

Development of the Miami-Dade County Integrated Transportation Management System (ITMS)

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1.0 INTRODUCTION

1.1 Background

The 1991 Intermodal Surface Transportation Efficiency Act (ISTEA) legislation mandated the development of six management systems and one monitoring system. These systems are:

- Bridge Management System (BMS),
- Congestion Management System (CMS),
- Intermodal Management System (IMS),
- Pavement Management System (PMS),
- Public Transportation Management System (PTMS),
- · Safety Management System (SMS), and
- Traffic Monitoring System for Highways (TMS/H).

Subsequently, the 1995 National Highway System Act made most of the management system requirements optional. However, realizing the significance of these management systems to the planning process, the Miami-Dade County Metropolitan Planning Organization (MPO), along with the Florida Department of Transportation (FDOT), have continued their initiative to develop these management systems while customizing the systems to their own needs.

In 1996, the MPO completed the development of its Mobility Management Process/Congestion Management System (MMP/CMS). This process focuses on the concept of mobility of people and goods, rather than just congestion. The MMP/CMS process and other similar efforts around the nation have affirmed that a comprehensive transportation planning and decision-making process requires input from all management systems. The Miami-Dade County's MMP/CMS process has

been cited several times as a prime example demonstrating the concept of mobility management and congestion management.

As a logical next step to the development of the MMP/CMS, the MPO commissioned the development of an Integrated Transportation Management System (ITMS), which would integrate the MMP/CMS, IMS, PMS, PTMS, SMS, and TMS/H. The initial scope of the ITMS development called for the integration of the MMP/CMS, PTMS, IMS, and TMS/H, and was later expanded to include PMS and SMS as well. Due to budgetary constraints, the BMS was not included in this phase of the ITMS development, however, the flexible design of the ITMS allows for the addition of new management systems such as BMS.

1.2 Objective

The objective of this study was to develop a transportation information/analysis system for Miami-Dade County that functionally integrates the implementation of six of the seven management systems initially required by the ISTEA regulations. The ITMS system would provide an automated centralized platform for sharing and analyzing data. This system would function as a decision support tool providing the decision makers and officials improved access to transportation information within the Miami-Dade County area. The emphasis of this study would be on developing the ITMS system using available data. Additional data, over time would make all components more complete.

1.3 Acknowledgments

The full realization of the ITMS project objective has been possible because of extensive coordination efforts between the various agencies throughout the course of the ITMS development.

The MPO and the consultant team would like to express their appreciation for the contributions of the following agencies and their personnel:

Miami-Dade County MPO - Bicycle/Pedestrian Program

Miami-Dade County Public Works Department

Miami-Dade County Information Technology Department

Miami-Dade County Planning Department

Miami-Dade Transit Agency

FDOT Central Office - Systems Planning Office

FDOT Central Office - Transportation Statistics Office

FDOT Office of Planning - District Six

1.4 Data Review

An extensive data review was undertaken to identify data related to each of the management systems that was currently maintained at the state and county levels. As an initial step in this review, the data required for the various components of the ITMS were identified. The next step was to identify the agency that maintained that data. As a general guideline, the original department or agency that gathered and prepared the data was considered to be a more reliable source, and therefore, the most recent available data was obtained directly from them, whenever possible.

The data review also included the investigation of the current use of the data in order to understand the purpose and usage of the information contained in the databases so that those parameters were used appropriately within the ITMS. The data review phase and coordination efforts allowed input from both the agencies providing the data and the likely end-users of the information. Such input has been carefully considered in the development of the ITMS databases and analysis applications.

Appendix A, ITMS Documentation/Users Manual, contains an inventory of data used in the ITMS and includes information that would be useful to the end-user for future updates. The data inventory list includes description of each data item, the primary ITMS component in which that data is used, the ITMS file names, the source file names as provided by the agencies, the source (maintaining) agency, and the media used for transferring the data.

1.5 Literature Review

A careful review of published literature was undertaken for this study to establish current practices and procedures in the State of Florida as well as other states nationwide. Some of the key literature reviewed includes the federal requirements and the FDOT Work Plans regarding the development of the management systems. Another aspect of the literature review also focused on the current procedures and practices of the County Departments, such as, Public Works and Transit Agency. A list of references is included in Appendix B.

2.0 DESCRIPTION OF THE MANAGEMENT SYSTEMS

2.1 Mobility Management Process/Congestion Management System (MMP/CMS)

Miami-Dade County developed their MMP/CMS in 1996. The MMP/CMS provided a detailed inventory of available data at the state and county level. It established the congestion performance measures for Miami-Dade County. An in-depth analysis of the current congestion levels identified the congested locations in the County. It provided a menu of mobility management strategies and guidance on their generalized effectiveness. The MMP/CMS also established procedures for the evaluation and ranking of the congested locations, as well as the applicable mobility management strategies. These processes and procedures formed the basis for developing the MMP/CMS component of the ITMS.

2.2 Intermodal Management System (IMS)

The IMS component has been developed as part of this ITMS project. This component identifies the significant facilities and the intermodal system in Miami-Dade County, and creates a process for collecting and analyzing the information pertaining to such facilities and system. As defined by the Federal regulation (23 CFR 500), an intermodal facility means a transportation element that accommodates and interconnects different modes of transportation, and serves intrastate, interstate, and international movement of people and goods. An intermodal system means a transportation network consisting of public and private infrastructure for moving people and goods using various combinations of transportation modes. The IMS component of ITMS considers the movement of both people and goods, and includes information pertaining to bikeways, railroad, AMTRAK, Tri-Rail, major airports, major seaports, intercity bus terminals, major truck terminals, and freight

roadway network. The IMS component facilitates an improved coordination in the planning and implementation of air, water, and land-based transportation facilities.

2.3 Pavement Management System (PMS)

The FDOT District Six developed a PMS for the state roadway system within Miami-Dade County in 1996. The PMS component developed for the ITMS incorporates the FDOT District Six procedures for state roadways and expands the management system to include the information and procedures utilized by the Miami-Dade County Public Works Department (MDCPWD) for county roadways. The PMS component of ITMS provides data and analysis related to pavement condition and identifies the current pavement deficiencies. This component facilitates the evaluation of needs, selection of remedial strategies, setting priorities, and scheduling of improvements, needed in developing metropolitan transportation plans and improvement programs.

2.4 Public Transportation Management System (PTMS)

The PTMS component has been developed as part of this ITMS project. This component identifies the major public transportation facilities in the County, and creates a process for gathering and analyzing the information pertaining to such facilities. In Miami-Dade County, the majority of the information pertaining to the PTMS component is collected and maintained by the Miami-Dade Transit Agency (MDTA) and the Miami-Dade Information Technology Department (ITD). This information includes an inventory of the stops, stations, alignment, maintenance facilities, annual ridership and seasonal variations for the Metrobus, the Metromover, and the Metrorail transit systems. The PTMS component also provides analysis of the availability and usage of public transportation facilities which would facilitate the identification of future infrastructure needs and development of strategies for managing the public transportation facilities.

2.5 Safety Management System (SMS)

The SMS component has been developed as part of the ITMS project. This component identifies roadway locations in the County with high occurrence of crashes and multimodal conflicts. The identification of such hazardous and potentially hazardous locations would facilitate the selection and implementation of effective safety strategies and projects. The SMS component also includes data regarding the various enforcement agencies, emergency and medical service locations as these disciplines are often involved in highway safety initiatives. The integration of the SMS component with the other ITMS components also facilitates early consideration of safety in the development of transportation programs and projects.

