882-8096	Eglin AFB, Florida	Electronic test & evaluation, measurement testing, modeling & simulation, environmental replication, hardware-in-the-loop simulation.
Associate Testing Laboratories	201-628-1363	Wayne, New Jersey	Simulations of environments in test lab to which ITS equipment will be exposed during actual use.
General Motor Research & Development Center	810-986-2990	Warren, Michigan	Spearheaded the integration of in-vehicle navigation system used during the TravTek project in Orlando.
Universities			
Name	Phone Number	Address	Description
Florida International University - Lehman Center	305-348-3055	Miami, Florida	Advanced transit systems, traffic managements systems, institutional and societal issues, human factors.
University of Florida - Transportation Research Center	904-392-0378	Gainesville, Florida	ITS State of the Art Report, video-imaging applications, software distribution, technology transfer center.
University of South Florida, Center for Urban Transportation Research	813-974-3120	Tampa, Florida	Objective independent evaluation of ITS technologies, examination of application areas for ITS technologies, client needs assessment, and market research.

Automakers/ Vehicle Manufacturers			
Company Name	Phone Number	Address	Description
Chrysler Corporation	810-583-5238	Auburn Hills, Michigan	ITS needs definition committee, electronic clearance and payment, collision warning systems.
Ford Motor Company	313-594-3700	Dearborn, Michigan	ADVANCE, DIRECT, ENTERPRISE, TRILOGY, all weather night vision systems, obstacle detection warning, active involvement in SAE, open system architecture for ITS.
General Motors Corporation	810-986-2916	Warren, Michigan	ITS base technologies, products and systems on a worldwide scale.
Honda R&D North America, Inc.	310-781-5500	Torrance, California	Performs research and development of new automotive products. Directs ITS activities.
Nissan Research & Development, Inc.	810-488-4123	Farmington Hills Michigan	Navigation system, traffic-eye laser radar warning system, head-up display, guide light system, road vehicle lighting integration.
Local Government			
Name	Phone Number	Address	Description
City of Orlando	407-246-2281	Orlando, Florida	Operation of Traffic Management Center for Metropolitan Orlando Area, TravTek.
Dade County Public Works Department	305-592-8925	Miami, Florida	The Dade Traffic Control System, monitoring and controlling over 2000 signalized intersections.
MPO for the Miami Urbanized Area	305-375-4507	Miami, Florida	ETC, ATMS, ICS, AVL for transit, ITS comprehensive plan
Orlando-Orange County Expressway Authority	407-425-8606	Orlando, Florida	E-Pass (ETC) System in operation since 1994.
Orlando Urban Area Metropolitan Planning Organization (MPO)	407-623-1075	Winter Park, Florida	Travel and trip management, incident management, traffic control, electronic payment services, emergency management, safety, public transportation management.
Tampa Bay Regional Planning Council	813-577-5151	St. Petersburg, Florida	Keep local officials aware of new technologies that effect transportation.

Toll Authorities			
Name	Phone Number	Address	Description
Florida Department of Transportation, Turnpike District	904-488-4671	Tallahassee, Florida	FDOT operates Florida's Turnpike and expects to gradually install an electronic toll collection system.
Lee County Department of Transportation	941-335-2111	Ft. Myers, Florida	Operates three toll bridges in Lee County. Currently developing implementation plan for ETC and congestion pricing.
Metro Dade County Department of Public Works	305-375-2962	Miami, Florida	The Metro Dade County Department of Public Works (DCPW) has initiated one Electronic Toll Collection (ETC) procurement since 1992.
Orlando-Orange County Expressway Authority (OOCEA)	407-425-8606	Orlando, Florida	OOCEA operates toll facilities on three different expressways in Florida, and says it has almost completed replacement of its existing toll collection equipment with Automatic Vehicle Identification (AVI).
Software Tools			
Company Name	Phone Number	Address	Description
Berkeley Speech Technologies, Inc.	510-841-5083	Berkeley, California	Speech synthesis software for navigation systems and other driver information systems.
J.D. Gerdeman Associated	305-753-5358	Coral Springs, Florida	Radio frequency identification systems and high technology gate systems. Installed fleet management applications and access control monitoring systems.
Trident Systems, Inc.	703-273-012	Fairfax, Virginia	Graphical object-oriented software examining ITS architecture (Cascade), touch screens, system integration, software development, simulation.
Legal & Financial Services			
Company Name	Phone Number	Address	Description
3D Enterprises, Inc.	606-272-6618	Lexington, Kentucky	3D Enterprises has venture capital it is desiring to invest in innovative technologies in the ITS field.

Fish & Richardson P.C.	617-542-5070	Boston, Massachusetts.	Provides patent and Federal Communication Commission related services in the areas of navigation systems, spread spectrum radio communication, radar of ITS and other ITS technologies.
Miller, Canfield, Paddock & Stone, P.L.C.	202-785-0600	Washington, D.C.	Participated in a FHWA project. Examines various non-technical constraints involved in research development, and deployment of ITS products.

Appendix B

Steering Committee Interview Results

Steering Committee Interview Questionnaire Results

(1a) What do you feel are the worst traffic/mobility problem areas in Dade Co. today?
(e.g. intersections, interchanges, highway segments, entire areas)

- *I-95, Palmetto, Don Shula Expressway, Kendall Dr., Dolphin Expressway near MIA, Miami Beach area, Bird Road, Tamiami Road.*
- *US 1 in the Northeast, Southwest and downtown*

(1b) Do you foresee other critical problem areas occurring in the next 10 years?

- *Northeast and Southeast areas rapidly developing, worsening problems on roads like I-95, Don Shula Expressway and many East - West links*
- *Overflow of vehicles to the minor roads near the most congested corridors*

(1c) What do you think ITS can do to combat these, or other, problems in Dade Co.?

- *Expressed fear that ITS can only help in a limited fashion, but continuing to add additional lanes is not the answer and often not feasible.*
- *ITS can help to optimize existing infrastructure use.*

(1d) What are some of the perceived problems with the implementation of ITS in Dade Co.?
(e.g., privacy, legal/liability issues, lack of funds, etc.)

