Transportation Data Management System

Executive Summary

15% 4%

15%

20%

11%

12%

Number of Units

700
600
500
400
300
200
100
0

1991
1992
1993
1994
1995
1996
1997

January   February   March

52 GOULDS

NEWSPLEX

dpa

METROPOLITAN PLANNING ORGANIZATION

MPO

IDAS

INTERNATIONAL
DEVELOPMENT
ADVISORY
SERVICES
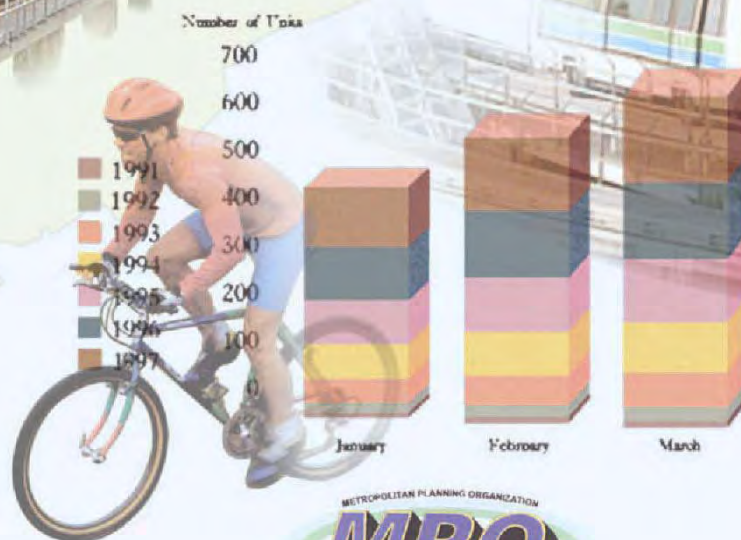
Executive Summary

Background

A disparate array of transportation-related information in a variety of formats and assorted media were available from numerous locally involved federal, state, and local public and private agencies. Travel demand model input data, and limited output data were available in yet other formats. Various efforts are being pursued by other agencies in order to make transportation-related data easily accessible and useable. Although the data is available, there is a need for developing a tool capable of centralizing the information.
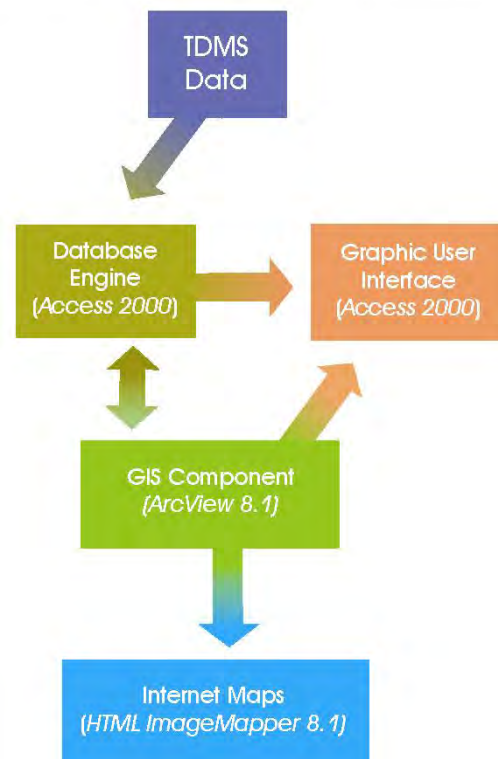
Objective

The objective of this project was to develop and implement a flexible, expandable, computer-based electronic database. As a result of this project, the database now resides at the Miami-Dade Metropolitan Planning Organization (MPO). The database holds transportation-related information that allows statistical, temporal, and geographic analysis. These data have been assembled into a product called the Transportation Data Management System (TDMS). The system is capable of generating reports in tabular, chart and/or map formats. The information in the system can then be used in reports, handouts, presentation exhibits, electronic presentations, and/or for publishing onto the Internet. The TDMS will facilitate both the analysis of available transportation information, as well as the preparation of materials in response to inquiries from elected officials, transportation agencies and/or the general public.