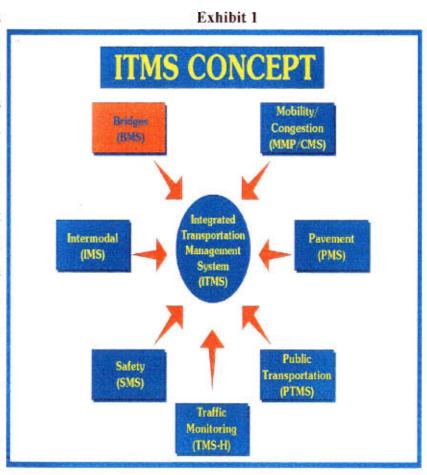
2.6 Traffic Monitoring System for Highways (TMS/H)

The TMS/H component of the ITMS has been developed as part of the ITMS project. This component includes the data and analysis of highway related traffic data for state and county roadways. Some of the significant information included in this component is data such as roadway network, roadway functional classification, daily traffic volumes, and traffic signals. This information is pertinent to several of the other ITMS components.

3.0 ITMS STRUCTURE AND USE

3.1 ITMS Concept

The underlying concept of the ITMS is an information management system that functionally and comprehensively integrates/analyzes information related to the Miami-Dade County's transportation system. This information management system is envisioned to be a decision support tool for the decision makers and officials who are involved in the transportation planning activities affecting the county. Consistent with this concept, six of the previously required ISTEA management systems form the primary components of the ITMS information system (see Exhibit 1).



3.2 ITMS Structure

A user-friendly program environment has been developed to guide a user through the components and modules of the ITMS program package. The ITMS environment is in the form of graphical user interfaces (GUIs) developed using Visual Basic 6.0. Upon starting the ITMS program, a sequence

of GUIs display the available options and allow the users to select their desired option. The GUI environment has been designed such that an average computer user familiar with the Windows environment would not have difficulty in successfully navigating and completing their selections.

Due to the extensive information brought together in the ITMS, the storage of the information, and the related analysis, has been organized into modules - one for each of the management systems. Even though the information resides in separate modules, it is integrated and is available across the modules for analysis and evaluation. This seamless assembly of data inputs and outputs is a primary aspect of the ITMS as integrated an information management system.

Exhibit 2 **Typical Module Structure** Files ITMS ITMS Conversion **Data Files** D-base Forma Routines Lotus 123 Visual ArcView D-base Analysis Tables Data Maps Tables Reports

The chart in Exhibit 3 maps out the comprehensive information that has been anlayzed, and made available, in the ITMS program. Exhibit 4 illustrates typical navigational steps and the functional elements of the ITMS program.

Exhibit 3 ITMS Functions at a Glance

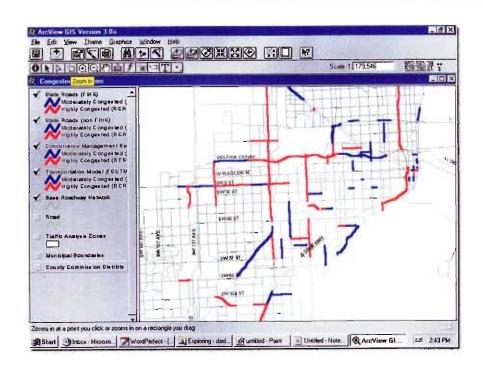
Miami-Dade County Integrated Transportation Management System (ITMS)

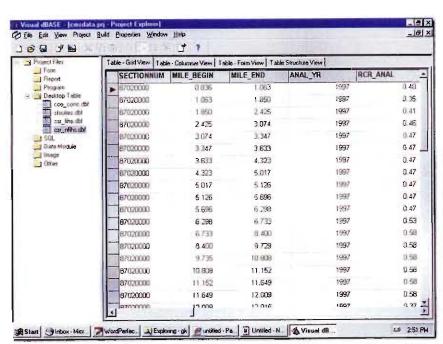
Mobility Management	Intermodal Management	Pavement Management	Traffic Monitoring	Public Transportation	Safety Management
Process/Congestion	System (IMS)	System (PMS)	System (TMS/H)	Management System (PTMS)	System (SMS)
Mgmt. System (MMP/CMS)					
MAPS	MAPS	MAPS	MAPS	MAPS	MAPS
State Roads - LOS	Bikeways	SR - Surveyed Pavement Deficiencies	ITD Basemap	Metrobus System	Bike & Pedestrian Crashes - Year 1997
Concurrency Data - LOS	Intermodal System	SR - Visually Evaluated Pavement Deficiencies	FDOT Basemap	Routes	Bike & Ped. Crashes - Years 1992 to 199
Florida Intrastate Highway System (FIHS)	Railroad Network	SR - Prioritized Pavement Deficiencies	County Traffic Count Stations - AWDT	Stops	High Accident Locations
Maximum Allowable LOS	AMTRAK Terminal	SR - Work Program Scheduling	Estimated Road Right of Way	Maintenance Facilities	SR - High Accident Segments
Analysis Year v/c Ratio	Tri-Rail System	SR - Number of Lanes	Federal Functional Classification	Metromover & Metrorali System	SR - High Accident Spots
Congested Locations	Tri-Rail Stations	Public Works Pavement Condition Survey	State Functional Classification	Alignment	Emergency Service, Medical Service &
State Roads (FIHS)	Major Airports		State Highway System	Stations	Enforcement Agency Locations
State Roads (non-FIHS)	Major Seaports		State Traffic Count Stations - AADT	Maintenance Facilities	
County Roads (Concurrency data)	Intercity Bus Terminals		SR - Traffic Monitoring Sites	Metromover System - Annual Ridership	
County Roads (FSUTMS)	Major Truck Terminals		Vehicle Classification Stations	Metrorail System - Annual Ridership	
Congestion Duration	Freight Roadway Network		Portable Stations		
	Railroad System &		Telemetered Stations		
	Grade Crossing Hazards		SR - Daily Truck Percentage		
			Traffic Signals		
REPORTS	REPORTS	REPORTS	REPORTS	REPORTS	REPORTS
AADT Report	Miami International Airport Operations	SR - List of Prioritized Pavement Deficiencies	SR - Seasonal Volume Factors	Metrobus Ridership	High Accident Locations
AWDT Report	General Aviation Operations	SR - List of Work Program Schedule	SR - Seasonal Axle Factors	Metromover Ridership	SR - High Accident Segments
SR - Vehicle Classification	Port of Miami Operations	Public Works - Survey Results		Metrorail Ridership	SR - High Accident Spots
Performance Measures					
15 Planning Factors					
Mobility Strategies					
Corridor Priority					
ANALYSIS	ANALYSIS	ANALYSIS	ANALYSIS	ANALYSIS	ANALYSIS
SR - LOS module	MIA Operations - Trend Analysis	Deficient Pavement Segment +	County Commission Districts	Metrobus Ridership - Seasonal Variation	High Accident+Congested Locations Ma
Concurrency Data	MIA Operations - Projections	Congested Locations Map	Traffic Analysis Zones	Metromover Ridership - Seasonal Variation Metrorall Ridership - Seasonal Variation	SR - High Percentage of Wet Weather, Elderly, Night Time Crashes Map
RCR module - Data Normalization	Gen Aviation Ops Trend Analysis Port of Miami Ops Trend Analysis	SR - Pavement Deficiencies versus Work Program Map	County Political Boundaries	Metrorali Ridership - Seasonal Vallation	Elderly, Night Time Grashes Way
User Specified Input Factors, e.g.,	Port of Miami Ops Projections	HOLK I LOGISIAN MAD		FDOT - Florida Departmen	nt of Transportation
Oser opecined input ractors, e.g.,	Water Control of the			ITD - Information Technological	ogy Department (Miami-Dade)
Growth Rates, Analysis Year, etc.					DESCRIPTION OF THE PROPERTY CONTRACTOR
Growth Rates, Analysis Year, etc. Selection & Scoring Module -				SR - State Roadways	Was the grant of the control of the
				SR - State Roadways LOS - Level of Service v/c - Volume to Capacity	

AADT - Annual Average Daily Traffic
AWDT - Average Weekday Daily Traffic
RCR - Relative Congestion Ratio
Source: David Plurnmer & Associates