- ***Coordination between agencies***
- *Politics in the decision making*
- *Lack of experience on the vendors/contractors part*
- *Need organizational changes to incorporate ITS*
- *Public perception problems*

(2a) What things would you like to see in the comprehensive plan we are putting together?

- ***Ranking of ITS projects for Dade County***
- ***Suggested communication network between agencies, improved interagency cooperation***
- ***Long term goals***
- ***Specify ITS benefits***

(2b) Anything in particular you would like to see happen as a result of the recommendations made in the plan. Immediate & short term?

- ***Clear ideas on how to proceed with ITS***
- *Move people to transit by improving transit information, including AVL*
- *Improve inter-agency and intra-agency coordination*

Long term?

- *Be wary of looking too far into the future due to the highly variable and evolving nature of ITS*
- *Look towards a fully integrated multi-modal system*
- *Expand the focus of ITS from freeways to all road classes*

(3a) Due to the size and scope of many ITS activities, it is often necessary to involve and coordinate several agencies in order to successfully deploy ITS in an area. For example, the Intelligent Corridor System project spans many municipalities, three counties as well as the Florida Department of Transportation. With projects such as these, clearly defining the role and responsibility of each agency involved becomes critical. What do you see as the role / responsibility of your agency in ITS deployment?

FDOT

- ***good funding source***
- *should coordinate activities, especially on a regional basis*

MPO

- ***planning and coordination, selection of projects***
- *local planning responsibilities, encourage local political participation*
- *prioritize projects for the area*

Municipal Governments

- *need to work with FDOT and the MPO*
- *provide information and input*

County Governments

Public Works Department

- *play the lead role in ATMS*
- *play a part in the ITS user services that stem from ATMS (collect and disseminate information)*
- *need to work with FDOT and the MPO*
- *provide information and input, especially where they own the infrastructure*

Environmental Resources Management

- *help with planning and design of any project that reduces emissions/ vehicle miles traveled*

Transit Authorities (MDTA, Tri-Rail)

- *need to form a **critical part** of an integrated transportation network*
- *should coordinate regionally*

Organizations such as ITS America and ITS Florida

- *provide information, technical clearinghouse*
- *initiate demonstration projects*
- *document ITS benefits*
- *provide a link between agencies that would otherwise not share information*

Universities

- *documentation of ITS benefits*
- *teach students and possibly the community about the benefits of ITS*
- *provide technical guidance (research and development)*

(3b) Who should be the lead agency?

- *3 for the MPO*
- *2 for Florida DOT (To ensure **regional** cooperation)*
- *2 for a consortium of key agencies*
- *4 for the owner of the infrastructure (Basically the FDOT & public works department)*

(3c) How do you think the efforts of the various agencies will successfully integrate and coordinate?

- *will take a good amount of time, clearly not there yet*
- *need to understand all the agencies and their individual goals*
- *agencies must be more flexible and accelerate decision making process*
- ***coordination likely through the MPO***

(4a) Do you see ITS playing a major role in the alleviation of traffic problems in the Metro-Dade area or more of a partial solution to be used in conjunction with conventional methods of alleviating traffic problems?

- *9 said a partial solution*
- *2 said it depends on the money invested*
- *Several thought that in the long run ITS could play a significant role*

(4b) In either case, what ITS user services do you see as most promising?
Immediate and short term:

- *ATIS - particularly real time*
- *ATMS*
- *ETTM*
- *Incident management on freeways*
- *Traffic control (ramp metering)*
- *Keep current ITS purchases flexible enough to accommodate future changes*

Long term:

- *Do not overly concentrate on the distant future as these technologies are still developing rapidly and subject to unforeseen changes.*
- *AHS*
- *Extensive TDM*
- *Congestion/road pricing*

(5a) The ICS project is clearly the main ITS project in the Miami area, and will serve as the “regional umbrella” for all ITS development and deployment in the area. How do you feel about the project?

- ***Generally considered a good project***
- *Too much reliance on VMS*
- *Ran into the problem of unfamiliarity with the technology (VMS)*
- *Overwhelmingly endorsed by FHWA*

(5b) Did it encompass everything you feel it should?

- *Generally yes, with the exceptions noted below*

(5c) Was anything overlooked?

- ***Needs a public consensus building effort (workshops, open houses, forums)***
- ***Integrate activities of other agencies***
- *Increased public input on ICS projects*
- *Maintenance money*
- *Local agencies need more say on equipment purchased*

The fact several Steering Committee members were not entirely familiar with the project may indicate the lack of promotion, consensus building, and interagency coordination mentioned above.

(6) As part of our comprehensive plan we may be adding to the steering committee and will be creating an ITS coordinating committee for the metro area. This coordination committee will contain everyone from the steering committee and representatives from various transportation related organizations like AAA, the police department, and Metro Traffic Control. These people will kept informed on all ITS issues and their input will be solicited when an ITS project involves their particular area of expertise.

(6a) Do you feel that both committees are needed?

- *10 said yes while 2 said both committees were not needed*
- *Some of steering committee should sit on already formed regional groups*

(6b) Do you have any suggestions as to names of people or organizations you feel should be on either one of these committees?

Steering:

- *Dade County Aviation Dept.*
- *Seaport*
- *General public contact, ie league of cities*
- *Private transportation*
- *More transit people*
- *An ITS consultant*
- *Expressway authority*
- *Enrique Zelaya, 305-357-6635, In charge of ITS in Broward County*
- *A regional planner from Broward Co.*

Coordinating:

- *Homeowners groups*
- *Emergency response and incident management*
- *Paratransit*
- *Law enforcement (FHP, Metro-Dade)*
- *AAA*
- *CTAC*
- *Transit 2020 coalition*
- *Citizen action groups*
- *Tourism groups*

- *Chamber of Commerce*
- *Gold Coast Commuter services*
- *Information Technology department*
- *Media*
- *Major municipalities*

(6c) Should these committees include representatives from outside Dade County?

- *6 votes for Yes and 4 votes for No*
- *Have the Steering Committee made up of Dade representatives only while Coordinating Committee have representatives from all three counties*
- *Only if there is a distinct need (ie. Required for federal funding)*
- *Only for a contact/information sharing list, not to bring together*

(6d) What do you feel both the ITS Steering and Coordinating committees should focus their efforts on?