Concept/Structure/Software

The TDMS assembled a central database with a multitude of transportation data readily available, in digital format, from various sources. In addition to the traditional text and numeric tabular data, the system also includes graphic images, drawings, pictures, aerial photography, maps, charts and complete electronic (PowerPoint) presentations.

TDMS Components/Relationships

TDMS Data

Database Engine (Access 2000)

Graphic User Interface (Access 2000)

GIS Component (ArcView 8.1)

Internet Maps (HTML ImageMapper 8.1)

The data has been set-up to be accessible through the combined use of mainstream database and Geographic Information System (GIS) software packages (Microsoft Access 2000 and ESRI ArcView 8.1, respectively). These programs also interface with software that creates Internet-ready maps (Alta4's HTML ImageMapper 8.1). Additionally, numerous other forms of output are available for the desired data and analysis.

Also built-into the TDMS are a Graphic User Interface (GUI) and a module with several transportation Models/ Applications. The GUI has limited data manipulation capabilities but greatly simplifies access to the most commonly used information in the system. The Models/Applications module centralizes various task-specific models such as the FSUTMS GIS-TM (for the conversion of FSUTMS data into GIS format), various GIS-based applications developed by FDOT, and the Integrated Transportation Management System - ITMS (another data-intensive GIS application previously developed by the MPO).
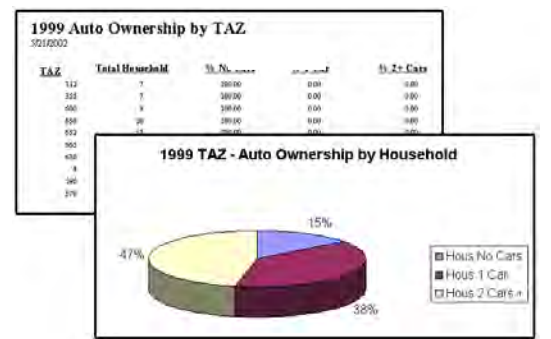
Hardware

The heart of the TDMS is a high power computer with excellent speed, storage capacity, graphic capabilities and input/output devices. Additional hardware that complements the various functions of the system includes a scanner, an LCD projector and a digital camera.

The computer was used during system development to ensure proper installation of all the peripheral
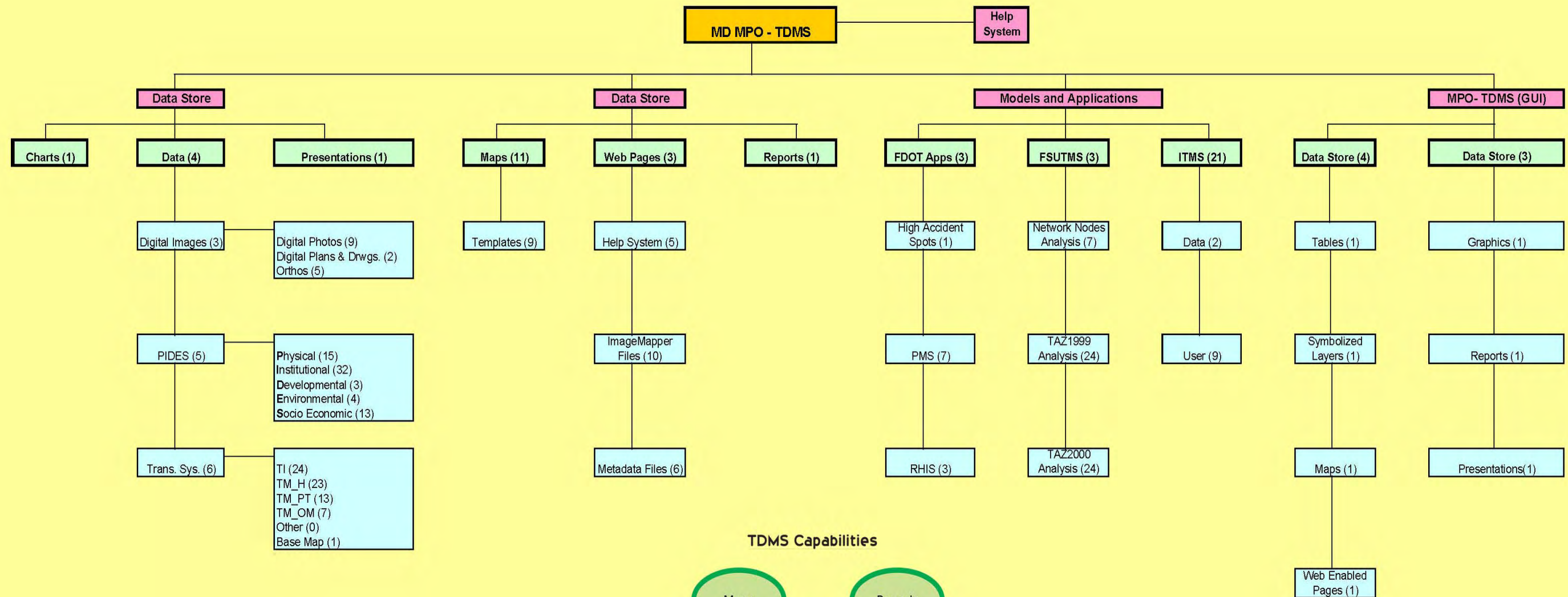
hardware and software as well as the data. This approach provided ample opportunity for testing the system in its entirety to further assure the MPO that the system was fully operational at project completion when the system was turned over to the MPO. The hardware was also used for the continuous hands-on training of MPO personnel. The training, therefore, was done under the exact same setup that the system had at project completion.