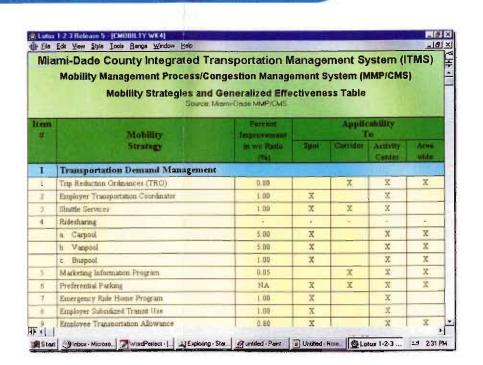
Integrated Transportation Management System (ITMS)











RCR Analysis		-
Select Inp	ut and Output Files Concurrency	
Input Variables:		3600
Peak to Daily Ratio (e.g., 7.00): 7	FSUTMS Base Year : 199	0
Annual Growth Rate (e.g., 1.00) : 1	State Roads Base Year : 1995	
RCR Threshold (e.g., 0.90): 9	Analysis Year (e.g., 1997) : 1997	
Concurrency Database:	Вгом	se
Concurrency Stations - State:	Brow	se
RCR Output - County Stations:	(Brow	(SE)
Run All Processes Systemwid	e <u>Parameters</u> <u>M</u> en	u

Each of the management system modules has the following basic functional elements:

- A database component that stores the data used in the ITMS program. The information is stored under a primary management system database but can be accessed from the other modules. This component also retains the dynamic relationships established between different pieces of data items eliminating the need to store the same information in multiple locations separately. Further, by establishing a dynamic relationship, any changes to the information in one module take effect automatically in all of the modules using that information. The advantage of this feature is that the information, although being used in different modules, is stored in one location, and any refinements or updates have to be made in that location only. One of the essential steps in enabling this coordination of information is the conversion of the source data to standard formats for use in ITMS.
- A data input and update component that allows the ITMS program to accept the source data files and convert them to standard file formats suitable for analysis and calculation in ITMS.
- An analysis and calculation component that stores the analysis and calculation processes that form the basis of maps and reports.
- A visual analysis component that allows visual and graphical presentation of the data and analysis.
- A map and report generation component that allows for the preparation of maps and reports. Maps portraying the analysis parameters have been pre-configured for screen viewing and/or plotting. The map setup includes size, output location, colors, etc. Reports listing the selected parameters have been also pre-configured. The setup includes printing destination, data layout, etc. In addition to the pre-configured maps and reports, default layouts have been developed so that a user may also develop customized maps and reports.

3.2.1 MMP/CMS Module

The following information is included in the MMP/CMS module of the ITMS database:

- Concurrency Data
- FDOT Level of Service (LOS) Data
- Florida Intrastate Highway System (FIHS)
- Model Data (Florida Standard Urban Transportation Model Structure FSUTMS)
- Mobility Management Strategies
- Corridor Ranking Criteria (15 Planning Factors)

Relative Congestion Ratio (RCR) Analysis Sub-Module

A sub-module has been developed to calculate the systemwide congestion performance measures and analysis parameters. This sub-module converts the input data (concurrency, FDOT LOS, and FSUTMS model data) to standard formats for analysis and applies appropriate factors to adjust the data to reflect common analysis year, season, and planning hour. The computer programming for this sub-module has automated the definitions and calculation procedures developed in the MMP/CMS document developed previously by the MPO. The following analysis parameters are calculated from the available data:

- Analysis Year Volume to Capacity (v/c) ratio
- RCR
- Degree of Congestion
- Peak Hour Volume
- Congested Distance
- Congestion Duration

- Congestion Hour-Miles
- · Congestion Vehicle-Hour-Miles

Mobility Management Strategies Sub-Module

A mobility management strategies sub-module, that can be accessed through the Reports option of the MMP/CMS GUI, has been developed in Lotus 1-2-3 software environment. This sub-module contains a menu of mobility management strategies. The user may review this menu, examine the applicability of each strategy and select those that are more appropriate for the specific corridor. The user may generate a report of the entire menu of strategies or only those selected for a specific corridor. A group of individuals, determined by the user, would manually rank the selected strategies based on mobility factors. The individual ranking scores and comments are input into this sub-module to automate the preparation of a combined report of ranked mobility strategies. The sub-module generates a report listing the selected alternatives, a general description of each strategy, and a composite measure of the expected improvement in the v/c ratio. The user may, as an option, classify the alternatives as short, medium, or long term, for implementation purposes.

Corridor Priority Sub-Module

A corridor priority sub-module has been developed in the Lotus 1-2-3 software environment. This sub-module is based on the application of the 15 ISTEA planning factors to the list of congested corridors and spots in the county. The user may generate a report of the pre-configured scoring forms. The corridor ranking, based on the 15 planning factors, would be done manually by a group of individuals. The individual ranking scores and comments are input into this sub-module to automate the preparation of a combined report ranking the congested locations. These scores can then be used to propose the priority of improvement implementation.

3,2,2 IMS Module

The following information is included in the IMS module of the ITMS database:

- · Bikeways
- Freight Roadway Network
- Intercity Bus Terminals
- Major Truck Terminals
- Major Airports
- · Major Seaports
- · Railroad Network
- Railroad Terminals AMTRAK, Tri-Rail
- Railroad Highway Grade Crossing Conflicts

This module also includes information on the operations at the Miami International Airport (MIA), other general aviation airports, and the Port of Miami. The analysis of this information includes historic trend analysis and future projections.

3.2.3 PMS Module

The following information is included in the PMS module of the ITMS database:

- Number of lanes
- FDOT Pavement Management System Data
- Miami-Dade County Public Works Pavement Condition Survey Data

This module includes analysis such as the identification of deficient pavement segments, and their agency assigned priorities and a comparison with the programmed improvements. This module also includes a comparison of deficient pavement segments that are congested locations also.

3.2.4 PTMS Module

The following information is included in the PTMS module of the ITMS database:

- Metrobus Routes
- Metrobus Stops
- Metrobus Ridership
- Metrobus Maintenance Facilities
- Metromover Alignment
- Metromover Stations
- Metromover Ridership
- Metromover Maintenance Facilities
- Metrorail Alignment
- Metrorail Stations
- Metrorail Ridership
- Metrorail Maintenance Facilities

This module also includes analysis of the annual ridership data to identify the availability and usage of each of the three public transportation systems. This analysis facilitates the identification of future infrastructure needs and development of strategies for managing the public transportation facilities.

3.2.5 SMS Module

The following information is included in the SMS module of the ITMS database:

- Emergency Service Locations
- Enforcement Agency Locations
- High Accident Segments
- High Accident Spots
- Medical Service Locations
- Multimodal Conflicts Bicycles and Pedestrian Crashes

This module identifies the hazardous and potentially hazardous roadway locations in Miami-Dade County. This module also identifies locations with a high percentage of crashes attributed to wet weather and night time conditions, as well as locations with a high percentage of crashes involving elderly drivers.

3.2.6 TMS/H Module

All or portions of the information included in the TMS/H module is used in the other management system modules. The following information is included in this module of the ITMS database:

- Roadway Network Data
- Average Daily Traffic (ADT)
- Daily Truck Percentages
- · Highway Functional Classification
- State Highway System
- Road Right of Way
- Traffic Signals

- Continuous Traffic Count Stations
- Classification Count Station Locations
- Portable Traffic Count Station Locations
- Seasonal Variation Factors
- County Commission Districts
- Traffic Analysis Zones
- County Municipal Boundaries

4.0 BENEFITS OF ITMS

The ITMS program package provides a comprehensive state-of-the-art transportation information/analysis system for Miami-Dade County. Consistent with the objective of this project, ITMS development has functionally integrated the implementation of six of the management systems initially required by ISTEA. The ITMS program provides an automated centralized platform for sharing and analyzing transportation data for Miami-Dade County. The following is a list of the main benefits of the ITMS:

- ► Improve the planning process and project selection through better utilization of available information.
- Improve the decision making process using advanced decision support and analysis capabilities.
- ► Increase effectiveness of planning through improved access to integrated and seamless multimodal and multi-disciplinary information.
- Build synergy between governmental agencies by creating a system for improved data exchange and information sharing.
- Increase productivity and more effective resource allocation through better coordination of efforts avoiding duplication.
- Provide a robust information system that can be expanded to integrate other analysis tools and applications.
- ► Improve the efficiency of the transportation system in Miami-Dade County.
- Increase satisfaction of the traveling public.