Steering:

- *consensus building forum*
- *clearinghouse of information*
- *champion of ITS*
- *identify needs and direction of ITS program*
- *lobby TIP committee in dealing with ITS projects*
- *simply support the ICS*
- *Avoid duplication*
- *Public awareness*
- *Oversight role*

Coordinating:

- *identify issues and problems*
- *do the research and background information gathering for the steering committee*
- *day to day operations*
- *project identification*
- *foster ITS deployment*

(7a) As with any project, these ITS projects can cost significant amount of money. How do you feel these projects should be funded, keeping in mind the multi-jurisdictional nature of the projects?

- **Federal/State government**

- *ISTEA*
- *Major municipalities should help*
- *Maintenance will likely be through local governments*
- *Gas tax*
- *Impact fees*
- *Must outline and establish benefits to help gather funding*
- *Joint partnerships*
- *Just as other projects, compete for the pot of money on merits*

(7b) Do you think the private sector should be heavily involved?

- *Yes, but it must be a win-win situation for government and private sector*
- *Yes, but it will be difficult to convince them to participate*
- *The general public very skeptical of private operators*
- *Private sector will only enter when a profit is evident - can ITS wait for a clear profit to appear in every area?*

(7c) How can we encourage private sector participation, not only with funding but also with the labor and/or equipment donations?

- *Must convince everyone (public and private) of the long term benefits*
- *Advertising space available when disseminating information*
- *Allow private to design, build, operate, and receive some profits (like a private toll road)*
- *Provide easy access (clearing house) to answers to private sector questions on involvement in ITS projects*
- *Provide tax brakes for private investment*
- *Need to look at revamping liability issues, private firms intimidated by lawsuits involved in highway accidents*
- *Go to the private sector with a proposal*

(8) A critical component of this project, and the success of many of the ITS user services (e.g., dynamic ride sharing) is public involvement and participation. We feel that educating the public is the key to achieving a high level of public involvement. What do you feel are some of the options available to educate the public on ITS and its benefits to them?

- ***Nothing sells like success - advertise a successful deployment***
- *Throughout school and university curriculums*
- *Flyers and newsletters*
- *TV channel*
- *Radio*

- *Newspapers (Science and Technology section)*
- *Informational video for distribution*
- *Bring up at meetings*
- *Open houses, forums, discussions (public often does not have time to attend)*
- *PSAs*
- *Service patrols with ICS 'logo'*

Appendix C

Public Involvement and Education Program

COMPOSITION OF PROJECT ADVISORY COMMITTEE

Occupation (Gender)	Gender/Ethnicity	Involvement in Transportation
Elementary School Teacher	Female/Hispanic	Transport of School Children
Catholic Priest	Male/Anglo	Mobility and Accessibility of Immigrants
Electronic Technician	Male/Anglo	Trucking Operations
Investment Broker	Male/African-American	Privatization of Public Infrastructure
Engineer	Female/Hispanic	FDOT Project Manager
Public Relations/Communications	Female/African-American	MDTA Passenger Services

The questionnaires were administered through several means:

mail surveys: the "Organizations" Survey was mailed to 163 entities. It included an introductory letter requesting that the survey form be completed by an official of the organization.

telephone

surveys: elderly persons were administered the Individual Survey by telephone. Organizations that had not responded to our mail survey were also contacted and administered the Organizations Survey by telephone.

focus groups: researchers organized two focus groups with an average of twenty persons per focus group. One of the focus group was held at Florida International University (FIU) and consisted mainly of juniors and seniors, the other focus group was held at Christ the King Catholic Church. This particular church was chosen primarily because of its geographical location and its multi-cultural congregation. It is composed of residents living in the communities of Homestead, Perrine and Cutler Ridge. The congregation is 30 percent Hispanic, 25 percent African-Caribbean Americans, 10 percent Asian and 45 percent Anglo-American.

A third focus group, held at Miami Dade Community College North as a component of a separate project, was also used to assess the level of awareness and education of public agency employees about ITS issues/programs.

The focus groups were similar in format and scope. They invariably began with a short 10-15 minutes presentation by FIU personnel on the Dade County ITS Plan, its Public Involvement component, ITS concepts and the objectives of the presentation. Information emanating from the ensuing discussions was recorded.

informal

discussion: participation in a "Transportation Career Day" at a Dade County public elementary school turned into another opportunity to introduce and discuss ITS concepts.

Identification of the key populations to be targeted for a survey/workshop/focus group on ITS issues and projects: By analyzing the membership list of ITS America, on the assumption that this organization's success at building consensus and creating joint partnerships could serve as an adequate outreach model, and by considering the nature of political and demographic structures of Dade County, researchers were able to identify seven broad categories of "actors" which needed to be reached:

DADE COUNTY/FIU ITS SURVEY (Organizations)

- 1) Name and Address of Organization (optional) _____
2) Please identify your organization by choosing ONE of the following categories?

* Community Organization ___ * Educational Institution ___
* Professional/Trade Society ___ * Public/Advocacy Group ___
* Chamber of Commerce/Business Association * Other _____

- 3) Are you familiar with the terms "Intelligent Transportation Systems (ITS)", "High-Tech Highways (HTH)" or "Smart Highways (SH)"? * Yes ___ * No ___

- 4) If yes, please briefly describe your understanding of ITS/HTH/SH.

- 5) Are you familiar with any one of these expressions:

Advanced Traffic Management Systems ___ Yes ___ No
Commercial Vehicle Operations ___ Yes ___ No
Advanced Public Transit Systems ___ Yes ___ No
Advanced Traveler Information Systems ___ Yes ___ No
Electronic Toll Collection Systems ___ Yes ___ No

- 6) If No, are you interested in receiving information on these subjects? * Yes ___ * No ___

- 7) If Yes, please make sure to answer question #1.

- 8) Please select 5 of the following means for publicizing your activities/disseminating information to your membership. Please rank them from 1-5, with 1--most preferred or used and 5--least preferred or used.