5.0 RECOMMENDATIONS FOR FUTURE ENHANCEMENTS

The ITMS system provides the county with a valuable information resource, as well as a platform for sharing and analyzing data. Recognizing the potential for future enhancements to the ITMS, the program was designed such that other components and applications could also be integrated into the system. The following is an initial listing of system enhancement recommendations for future phases:

- ► Develop Transportation Improvement Program (TIP) application.
- ▶ Update the ITMS system to incorporate FDOTs improved roadway network, when available.
- Automate maintenance of historic data.
- Develop an internal agency program for annual data updates.
- Integrate traditional transportation analysis tools, such as, Highway Capacity Software.
- Integrate FDOTs transportation modeling and GIS applications.
- Develop Internet applications.
- Develop applications to interact with other areas of transportation, e.g., bridge management,
 construction management, socio-economic data, land use, utilities, etc.
- Expand/enhance the means of accessibility to the system by other departments and agencies.
- Complete the population of all databases over time.

APPENDIX A ITMS Documentation/Users Manual



A-1.0 WORKING WITH ITMS

A-1.1 ITMS Software and Hardware Requirements

Software Requirements

- ArcView Version 3.0a,
- Visual dBase Version 7.0, and
- Lotus 1-2-3 Release 5.0 or later.

Hardware Requirements

- Industry standard personal computer Windows 95 operating system,
- 1.44 MB or higher floppy disk drive,
- CD-ROM drive (needed for installation of the softwares only),
- 64 MB RAM or higher strongly recommended,
- Hard Drive Disk Space 4 GB or higher recommended,
- Modem Access recommended,
- Printer color printer (11" X 17" paper size) recommended,
- VGA or higher resolution monitor and graphics adapter, and
- Mouse.

A-1.2 ITMS Installation

Installation diskettes have been provided that contain the necessary ITMS programs developed in this study. There are two sets of installations, one for the ITMS program and the other for the Data Input/Update program. The installation steps are the same for both, and are as follows:

1. Start Windows.

- 2. Insert disk 1 of the installation program in the disk drive (typically designated as A:\ drive).
- 3. From the Start button, choose the Run option.
- 4. From the Run dialog box, type A:\SETUP.EXE on the command line, and click OK.
- 5. When Setup starts, follow the instructions on the screen.

The successful completion of the setup programs will add/modify the necessary system files on the personal computer. It will also add the ITMS and Convert program icons to the selection menu of the Program option available from the Start button in Windows.

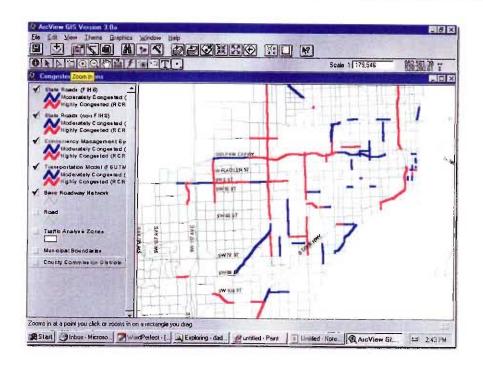
In addition to the program installation, diskettes containing the data files are also provided. The MPO computer hard drive is partitioned into $C:\$ and $D:\$ drives. The ITMS data files will be resident on the $D:\$ drive under the folder name DADEITMS. The folder names and file names are not case sensitive.

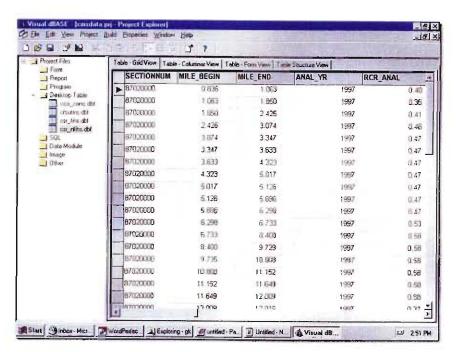
A-1.3 Getting Started

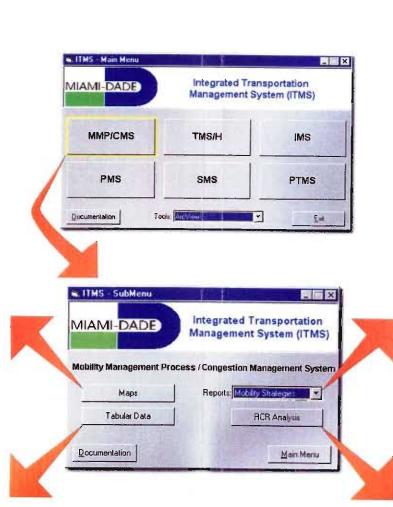
Exhibit 4 in the main document illustrates the typical navigational steps for a user to access the ITMS information and analysis. For the user's convenience, this exhibit has been included here as Exhibit A-1. Upon starting the ITMS program, a sequence of graphical user interfaces (GUIs) display the available options and allow the users to select their desired option. Brief descriptions and illustrations of the various elements of the GUIs are provided in the following sub-sections. Where appropriate, additional details on the analysis capabilities of the various elements have been also included. In addition to the description of the GUI navigational steps, these sub-sections also list the information and analysis accessed by the buttons on the GUI. A complete set of the preconfigured maps and reports is provided in separate document labels <u>ITMS Maps</u> and <u>ITMS Reports</u>, respectively.

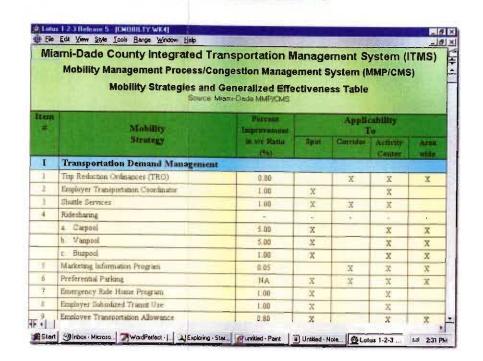
Integrated Transportation Management System (ITMS)











RCR Analysis		
	elect Input and Output Files Concu	urrency
Input Variables:		
Peak to Daily Ratio (e.g., 7.00):	7 FSUTMS Base	Year: 1990
Annual Growth Rate (e.g., 1.00):	1 State Roads Base	Year: 1995
RCR Threshold (e.g., 0.90):	Analysis Year (e.g.,	1997): 1997
Concurrency	TOTAL STREET	
Concurrency Database:	N 100 - 100	Browse
Concurrency Stations - State:		Browse
RCR Output - County Stations:		(Browse)
Hun All Processes Sy	stemwide Parameters	Menu

A-1.3.1 Starting ITMS

- From the Windows Start button, go to the Programs list, and
- Select ITMS to launch the ITMS program GUIs. Alternatively, this program may also be launched from a shortcut on the Windows desktop.

A-1.3.2 Main Menu

Launching the ITMS program brings up the main menu GUI (see Exhibit A-2). The user may choose one of the following options from this GUI:

- Click one of the management system buttons, which would launch the corresponding management system GUI.
- ► Click the Documentation button, which would display the on-line documentation provided with the ITMS program. Access to this documentation is also provided from the subsequent management system GUIs.
- Select a third-party software from the Tools drop-down list, which would launch the corresponding software. Currently, the user may select from ArcView, Highway Capacity Software (HCS), Lotus, Visual dBase, and Notepad. To add additional software programs to the Tools list, the user may edit the C:\text{VTMS\USER\TOOLS.TXT}\$ file in the Notepad environment. The ITMS program has to be re-launched for these modifications to take affect in the Tools list.

Exhibit A-2: GUI - ITMS Main Menu

IIMS - Main Menu

MIAMI-DADE Integrated Transportation Management System (ITMS)

MMP/CMS TMS/H IMS

PMS SMS PTMS

Documentation Tools Street Processing System (ITMS)

A-1.3.3 Management System GUIs

The management system GUIs (see Exhibits A-3 and A-4) provide the user access to the corresponding data, analysis, maps and reports. Each of the GUI screens have been designed to ensure consistent environment and navigational steps. The user may select one of the following options from the management system GUI.

Click Maps Button

Clicking the Maps button from a management system GUI launches ArcView environment (see Exhibit A-1) and opens the corresponding project file (e.g., CMSMAPS.APR from the MMP.CMS GUI). Each management system project file in ArcView stores the corresponding data and analysis as a set of views, tables, and later layouts. A view is an interactive map that allows the user to display, explore, query, and analyze tabular information about geographic features (e.g., roadways). The tabular information, itself, may be displayed, explored, queried, and

Exhibit A-3: GUI - MMP/CMS

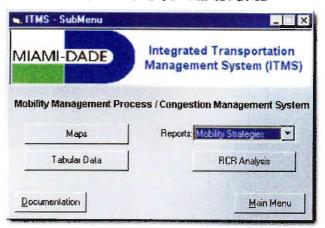
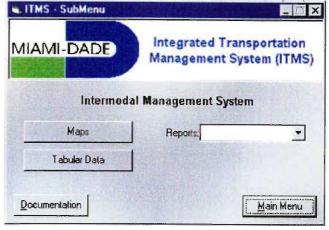


Exhibit A-4: GUI - Typical (IMS, PMS, PTMS, SMS, TMS/H)



analyzed in the ArcView environment. A layout allows the user to <u>print maps</u> along with components such as a title, scale bar, north arrow, and descriptive text. A view and its corresponding tabular data as well as its layout in the project file are inter-related and dynamically linked.

In the ArcView environment, the user may access, analyze, and/or modify the pre-configured views, tables, and layouts. The user may also add/create new views, tables, and layouts in the management system project file by using the ArcView menu-driven features. This capability allows the user to readily combine and analyze several pieces of information within a management system as well as across management systems. Additional maps may be generated in the ArcView environment, and those generated within the management system project file will automatically be accessible from the corresponding GUI. The ArcView software program includes comprehensive on-line help documentation to assist the user in basic as well as advanced use of the software. The ITMS user is also encouraged to refer to the *Using ArcView GIS* manual included with the software package.

The following is a list of pre-configured maps accessed by clicking the maps button from each of the management systems GUI (see corresponding exhibits in the <u>ITMS Maps</u> document):

MMP/CMS Maps

- Congested Locations
- Florida Intrastate Highway System (FIHS)
- Maximum Allowable Level of Service (LOS)
- State Roads LOS
- Concurrency Data LOS
- Congestion Duration
- Analysis Year v/c Ratio

IMS Maps

- Intermodal System
 - Railroad Network

AMTRAK Terminal

Tri-Rail System

Tri-Rail Stations

Major Airports

Major Seaports

Intercity Bus Terminals

Major Truck Terminals

Freight Movement Roadway Network

- Bikeways
- Railroad Alignment and Rail-Highway Grade Crossing Hazards

PMS Maps

- State Roads Surveyed Pavement Deficiencies
- State Roads Visually Evaluated Pavement Deficiencies
- State Roads Prioritized Pavement Deficiencies
- State Roads Work Program Scheduling
- Public Works Pavement Condition Survey Results
- Number of Lanes
- Deficient Pavement Segments/Congested Locations
- State Roads Pavement Deficiency versus Work Program

PTMS Maps

Metrobus System

Routes

Stops

Maintenance Facilities

Metromover & Metrorail Systems

Alignment

Stations

Maintenance Facilities

- Metromover System Annual Ridership
- Metrorail System Annual Ridership

SMS Maps

- Bicycle and Pedestrian Crashes Year 1997
- Bicycle & Pedestrian Crashes Years 1992 to 1994
- Countywide Highest Accident Locations
- State Roads High Accident Segments
- State Roads High Accident Spots
- Emergency Service, Medical Service and Enforcement Agency Locations
- Countywide Highest Accident Locations and Congested Locations
- State Roads High Percentage of Elderly, Night time and Wet Weather Crashes

TMS/H Maps

Basemap - Miami-Dade Information Technology Department (ITD)

- Basemap Florida Department of Transportation (FDOT)
- Federal Functional Classification
- State Functional Classification
- State Roadway System
- Average Weekday Daily Traffic (AWDT) County Traffic Monitoring Sites
- State Roads FDOT Traffic Monitoring Sites

Vehicle Classification Traffic Monitoring Sites

Portable Traffic Monitoring Sites

Telemetered Traffic Monitoring Sites

- Annual Average Daily Traffic (AADT) FDOT Traffic Monitoring Sites
- State Roads Daily Truck Percentage
- Estimated Road Right of Way Width
- Traffic Signals

Click Tabular Data Button

Clicking the tabular data button from a management system GUI launches Visual dBase environment (see Exhibit A-1) and opens the corresponding project file (e.g., CMSDATA.PRJ from the MMP/CMS GUI). In addition to accessing and analyzing the tabular data from the Maps button, as described previously, the user may access, explore, edit and analyze it in the Visual dBase environment. The Visual dBase software program includes comprehensive on-line help documentation to assist the user in basic as well as advanced use of the software.

Select Reports Drop-Down List

Selecting a report from the Reports drop-down list launches the Lotus 1-2-3 environment and opens the corresponding data file. The Lotus software program includes comprehensive on-line help documentation, as well as a reference manual, to assist the user in basic as well as advanced use of the software. The pre-configured reports generated in ITMS are in the form of tables and charts. Once in the desired report, the user may <u>print reports</u> by clicking the print buttons programmed in the reports/analysis area which would automatically select the pre-configured print area and print size. Alternatively, the user may follow the customary steps of printing in the Lotus environment.

In addition to the report generation capability, Lotus 1-2-3 programs (macros) have also been developed for providing analysis capability. For example, the user may interactively develop alternative future projections of operations at the Miami International Airport and compare those with historic trends and official projections. Exhibits A-5 and A-6 provide samples of analysis results in Lotus 1-2-3, that are pre-configured to be generated as a report.

The user may generate additional reports/analysis in the Lotus environment. If desired, the reports drop-down list may be expanded to include such new reports by editing the corresponding text file under C:\text{VTMS\USER\}} files (e.g., \text{RPTCMS.TXT}) in the Notepad environment.

The following is a list of pre-configured reports accessed by selecting from the reports drop-down list from each of the management systems GUI (see the <u>ITMS Reports</u> document for copies of the reports):

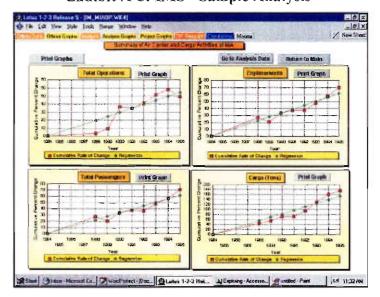
MMP/CMS Reports

- AADT Report
- AWDT Report
- State Roads Vehicle Classification
- Systemwide Performance Measures
- 15 Planning Factors
- Mobility Strategies
- Mobility Strategies Selection & Scoring (allows report generation as well as scoring calculations)
- Corridor Priority Selection & Scoring (allows report generation as well as scoring calculations)

IMS Reports

- Miami International Airport (MIA)
 Operations
- General Aviation Operations

Exhibit A-5: IMS - Sample Analysis



- Port of Miami Operations
- MIA Operations Trend Analysis
- Gen Aviation Operations Trend Analysis
- Port of Miami Operations Trend Analysis
- MIA Operations Projections (allows user-specified input to develop alternative projections)
- Port of Miami Operations Projections (allows user-specified input to develop alternative projections)