* Seminars/Workshops/Conferences ___	* Telephone ___	* Newsletters/Flyers ___
* Weekly/Monthly Meetings ___	* Computer Mail ___	* Radio Ads/Programs ___
* Television Ads/Programs ___	* Printed Press ___	* Other _____

- 9) Please select 5 of the following means for receiving information on ITS and ITS Projects in Dade County. Please rank them from 1-5, with 1--most preferred and 5-- least preferred.

* Seminars/Workshops/Conferences ___	* Telephone ___	* Newsletters/Flyers ___
* Weekly/Monthly Meetings ___	* Computer Mail ___	* Radio Ads/Programs ___
* Television Ads/Programs ___	* Printed Press ___	* Other _____

10) Would your organization be willing to actively participate--e.g., attend meetings, provide members for advisory committees, review ITS Projects/Plans, participate in outreach activities, etc.--in the Dade County Public Involvement Program?

* Yes___ * No___ * Maybe___

ITS QUESTIONNAIRE (Individuals)

General Information

Name _____

1) Do you currently drive? Yes___ No___

2) If yes, how many days a week do you drive? _____ days

3) What do you like most about driving?

4) What do you dislike most about driving?

5) Do you use public transportation? Yes___ No___

6) How many times a week do you use public transportation? _____ days

7) What do you like most about using public transportation?

8) What do you dislike most about using public transportation?

9) Do you have any difficulty walking? Yes___ No___

10) How many days a week do you walk? _____ days

11) Did you attend the Town Meeting on Intelligent Transportation Systems (ITS) recently held at FIU?

Yes _____ No _____

12) (If Yes) Had you heard anything about ITS prior to that? Yes___ No___

13) Was the meeting informative? Yes___ No___

14) How will ITS help you as a driver (if person is a driver)?

15) Are there any issues that you have as a driver that you feel should be addressed by ITS?

16) How will ITS help you as a user of public transportation?

17) Are there any issues that you have as a user of public transportation that you feel should be addressed by ITS?

18) How will ITS help you as a pedestrian?

19) Are there any issues that you have as a pedestrian that you feel should be addressed by ITS?

20) How do you rate the Town Meeting overall?

Poor _____ Fair _____
Good _____ Excellent _____

RESULTS OF ORGANIZATIONS SURVEY:

Community Organizations vs. Chambers of Commerce/Business Associations

INTEREST IN RECEIVING INFORMATION ON INTELLIGENT TRANSPORTATION SYSTEMS	
Yes	34
No	21
Total	55

BEST MEANS FOR PUBLICIZING ORGANIZATION'S ACTIVITIES (number of organizations selecting item as one of the 5 best means)	
Seminars/Workshops/Conferences	26
Weekly/Monthly Meetings	30
Television Ad/Programs	9
Radio Ad/Programs	12
Telephone	29
Computer Mail/Internet	14
Printed Press	24
Newsletters/Flyers	45
Others	6

RESULTS OF ORGANIZATIONS SURVEY:

Community Organizations vs. Chambers of Commerce/Business Associations

BEST MEANS FOR ITS INFORMATION DISSEMINATION (Number of organizations selecting item as one of the 5 best means)	
Seminars/Workshops/Conferences	21
Weekly/Monthly Meetings	22
Television Ad/Programs	23
Radio Ad/Programs	21
Telephone	23
Computer Mail/Internet	14
Printed Press	28
Newsletters/Flyers	53

PARTICIPATION IN ITS OUTREACH ACTIVITIES	
Yes	11
No	9
May be	35
Total	55

RESULTS OF ORGANIZATIONS SURVEY:

Community Organizations vs. Chambers of Commerce/Business Associations

FAMILIARITY WITH INTELLIGENT TRANSPORTATION SYSTEMS, HIGH-TECH HIGHWAYS OR SMART HIGHWAYS (COMMUNITY ORGANIZATIONS)	
Yes	4
No	15
Somewhat Familiar	1
Total	20

FAMILIARITY WITH INTELLIGENT TRANSPORTATION SYSTEMS, HIGH-TECH HIGHWAYS OR SMART HIGHWAYS (CHAMBERS OF COMMERCE/BUSINESS ASSOCIATIONS)	
Yes	2
No	11
Somewhat Familiar	1
Total	14

RESULTS OF ORGANIZATIONS SURVEY:

Community Organizations vs. Chambers of Commerce/Business Associations

FAMILIARITY WITH ADVANCED TRAFFIC MANAGEMENT SYSTEMS (COMMUNITY ORGANIZATIONS)	
Yes	5
No	15
Total	20

FAMILIARITY WITH ADVANCED TRAFFIC MANAGEMENT SYSTEMS (CHAMBERS OF COMMERCE/BUSINESS ASSOCIATIONS)	
Yes	1
No	13
Total	14

RESULTS OF ORGANIZATIONS SURVEY:

Community Organizations vs. Chambers of Commerce/Business Associations

FAMILIARITY WITH COMMERCIAL VEHICLE OPERATIONS (COMMUNITY ORGANIZATIONS)	
Yes	7
No	13
Total	20

FAMILIARITY WITH COMMERCIAL VEHICLE OPERATIONS (CHAMBERS OF COMMERCE/BUSINESS ASSOCIATIONS)	
Yes	1
No	13
Total	14

RESULTS OF ORGANIZATIONS SURVEY:

Community Organizations vs. Chambers of Commerce/Business Associations

FAMILIARITY WITH ADVANCED PUBLIC TRANSIT SYSTEMS (COMMUNITY ORGANIZATIONS)	
Yes	5
No	15
Total	20

FAMILIARITY WITH ADVANCED PUBLIC TRANSIT SYSTEMS (CHAMBERS OF COMMERCE/BUSINESS ASSOCIATIONS)	
Yes	2
No	12
Total	14

RESULTS OF ORGANIZATIONS SURVEY:

Community Organizations vs. Chambers of Commerce/Business Associations

FAMILIARITY WITH ADVANCED TRAVELER INFORMATION SYSTEMS (COMMUNITY ORGANIZATIONS)	
Yes	5
No	15
Total	20

FAMILIARITY WITH ADVANCED TRAVELER INFORMATION SYSTEMS (CHAMBERS OF COMMERCE/BUSINESS ASSOCIATIONS)	
Yes	1
No	13
Total	14