PMS Reports

- State Roads List of Prioritized Pavement Deficiencies
- · State Roads List of Work Program Schedule
- Public Works Pavement Condition Survey Results

PTMS Reports

- Metrobus Ridership
- Metromover Ridership
- Metrorail Ridership
- Metrobus Ridership
 - Seasonal Variation
- Metromover Ridership
 - Seasonal Variation
- Metrorail Ridership
 - Seasonal Variation

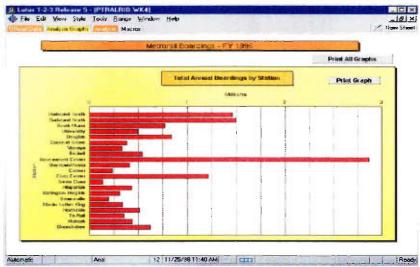
SMS Reports

- Countywide Highest Accident Locations
- State Roads High Accident Segments
- State Roads High Accident Spots

TMS/H Reports

- State Roads Seasonal Volume Factors
- State Roads Seasonal Axle Factors

Exhibit A-6: PTMS - Sample Analysis



Click Documentation Button

The documentation button provides access to the on-line documentation provided with the ITMS program. The documentation consists of majority of the information provided in this final report for ITMS. The user may update this documentation by editing the *C:\VTMS\USER\HELP.TXT* file in the Notepad environment.

Click RCR Analysis Button (MMP/CMS GUI only)

The RCR analysis button on the MMP/CMS GUI launches the relative congestion ratio (RCR) submodule (see Exhibit A-7), and allows the calculation of RCR and other systemwide parameters (see Exhibit 8). All input fields on the GUI initially have the default (official) entries. The user may specify alternate analysis parameters in the Input Variables area of the GUI. The default file paths and file names are also included as tool tips.

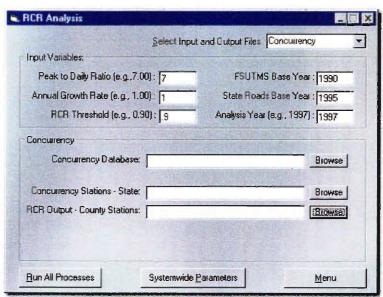


Exhibit A-7: GUI - RCR Analysis

Alternate file paths and names for

input and output files may also be specified on this GUI by using the Browse option. The approximate run-time for this module is 15 minutes, and may vary depending on the computing speed of a computer.

The RCR Analysis module uses the file paths and file names to internally access and analyze the state LOS module database, the concurrency database, and the FSUTMS model database. Based on the

analysis parameters provided in the input variables area of the GUI, the module normalizes the data from the three different databases to correspond to a common analysis year. For each roadway in the database, the RCR Analysis module automatically accesses the

appropriate file and corresponding information record to calculate the RCR and other systemwide parameters. This module's internal record selection logic is based on the analysis procedures established in the Miami-Dade MMP/CMS document. When this module is run with the default (official) file paths and file names, the results are automatically reflected in the views, tables, and layouts of the MMP/CMS ArcView project tile.

The user may test alternatives by changing all or some of the input variables. The base year of the data files should not be changed unless the source databases have been updated to another base year. Upon running this sub-module, the user can view the systemwide parameters on the screen, however, these results are not retained for a subsequent ITMS session. Therefore, the user is encouraged to use the Print Screen key on the keypad to copy and save these results, in a Windows Accessories program such as WordPad.

Close

A-1.4 Data Input/Update Procedures

Exhibit A-9 shows the Data
Input/Update GUI. The following general steps should be followed for data input/update:

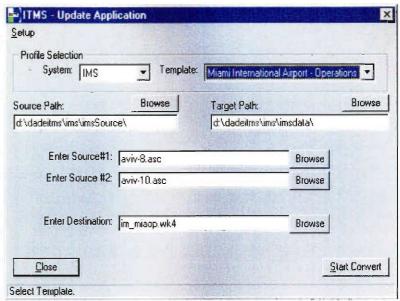
Exhibit A
Exhibit A
Exhibit A
Exhibit A
Frofile Selection

System: Truce

- Step 1. Obtain data from the source agency.
- Step 2. Ensure that the format of the source data is compatible with the ITMS program.

 For the purpose of developing the data input/update application, it Select Template.

Exhibit A-9: GUI - Data Input/Update



was assumed that the provider (or source) agencies would continue to use the current filename and data formats. Minor variations, such as changes to the file name, are allowed by the data input/update application.

- Step 3. Make backup of the current versions of the input and output files. This would ensure against inadvertent data loss as well as facilitate historic comparisons, if desired.
- Step 4. From the Windows Start button, go to the Programs list, and select Convert to launch the Convert program GUIs.
- Step 5. Select the Data Input/Update button which launches the GUI for specifying the source file path (input) and target file path (output).
- Step 6. Upon selecting a system and a template, the remaining fields automatically retrieve the default file paths and filenames.
- Step 7. Click the Start Convert button.

A-1.5 Data Inventory

The data inventory included in Exhibit A-1 provides an easy and convenient reference for the user to identify the various data items included in the ITMS. Further, for future updates and/or adjustments to the data, the user should refer to this list for contacting the source agency to request the data. The type of transfer media used has also been included, however, an equivalent transfer media would be also sufficient. For example, files that were downloaded from the FDOT mainframe computer can be obtained via electronic mail or on a diskette. In developing the ITMS program, it was assumed that the various source agencies would continue to maintain their data in the current formats.

Exhibit A-10
rated Transportation Management System (ITMS) - Data Inventors

Integrated Transportation Management System (ITMS) - Data Inventory							
Data Description	ITMS Component	ITMS Data File Name	Source Data File Name	Source Agency/ Transfer Protocol			
		imsrailterm.dbf		-			
Amtrak Terminal	IMS	imsrailterm.shp	Developed by DPA/TPS				
		imsrailterm.dbf					
		imsbike.dbf	Developed by DPA/TPS Derived from MPOs Bikeways Database				
Bikeways	IMS	imsbike.shp					
		imsbike.shx					
		daderoad.dbf	Developed I	by DPA/TPS			
Freight Roadway Network	IMS	daderoad.shp	Derived from MPO	s Freight Movement			
		daderoad.shx	Str	ıdy			
General Aviation -	IMS	im_genav.wk4	aviv-9.asc	Miami-Dade County Planning			
Operations			aviv-11.asc	Department/ Diskette			
		imsi_citybus.dbf	Developed by DPA/TPS				
Intercity Bus Terminals	IMS	imsi_citybus.shp					
		imsi_citybus.shx		<u> </u>			
		imsairpoly.dbf	Developed by DPA/TPS				
Major Airports	IMS	imsairpoly.shp					
		imsairpoly.shx		_			
		imsseaport.dbf	Developed by DPA/TPS				
Major Seaports	IMS	imsseaport.shp					
	-	imsseaport.shx					
		imsfreight.dbf	Developed by DPA/TPS				
Major Truck Terminals	IMS	imsfreight.shp					
		imsfreight.shx					
Miami International Airport -	port - IMS	im miaop.wk4	aviv-8,asc	Miami-Dade County Planning			
Operations			aviv-10.asc	Department/ Diskette			

Exhibit A-10 (Continued)
Integrated Transportation Management System (ITMS)

Integrated Transportation Management System (ITMS) - Data Inventory							
Data Description	ITMS Component	ITMS Data File Name	Source Data File Name	Source Agency/ Transfer Protocol			
Port of Miami - Operations	IMS	im_port.wk4	ix-34.asc	Miami-Dade County Planning Department/ Diskette			
Railroad - Highway	D.40	imsrailxng.dbf	imsrrxng.txt	FDOT/			
Grade Crossing Hazards	IMS	imsrci253_xng.dbf	rci253.txt	DOTNET			
		imsrail.dbf	arail.dbf				
Railroad Network	IMS	imsrail.shp	arail.shp	ITD/FPL/ Diskette			
		imsrail.shx	arail.shx	Diskono			
_		imstrirailstn.dbf					
Tri-Rail Stations	IMS	imstrirailstn.shp	Developed by DPA/TPS				
		imstrirailstn.shx					
Concurrency Data	MMP/CMS	cco_conc.dbf	plummer2.dat	MDCPWD- Concurrency Office/Tape/ Diskette			
County StationsState Stations		csr_conc.dbf					
Corridor Priority 15 Planning Factors	MMP/CMS	ccoridor.wk4	Developed by DPA				
FSUTMS Modei		cfsutms.dbf	nwork90.dbf result90.dbf	FDOT/ GIS-TM			
Data	MMP/CMS	cfsutms.shp	nwork90.shp	Software			
		cfsutms.shx	nwork90.shx				
Mobility Strategies	MMP/CMS	cmobilty.wk4	Developed by DPA				
State Roads - LOS Module		csr_fihs.dbf	sd6mrn95.dbf	FDOT/			
FIHS RoadwaysNon FIHS Roadways	MMP/CMS	csr_nfihs.dbf	srd6a95.dbf	Diskette			

Exhibit A-10 (Continued)

Integrated Transportation Management System (ITMS) - Data Inventory

Data Description	ITMS Component	ITMS Data File Name	Source Data File Name	Source Agency/ Transfer Protocol
_		pmsdade.dbf	Developed by DPA/TPS Derived from MDCPWD Data	
County Roads - Pavement Condition Survey	PMS	pmsdade.shp		
		pmsdade.shx		
State Roads - Number of	DMC		rci212.txt	FDOT/
Lanes	PMS	pmsrci212_nlane.dbf	heft212.txt	DOTNET
State Roads - Prioritized	DMC	pmspcpri.dbf	pc96pri.dbf	FDOT/
Deficiencies	PMS	pmspcpri.wk4	pc96pri.wk4	Diskette
		pmspcndl.dbf	pvcnd_l.dbf	
State Roads - Surveyed Deficiencies	PMS	pmspcndr.dbf	pvcnd_r.dbf	FDOT/ Diskette
		pmspcndc.dbf	pvcnd_c.dbf	Biokowo
State Roads - Work Program Scheduling	PMS	pmspcwrk.dbf	pc96wrk.dbf	FDOT/
		pmspcwrk.wk4	pc96wrk.wk4	Diskette
		ptbusmaint.dbf		
Metrobus Maintenance Facility	PTMS	ptbusmaint.shp	Develope	d by DPA/TPS
		ptbusmaint.shx		
Metrobus - Ridership	PTMS	ptbusride.wk4	bus96.wk4	MDTA/ Diskette
-	s Routes PTMS	ptabusrout.dbf	abusrout.dbf	
Metrobus Routes		ptabusrout.shp	abusrout.shp ITD/ CD-ROM	
		ptabusrout.shx	abusrout.shx	

Exhibit A-10 (Continued)
Integrated Transportation Management System (ITMS) - Data Inventory

Integrated Transportation Management System (ITMS) - Data Inventory							
Data Description	ITMS Component	ITMS Data File Name	Source Data File Name	Source Agency/ Transfer Protocol			
		ptlbusstop.dbf	lbusstop.dbf				
Metrobus Stops	PTMS	ptlbusstop.shp	lbusstop.shp	ITD/ CD-ROM			
		ptlbusstop.shx	lbusstop.shx				
		ptmovermaint.dbf					
Metromover Maintenance Facility	PTMS	ptmovermaint.shp	Developed	by DPA/TPS			
		ptmovermaint.shx		_			
Metromover - Ridership	PTMS	ptmovrride.wk4	mover96.wk4	MDTA/ Diskette			
		ptlmmovrst.dbf	lmmovrst.dbf				
Metromover Stations	PTMS	ptlmmovrst.shp	lmmovrst.shp	ITD/ CD-ROM			
		ptlmmovrst.shx	lmmovrst.shx	OD ROM			
Metromover System	PTMS	ptammover.dbf	ammover.dbf				
		ptammover.shp	ammover.shp	ITD/ CD-ROM			
		ptammover.shx	ammover.shx	OD ROM			
		ptmrailmaint.dbf	Developed by DPA/TPS				
Metrorail Maintenance Facility	PTMS	ptmrailmaint.shp					
		ptmrailmaint.shx					
Metrorail - Ridership	PTMS	ptrailride.wk4	rail96.wk4	MDTA/ Diskette			
		ptlmrailst.dbf	lmrailst.dbf				
Metrorail Stations	PTMS	ptlmrailst.shp	lmrailst.shp	ITD/ CD-ROM			
		ptlmrailst.shx	lmrailst.shx				
		ptamrail.dbf	amrail.dbf				
Metrorail System	PTMS	ptamrail.shp	amrail.shp	ITD/ CD-ROM			
		ptamrail.shx	amrail.shx	OD ROM			

Exhibit A-10 (Continued)
Integrated Transportation Management System (ITMS) - Data Inventory

Data Description	ITMS Component	ITMS Data File Name	Source Data File Name	Source Agency/ Transfer Protocol	
_,		sbk9294cr.dbf			
Bicycle Crashes 1992-1994	SMS	sbk9294cr.shp	Developed by DPA/TPS Derived from MPOs Database		
		sbk9294cr.shx			
		sbikecr97.dbf	Developed by DPA/TPS Derived from MPOs Database		
Bicycle Crashes 1997	SMS	sbikecr97.shp			
		sbikecr97.shx		, .	
		spmun.dbf			
City Police Departments	SMS	spmun.shp	pmun.dxf	ITD/Email, Diskette	
		spmun.shx			
Elderly Drivers Crashes	SMS	sheld2595.dbf	held2595.dbf	FDOT/ DOTNET	
Fire Stations	SMS	slfirest.dbf	lfirest.dbf		
		slfirest.shp	lfirest.shp	ITD/ CD-ROM	
		slfirest.shx	lfirest.shx		
Trick Assidant Landing	SMS	scrascty.dbf		Developed by DPA/TPS ed from Miami-Dade County anning Department Data	
High Accident Locations	21/12	scrascty.wk4			
		slhrshosp.dbf	lhrshosp.dbf		
Hospitals	SMS	slhrshosp.shp	lhrshosp.shp	ITD/ CD-ROM	
		slhrshosp.shx	lhrshosp.shx		
		slmdpdcty.dbf	lmdpdcty.dbf		
Miami-Dade Police Department	SMS	slmdpdcty.dbf	lmdpdcty.shp	ITD/ CD-ROM	
		slmdpdcty.dbf	lmdpdcty.shx		

Exhibit A-10 (Continued)