RESULTS OF ORGANIZATIONS SURVEY:

FAMILIARITY WITH ELECTRONIC TOLL COLLECTION SYSTEMS (COMMUNITY ORGANIZATIONS)	
Yes	7
No	13
Total	20

FAMILIARITY WITH ELECTRONIC TOLL COLLECTION SYSTEMS CHAMBERS OF COMMERCE/BUSINESS ASSOCIATIONS	
Yes	3
No	11
Total	14

INTEREST IN RECEIVING INFORMATION ON INTELLIGENT TRANSPORTATION SYSTEMS (COMMUNITY ORGANIZATIONS)	
Yes	9
No	11
Total	20

INTEREST IN RECEIVING INFORMATION ON INTELLIGENT TRANSPORTATION SYSTEMS CHAMBERS OF COMMERCE/BUSINESS ASSOCIATIONS	
Yes	12
No	2
Total	14

RESULTS OF ORGANIZATIONS SURVEY:

Community Organizations vs. Chambers of Commerce/Business Associations

BEST MEANS FOR PUBLICIZING ORGANIZATION'S ACTIVITIES (Number of Community Organizations selecting item as one of the best 5 means)	
Seminars/Workshops/Conferences	9
Weekly/Monthly Meetings	8
Television Ad/Programs	4
Radio Ad/Programs	6
Telephone	8
Computer Mail/Internet	3
Printed Press	8
Newsletters/Flyers	16
Others	3

BEST MEANS FOR PUBLICIZING ORGANIZATION'S ACTIVITIES (Number of Chambers of Commerce/Business Associations selecting item as one of the 5 best means)	
Seminars/Workshops/Conferences	10
Weekly/Monthly Meetings	14
Television Ad/Programs	1
Radio Ad/Programs	2
Telephone	9
Computer Mail/Internet	4
Printed Press	8
Newsletters/Flyers	13
Others	0

RESULTS OF ORGANIZATIONS SURVEY:

Community Organizations vs. Chambers of Commerce/Business Associations

BEST MEANS OF ITS INFORMATION DISSEMINATION (Number of Community Organizations who ranked item as one of the best 5 means)	
Seminars/Workshops/Conferences	6
Weekly/Monthly Meetings	6
Television Ad/Programs	2
Radio Ad/Programs	4
Telephone	7
Computer Mail/Internet	4
Printed Press	7
Newsletters/Flyers	14

BEST MEANS OF ITS INFORMATION DISSEMINATION (Number of Chambers of Commerce/Business Associations who ranked item as one of the 5 best means)	
Seminars/Workshops/Conferences	10
Weekly/Monthly Meetings	10
Television Ad/Programs	6
Radio Ad/Programs	4
Telephone	9
Computer Mail/Internet	3
Printed Press	11
Newsletters/Flyers	13

RESULTS OF ORGANIZATIONS SURVEY:

Community Organizations vs. Chambers of Commerce/Business Associations

PARTICIPATION IN ITS OUTREACH ACTIVITIES (COMMUNITY ORGANIZATIONS)	
Yes	6
No	4
Maybe	10
Total	20

PARTICIPATION IN ITS OUTREACH ACTIVITIES (CHAMBERS OF COMMERCE/PROFESSIONAL ASSOCIATIONS)	
Yes	2
No	0
Maybe	12
Total	14

Results from the Organization Surveys

A total of 55 entities completed the "Organizations Survey," yielding a response rate of 34 percent. This number includes 37 mailed-back surveys and 18 telephone interviews. The results are discussed below.

Table 19 provides the breakdown of the 55 surveys by organization type. The resulting tally shows that the largest group of respondents (36 percent) were community organizations. In second place, based on the number of responses, are chambers of commerce/business associations (25 percent), followed closely by professional associations/trade groups which constituted 22 percent of the respondents. A secondary analysis comparing the two highest responding groups has also been conducted.

At the primary level, almost 7 out of 10 respondents acknowledged having no familiarity with the formal expression "*Intelligent Transportation Systems*," or the popular media's "*high-tech highways*" and "*smart highways*" (Table 20). This level of familiarity was further explored in the survey with answers to the key components of ITS; 82 percent of respondents said they had no familiarity with ATMS, 3 out of 4 respondents acknowledged no familiarity with either CVOs or ATIS; and seven out of ten respondents said that the concept of APTS was unknown to them. Finally, 1 out of 3 respondents said that they had some familiarity with ETC systems. However, the majority of respondents (62 percent) expressed an interest in receiving information on ITS.

On the subject of information dissemination, survey questions and responses are divided into two sections: the first deals with the means of acquiring information, e.g., from MPO, and the second reflects the dissemination process for sharing the information with the organization's membership. Almost all of the respondents (96 percent) said that newsletters and flyers are one of the 5 best means for outside organizations to disseminate information to their groups (See Appendix C for full survey results in Tabular form). Printed press, including ethnic newspapers, was the second tool identified as one of the 5 best means of information dissemination. Telephone, television and radio ads/programs, and monthly meetings/seminars, received almost an equal number of votes (around 40% each).

A total of 82 percent of survey respondents rate newsletters/flyers as one of the 5 best means used by their organizations to publicize activities. Weekly/monthly meetings (55 percent), telephone (53 percent) and seminars/workshops (47 percent) are the next tools rated highly on the various mechanisms for dissemination. Finally, 84 percent of respondents expressed some level of interest in participating in ITS outreach activities.

The secondary level of analysis of the "Organization Survey," i.e., a comparison between the top 2 respondent categories, shows a great deal of consistency among responses given by community organizations and chambers of commerce/business associations. Seventy five percent of community organizations and 79 percent of chambers of commerce/business associations expressed no familiarity with ITS terms. This trend is found throughout the survey, i.e., 75

percent of community organizations and 82 and 93 percent of chambers of commerce acknowledge no familiarity with APTS and ATIS respectively.

The only major difference in responses is found in the level of interest in receiving information on ITS. Only 45 percent of community organizations expressed an interest in receiving information on ITS, compared with 86 percent of chambers of commerce who were interested. In evaluating the means for information dissemination, 70 percent of community organizations believed that newsletters/flyers are one of the 5 best means of ITS information dissemination, versus 93 percent for chambers of commerce.