Integrated Transportation Management System (ITMS) - Data Inventory

Integrated Transportation Management System (ITMS) - Data Inventory							
Data Description	ITMS Component	ITMS Data File Name	Source Data File Name	Source Agency/ Transfer Protocol			
Night Time Crashes	SMS	shnit5095.dbf	hnit5095.txt	FDOT/ DOTNET			
		sped9294.dbf					
Pedestrian Crashes 1992-1994	SMS	sped9294.shp	Developed by DPA/TPS Derived from MPOs Database				
		sped9294.shx	2011.00 HOM 111 OS Dutubuse				
		spedcr97.dbf		D.D. 4 7000			
Pedestrian Crashes 1997	SMS	spedcr97.shp		oy DPA/TPS MPOs Database			
		spedcr97.shx					
State Roads - High	SMS	ssrhseg.dbf	srhseg95.txt	FDOT/			
Accident Segments	51410	ssrhseg.wk4	Siliseg/J.ixt	DOTNET			
State Roads - High	SMS	ssrhspot,dbf	srhspo95.txt	FDOT/			
Accident Spots	SIVIS	ssrhspot.wk4	sinsposs.ixt	DOTNET			
Wet Weather Crashes	SMS	shwet5095.dbf	hwet5095.txt	FDOT/ DOTNET			
	TMS/H	pcommiss.dbf	pcommiss.dbf				
County Commission Districts		pcommiss.shp	pcommiss.shp	ITD/ CD-ROM			
		pcommiss.shx	pcommiss.shx	02 1(0.11			
County Traffic Count Stations - AWDT	TMS/H MMP/CMS	tawdt.dbf cawdt.wk4	1995awdt.doc MDCPWD/ Diskette				
		pmunicwt.dbf	pmunicwt.dbf				
County Municipal Boundaries	TMS/H	pmunicwt.shp	pmunicwt.shp	ITD/ CD-ROM			
Doundaries	_	pmunicwt.shx	pmunicwt.shx	CD-ROM			
Daily Truck Percentage	TMS/H MMP/CMS	tvehclas.dbf cvehclas.wk4	Developed by DPA/TPS Derived from FDOT Vehicle Classification Data				
Estimated Right-of-way	TMS/H	trcil18_row.dbf	rci118.txt	FDOT/ DOTNET			
FDOT Basemap	TMS/H	LRS Files	FDOT - ARC/INFO Roadway Coverage/Diskette				
Federal and State	TNACAL	. :101 6 11 6	rci121.txt	FDOT/			
Functional Classification	TMS/H	trci121_func.dbf	heft121.txt	DOTNET			

Exhibit A-10 (Continued)

Integrated Transportation Management System (ITMS) - Data Inventory

Data Description	ITMS Component	ITMS Data File Name	Source Data File Name	Source Agency/ Transfer Protocol	
_		daderoad.dbf	amajor.dbf	ITD/CD DOM	
ITD Basemap	TMS/H	daderoad.shp	amajor.shp	ITD/CD-ROM Further Modified	
		daderoad.shx	amajor.shx	by DPA/TPS	
			rcill1.txt	FDOT/	
State Highway System	TMS/H	trci111_sr.dbf	heft111.txt	DOTNET	
			87_ptms.txt	FDOT/	
State Traffic Count	TMS/H	taadt.dbf	87_ttms.txt	Diskette	
Stations - AADT	MMP/CMS caadt.dbf	t87_heft.dbf	Developed by DPA		
State Roads - Seasonal Axle Factors	TMS/H	taxlefac.wk4	87_axwoy.txt	FDOT/ Diskette	
State Roads - Seasonal Volume Factors	TMS/H	tvolfact.wk4	87_svwoy.txt	FDOT/ Diskette	
		daderoad.dbf		-	
State Roads - Traffic Monitoring Sites	TMS/H	daderoad.shp	Developed by DPA/TPS Derived from FDOT Data		
Workering Siess		daderoad.shx			
		ptaz1992.dbf	ptaz1992.dbf		
Traffic Analysis Zones	TMS/H	ptaz1992.shp	ptaz1992.shp	ITD/ CD-ROM	
		ptaz1992.shx	ptaz1992.shx	02 110111	
		tlsigs.dbf	lsigs.dbf		
Traffic Signals	TMS/H	tlsigs.shp	lsigs.shp	ITD/ CD-ROM	
		tlsigs.shx	lsigs.shx	02 NO.11	

PMS:

N	n	t۵	c		
	<u> </u>	<u></u>	<u>3</u>	٠	

DPA: David Plummer and Associates TPS: Transportation Planning Services MPO: Metropolitan Planning Organization

Information Technology Department ITD:

FDOT: Florida Department of Transportation DOTNET: FDOT Mainframe

FPL: MDCPWD: Miami-Dade County Public Works

Florida Power and Light Department

MDTA: Miami-Dade Transit Agency

Intermodal Management System IMS: MMP/CMS: Mobility Management Process/

Congestion Management System Pavement Management System

Public Transportation Management System PTMS: Safety Management System SMS:

TMS/H: Traffic Monitoring System for Highways

Linear Referencing System LRS:

APPENDIX B Literature Review



B-1.0 LITERATURE REVIEW

The literature review focused on the six management systems (MMP/CMS, IMS, PMS, SMS, PTMS & TMS/H) for which the ITMS system is being developed. The literature related to BMS was also reviewed to understand its requirements because the general intent is to eventually integrate all seven management systems.

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- 6. Comparing Ranking and Optimization Procedures for the Texas Pavement Management Information System, by Felipe Zambrano, Tom Scullion, and Roger Smith, Texas Transportation Institute, Texas A&M University System, November 1995.
- 7. <u>Congestion Management Case Studies</u>, Metropolitan Planning Technical Report, U. S. Department of Transportation, September 1995.
- 8. <u>Dade County Mobility Management Process/Congestion Management System Report, Miami-Dade County MPO</u>, 1996.
- 9. <u>Development of a Prototype Integrated Management System</u>, by F. Thomas Creasey and Albert Dominguez, Institute of Transportation Engineers (ITE) Conference Technology Tools for Transportation Professionals, April 1995.
- 10. <u>Draft Technical Memorandum: Task 5 Scope of Services for Design and Development of Systems, Phase I Management Systems Foundation, FDOT District Six, March 1994.</u>
- 11. FDOT Bridge Management System Work Plan, November 1995.

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- 13. FDOT Intermodal Management System Work Plan, Rail Office-Ports/Intermodal Section, December 1994.
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- 15. FDOT Pavement Management System Work Plan, December 1994.
- 16. FDOT Safety Management System Work Plan, December 1994.
- 17. Florida's Intermodal Planning Process, March 1994.
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- 19. Freight Movement Study, Miami-Dade County Metropolitan Planning Organization, December 1996.
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- 21. <u>Integrated Management System Preliminary Draft Work Plan</u>, FDOT District Six, October 1994.
- 22. <u>Integrated Transportation Management Systems Definition of the Concept</u>, by Thomas Urbanik II, Texas Transportation Institute, The Texas A&M University System, March 1995.
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- 24. <u>Metrobus, Metrorail, Metromover, and Paratransit Ridership Technical Reports, Miami-Dade Transit Agency</u>, 1995 1997.
- 25. Miami-Dade Bicycle Facilities Plan, Metropolitan Planning Organization, July 1995.
- 26. Michigan DOT CMS, IMS, PMS, PTMS, BMS, SMS Workshops Material, 1993.
- 27. <u>Michigan DOT Streamlines Project Management with Desktop Data System</u>, *Roads and Bridges* magazine, March 1995.

- 28. <u>Multimodal ITMS: From Integrated Traffic Management to Integrated Transportation Management, Texas Transportation Institute.</u>
- 29. Pavement Deficiency Analysis, FDOT District Six, August 1996.
- 30. <u>Pavement Management System Distress Identification Manual</u>, *Miami-Dade County Public Works Department*, February 1997.
- 31. Proceedings of Management Systems Integration Committee, January 1996 and March 1996.
- 32. <u>Stronger Intermodal Policy Urged and The Intermodal Connection</u>, *Transport Topics*, August 1994.
- 33. System Engineering A Short Course in the Obvious.
- 34. <u>Technical Memorandum: Definition of the Integrated Management System Process. Phase I-Management Systems Foundation</u>, *FDOT District Six*, August 1995.
- 35. <u>Technical Memorandum: Intermodal Management System Final Work Plan and Responses</u> to Work Plan Comments, December 1994.
- 36. <u>Technical Memorandum: Phase I Management Systems Foundation, Tasks 1, 2 & 3, FDOT District Six</u>, January 1994.
- 37. Technical Memorandum: Revised Tasks 3 & 4 (of Phase II), FDOT District Six, January 1996.
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- 39. <u>Technical Memorandum: Traffic Monitoring Sites for Highways Proposed Work Plan,</u> August 1994.
- 40. <u>The Integration of Transportation Information, Final Report of the Management System Integration Committee</u>, June 1998.
- 41. <u>Transportation Infrastructure: States' Implementation of Transportation Management Systems, United States General Accounting Office, January 1997.</u>
- 42. <u>Transportation Management Systems Project Manual</u>, Missouri Highway & Transportation Department.

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