Similarly, seventy nine percent of chambers of commerce compared to only thirty five percent of community organizations identified the printed press as one of the best means of information dissemination. Finally, by an overwhelming margin, both types of organizations indicated that they might be willing to participate in ITS outreach activities (80 percent of community organizations and 100 percent of chambers of commerce/business associations).

Results from the Elderly Surveys

Driving Patterns

Most of the respondents (83%) drove and did so seven days a week. The most frequently cited reason for driving was the convenience it provided followed by the wish for independence. As for the aspects of driving they disliked most, most respondents ranked traffic congestion first, followed by the reckless behavior of other drivers--which was perceived both as an annoyance and a hazard.

The dislikes expressed by the elderly drivers can help to explain how they hope ITS will facilitate driving for them. Specifically, these respondents reported that ITS would be useful to them by providing en-route information and guidance, decreasing congestion, and enhancing safety. It is not surprising that elderly drivers report information and guidance as being useful; data gathered from focus group discussions conducted at SGI revealed that one of the most critical concerns of elderly drivers was the lack of advanced information regarding the condition of the road. Such information they report would permit them to either refrain from driving at such times or find alternate routes.

Another implementation of ITS mentioned by some older drivers which they believe would promote safety is the use of cameras on the road to monitor the behavior of reckless drivers. The concern about the risk posed by reckless drivers has also been reported in focus group discussions by older drivers. For example, they mentioned particularly being incensed at drivers who, aware of lane reductions ahead, disregard signs to that effect and subsequently attempt to force their way ahead of the line.

Use of Public Transportation

Most of the respondents (70%) did not use public transportation (i.e., mass transit). The reasons given for disliking public transportation included their being too slow and inflexible. While not mentioned by the respondents interviewed, data from a White House Conference on Mobility conducted by SGI (1994) suggests that in addition to the inflexibility and slowness of mass transit, concerns for personal safety also contributed to their dislike and subsequent lack of use by the elderly. This observation is also supported by the literature. According to the respondents, ITS would be useful to them by rendering mass transit more reliable, namely by reducing waiting time for users. It is evident that, while not mentioned by these respondents, ITS can play an important role in making mass transit attractive to them, by addressing real as well as perceived threats to their safety.

Walking Habits

About half (52 percent) of the respondents did not usually walk. Their reasons for not doing so had to do with the distances to their destination. According to data from the U.S. Department of Education 58.5 percent of persons 65 and older have a functional limitation¹. Therefore, it is not surprising that walking would be avoided especially to carry out such activities as shopping. Ways reported by the respondents in which ITS could improve the streets for pedestrians included controlling and monitoring vehicular activity at intersections with the aim of protecting pedestrians and improving crossing signals.

Focus Groups

Christ the King Catholic Church. Almost all of the people who participated in the discussion at this site had never heard of ITS. A handful had some notion of smart highways and were able to relate their experiences with electronic toll collection systems to ITS concepts. The general consensus of the participants was that one of the most effective ways of educating people about ITS concepts, projects and strategies is through similar presentations to church groups as well as organized field trips for congregation members. Additionally, the group also mentioned that simple (non-technical) brochures and videos would be most useful for lay people attempting to understand the relevance of these new technologies.

Miami Dade Community College-North. This focus group was composed of representatives from MDCC-N, from MDTA, from FIU (all of whom were not members of this research team),

1. Functional limitation refers to a reduction in a person's ability to perform nine sensory and physical activities including: reading newspaper print, hearing normal conversation, walking three city blocks, having speech understood, lifting and carrying a 10 lb bag, walking up a flight of stairs without resting, getting around outside the house without help, getting around inside the house without help, and getting in and out of bed without help.

from the local chapter of the Transport Workers Unions (TWU), and from the Miami chapter of the Conference of Minority Transportation Officials (COMTO). The discussion focused on the level of ITS awareness among staff and employees at transportation agencies in general, and MDTA in particular. The general consensus of the group was that awareness of ITS concepts, issues and projects seem to be fairly low among both white-collar and blue-collar workers. MDTA and TWU representatives argued for the need to establish some form of ITS educational campaign for transit personnel and suggested that FIU and MDCC-N take a leading role in the process. Specifically the representatives emphasized that the program should be multilingual, because of the substantial numbers of non-native English speaking workers at the lowest 3 entry levels.

Florida International University. The results from the group's discussion show that generally speaking, a majority of respondents had no prior knowledge of ITS. Furthermore, many participants had no idea how ITS might be of help to drivers while others believed that ITS technologies may help to alleviate traffic congestion if it were to provide additional traffic information. Some participants believed that ITS technologies may have an impact on driver/vehicle safety. Yet few of the participants actually suggested safety as one of the issues that ITS should address. Approximately half of the participants could not identify any issues to be addressed by ITS technologies.

Grade School Outreach

Researchers, responding to an invitation from school officials, participated in a Sunset Elementary School Career Day Event which had a Trucking Operations theme. Researchers made a short presentation on the current and future trends in the trucking industry, within an ITS framework. Lively questions from the group of forty eight first, second and third graders (ages 6-10 years old), and their teachers, showed that although very few were familiar with ITS technologies, they were most responsive and enthusiastic about the trends.

Specifically, the students as a group expressed a great deal of interest about the weigh-in-motion concept and the vehicle-roadside infrastructure communications systems. One interesting issue raised was whether high school students could also participate as advisory members. The group suggested the creation of an advisory youth group which could participate in the County Plan and help in the public education process by focusing on the Dade County Public Schools. The group also favored tech fairs, television ads and electronic mail as the most effective ways of reaching out to their schoolmates.

FIU-LCTR SEMINAR/WORKSHOP FOR COLLEGE STUDENTS

Project

Dade County ITS Public Information Plan

Goal

Increase the awareness of ITS concepts, project and programs among students

Specific Objectives

1. Provide information regarding the ITS national program.
2. Provide information regarding the state and local ITS programs and projects.
3. Enhance the image and promote an in-depth awareness of MPO's role in the development of Dade ITS programs and projects.
4. Provide information to uninformed and misinformed students to permit them to reach a decision regarding the need for ITS projects and programs in Dade County.

Target Audience

Students in non-engineering degree programs, particularly juniors/seniors.

Essential Elements

- * Information must be accurate and provide the following:
 - = = > Definition of ITS and all its components
 - = = > Description of Transportation system and issues in Dade
 - = = > Estimated short term and long term costs of ITS projects
 - = = > Employment opportunities
- * Information must avoid perception of "selling" ITS program
- * Information should link the student with projects addressing socio-technical problems.

Supportive Elements

- * Willingness of other institutions to permit representatives involved in ITS projects to visit the school and address the students or form articulation agreements.

FIU-LCTR RADIO CALL-IN FORMAT FOR IMMIGRANT GROUP

Project

Dade County ITS Public Information Plan

Goal

Increase the awareness of ITS concepts, project and programs among immigrant groups

Specific Objectives

1. Provide information regarding the ITS national program.
2. Describe ITS Technologies in general and implementation in Dade County in particular.
3. Describe means for accessing ITS related information.
4. Respond to questions about ITS in Dade County.

Target Audience

Immigrant populations with limited (or nonexistent) skills in english language and who are strongly dependent on public transportation.

Essential Elements

- * Information must be provided in appropriate language of target group, e.g., créole, or spanish, or english. If the audience targeted is mostly made up of users of public transportation, then:
 - = = > Provide information on how ITS facilitates use of public transportation
 - = = > Describe means to currently access information
 - = = > Provide information on how ITS helps in identifying alternative routes to specific destinations.
 - = = > Record information requested and concerns expressed as springboard to other of audience's transportation problems.

Supportive Elements

- * Willingness of other agencies to permit representatives involved in ITS projects to participate in call-in show and address the audience's concerns

LIST OF ORGANIZATIONS CONTACTED

Airport West Chamber of Commerce
All People's Democratic Club
Allapatah Chamber of Commerce
American Legion
American Dental Association
American Czechoslovak Social Club
Amvets, Dade Broward Memorial Chapter Arch Creek Trust
Asociasion Interamerica De Hombres
Association of American Schools in South America
Aventura Marketing Council
Bay of Pigs Veterans Association 2506
Beacon Council Economic Development Organization
Biscayne Cove Condo Association
Biscayne Gardens Civic Organization
Biscayne Business and Professional Women's Club
Biscayne Gardens Civic Association
Biscayne Park Civic Club
Black Business Association
Boy Scouts of America
Brickell Area Association
Brothers To The Rescue
Builders Association of South Florida
Business Assistance Center
Business Coalition for Americans with Disabilities
Casablanca Condominium Association
Catholic Community Service
Catholic Home For Children
Central America-US Chamber of Commerce
Central NM Homeowners
Christ Apostolic Church, Miami
Citizen's Crime Watch of North Dade
Citizens For Responsible Government
Coalition of Hispanic American Women
Coconut Grove Chamber of Commerce
Concerned Citizens of Northeast Dade
Concert Association of Florida
Congress of Religious Credit Unions
Coral Gables Women Club
Coral Gables Chamber of Commerce
Country Village Homeowners Association
Covenant Palm Chapter

Crime Is Not Acceptable
Cuban American Organization For Dignity
Dade County Public Schools
Dade Heritage Trust
Dominican Professional Association of Florida
Downtown Miami Partnership
Edo/Delta Association of Florida
Egba Association of Florida
Elderly Persons-Hadley Park Chapter
Elite Ladies Association of Miami
Executives' Association of Greater Miami
Florida Gold Coast
Florida International Bankers Associates
Florida Association of Non-Profit Organizations
Forum of North Dade Friends of the North Miami public Library
Friends of North Miami, Florida
Fund for Public Interest Research
Girl Scouts of America
Golfwood I& II Homeowners Association
Goodwill Industries
Greater Biscayne Chamber of Commerce
Greater Miami & The Beaches Hotel Association
Greater Miami Investments Incorporated
Haitian American Engineering Society
Hammocks Community Association
Hialeah Chamber of Commerce
Hispanic Americans Builders Association
Hispanic Latin Foundation
Holy Family Episcopal Church
Independent Electrical Contractors
Industrial Association of Dade County
International Exporters Importers
Izzack Walton League
Jamaican Business Association of Florida
James E. Scott Community Association
Japan Society of South Florida
Jewish War Veterans Post
Junior Chamber International
Junior League of Miami
Kendall Business and Professional Association
Knights of Pythias
Knights of Columbus Marion Council
Lakes of Acadia Homeowners Association

Latin Chamber of Miami Beach
Lejeune House Condominium Association
Little Havana Development Authority
Little Haiti Crime Prevention Subcouncil
Marbella Park Homeowners Association
Martin Luther King Economic Development Corporation
Metro Miami Action Plan
Metro Dade Advocates for Victims
Miami Beach Taxpayers Association
Miami Lakes Business Association
Miami Special Olympics
Miami River Coordinating Committee
Miami Shores Chamber of Commerce
Miami Dade Community College
Miami Dade Chamber of Commerce
Miami Pioneers Club
Miami Springs Historical Society
Miami Shores Property Owners
Miami Springs Chamber of Commerce
Miami Beach Latin Chamber of Commerce
Miami Historical Society
Miami River Coordinating Committee
Munisport Dump Coalition The Nature Conservancy
National Association of Letter Carriers
NEDID Democratic Club
New Horizons Community Mental Health Center
Nigerian Association of South Florida
North Miami Mayor's Task Force
North Miami Moose Lodge
North Miami Women's Club
North Miami Beach Jaycees
North Miami Beach Kiwanis
North Miami Beach Optimist
North Miami Green Thumb Garden Club
North Dade League of Women Voters
North Miami Elks
North Miami Civilian Club
North Dade Rotary Club
North Miami Senior Foundation
North Central Dade Community Improvement Association
North Miami Beach Chamber of Commerce
North Dade Chamber of Commerce
Northeast Dade Chapter

Palmetto Lakes Industrial Association
Partners for Progress
Partners For Self Employment
People Acting for Community Togetherness
Pockets of Pride
Printing Association of South Florida
Progressive Firefighter Association Incorporated
Redlands Conservancy
Shorecrest Homeowners Association
Sierra Club
South Florida Auto Dealers Association
Summit Condominium Association
Sunny Isle Resort Association
Sunrise Club Chapter
Sunshine State Industrial Park Association.
The Greater Miami Chamber of Commerce
The Wilderness Center
The Business Council
Tropical Audubon Society
Turkish America association of Florida
Unidad Cubana Incorporated
United Democratic Club
United Taxi Owner Driver Association
United Teachers of Dade County-Local 1974 AFL-CIO
United States Postal Service (UPS)
United Teachers of Dade
Veterans of Foreign Wars Post 471
Voices for Children of Dade County
Voters Council of North Miami Beach 128
West Perrine Community Development Center
West Indian Driving School
Westside Property Owners
Women's Chamber of Commerce
Womens Preservation Society of Miami
Young Women Christian Association
Zapata Foundation

ITS TOWN MEETING AGENDA

WEDNESDAY FEBRUARY 21, 1996

ITS CONCEPTS, PROGRAMS AND PROJECTS: A COMMUNITY DIALOGUE

8:00 AM -- 5:00 PM **REGISTRATION, VENDOR EXPO AND VEHICLE DISPLAYS**

*FHWA Advanced Traffic Control Trailer
Avis Rent-a-Car Satellite Guidance System
Metro Dade Transit (Automatic Vehicle Location) Bus*

8:45 AM -- 9:00 AM **INTRODUCTION AND WELCOMING REMARKS**

*Dr. Sylvan C. Jolibois, Jr., ITS Program Manager, LCTR
Dr. L. David Shen, Chairman and Director, LCTR*

Introduction of Keynote Speaker

*Dr. Gordon Hopkins, Dean
College of Engineering and Design*

Keynote Speaker

*The Hon. William Lehman, Member (Ret.)
U.S. Congress*

9:00 AM -- 10:15 AM **SESSION NO.1: INTELLIGENT TRANSPORTATION SYSTEMS
CONCEPTS, PROGRAMS AND PROJECTS AT THE NATIONAL
AND STATE LEVELS**

Moderator: Dr. Sylvan C. Jolibois, Jr., Lehman Center for Transportation Research

Panelists: *Mr. Chris Richter, Federal Highway Administration (FHWA)
Dr. Donna Nelson, Intelligent Transportation Society (ITS) of America
Mr. Jack H. Kay, JHK & Associates
Mr. Clem Monge, U.S. Department of Transportation (USDOT)
Mr. Jack Brown, Florida Department of Transportation (FDOT)
Mr. Hamby Hutcheson, Intelligent Truck Project (ITP)*

10:15 AM -- 10:30 AM Refreshment Break

10:30 AM -- 11:45 AM **SESSION NO.2: PUBLIC AND PRIVATE SECTOR
PERSPECTIVES ON ITS PROGRAMS AND PROJECTS IN DADE
COUNTY**

Moderator: Dr. José Guerrier, Stein Gerontological Institute

Panelists: *Dr. Arvind Kumbojhkar, FDOT District 6
Mr. Michael Pietrzyk, Center for Urban Transportation Research (CUTR)
Mr. Terry McKinley, Metro Dade Transit Agency (MDTA)
Lt. Ernesto Duarte, Florida Highway Patrol (FHP)
Mr. Chester Chandler, Florida Turnpike Authority (FTA)
Mr. Manny Rodriguez, Miami International Airport (MIA)*

12:00 NN -- 1:30 PM **CORPORATE SPONSORS LUNCHEON**

Guest Speaker: *The Hon. Arthur W. Kennedy, Member
Florida Transportation Commission*

1:30 PM -- 3:15 PM **SESSION NO. 3: LOOKING INTO DADE COUNTY'S FUTURE
TRANSPORTATION NETWORKS--INTELLIGENT
TRANSPORTATION SYSTEMS IN THE WASHINGTON DC
METROPOLITAN AREA AND AT THE ATLANTA OLYMPICS**

Moderator: Ms. Cheryl McConnell, De Leuw, Cather and Company

Panelists: *Mr. Yves Point-du-Jour, Maryland State Highway Administration (MSHA)
Ms. Shelley Lynch, Georgia Division, Federal Highway Administration (FHWA)*

3:15 PM -- 3:30 PM Refreshment Break

3:45PM -- 4:30 PM **SESSION NO. 4: STRATEGIES FOR PUBLIC INVOLVEMENT,
AWARENESS AND EDUCATION--COLLABORATIVE EFFORTS
WITH THE FOURTH ESTATE (MEDIA)**

Moderator: Ms. Yvonne McCormack, FDOT District 6

Panelists: *Mr. Alphonso Chardy, The Miami Herald
Mr. Marcus Garcia, Haiti en Marche
Mr. Danny Alvarez, MDTA
Mr. Enrique Cordoba, Radio Caracol
Ms. Lucy Unsworth, Gold Coast Commuter Services
Mr. Alberto Makacio, Acontecer Colombiano*

6:30 PM -- 9:00 PM DINNER BANQUET

Keynote Address:

***"In the Aftermath of the Adarand vs. Peña Supreme Court Case: Federal Opportunities
for Minority and Women Owned Businesses in the Transportation Industry"***

*Antonio J. Califa, Esq., Director, Office of Civil Rights
U.S. Department of Transportation, Office of the Secretary*

THURSDAY FEBRUARY 22, 1996

ITS CONSORTIUM INTERN AND EDUCATIONAL DEVELOPMENT MEETING

8:00 AM -- 4:00 PM Registration and Sessions

FRIDAY FEBRUARY 23, 1996

9:00 AM -- 3:00 PM Organized Tours of Dade County Transportation Agencies e.g.,
Florida Turnpike Authority, Miami International
Airport, Metro-Dade Transit, Florida DOT.

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Haitian American Engineering Society*

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Metropolitan Planning Organization
Metro Dade Transit Agency
Florida Department of Transportation
Federal Highway Administration
United States Department of Transportation, Office of the Secretary
Port of Miami
Florida Turnpike Authority
Tri-County Commuter Rail Authority
Intelligent Transportation Society of America
ITS Consortium, Inc.
University of South Florida
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FIU National Society of Black Engineers