Capabilities/Features

Given the extensiveness of the capabilities and the data in the system, only an overview and general descriptions of the system capabilities are provided below. No attempt has been made to provide a complete listing of data or system output options. These will continue to change and grow over time. Additionally, the flowchart gives more detailed information about the available data that can be manipulated through TDMS. A complete picture of the system's contents is best obtained by reviewing the system itself. The Training Manual contains examples of how selected products and outputs can be assembled from the information in the system.

Miami-Dade MPO
Transportation Data Management System

MD MPO - TDMS — **Help System**

Data Store | **Data Store** | **Models and Applications** | **MPO- TDMS (GUI)**

| Charts (1) | Data (4) | Presentations (1) | Maps (11) | Web Pages (3) | Reports (1) | FDOT Apps (3) | FSUTMS (3) | ITMS (21) | Data Store (4) | Data Store (3) |

Data (4) branch:
- Digital Images (3)
  - Digital Photos (9)
  - Digital Plans & Drwgs. (2)
  - Orthos (5)
- PIDES (5)
  - Physical (15)
  - Institutional (32)
  - Developmental (3)
  - Environmental (4)
  - Socio Economic (13)
- Trans. Sys. (6)
  - TI (24)
  - TM_H (23)
  - TM_PT (13)
  - TM_OM (7)
  - Other (0)
  - Base Map (1)

Maps (11) branch:
- Templates (9)

Web Pages (3) branch:
- Help System (5)
- ImageMapper Files (10)
- Metadata Files (6)

FDOT Apps (3) branch:
- High Accident Spots (1)
- PMS (7)
- RHIS (3)

FSUTMS (3) branch:
- Network Nodes Analysis (7)
- TAZ1999 Analysis (24)
- TAZ2000 Analysis (24)

ITMS (21) branch:
- Data (2)
- User (9)

Data Store (4) branch:
- Tables (1)
- Symbolized Layers (1)
- Maps (1)
- Web Enabled Pages (1)

Data Store (3) branch:
- Graphics (1)
- Reports (1)
- Presentations (1)

TDMS Capabilities

TDMS connects to: Maps, Reports, Presentations, Statistical Analysis, Digital Image, Charts/Graphs

Legend:
- FSUTMS: Florida Standard Transportation Modeling Structure
- GUI: Graphic User Interface
- ITMS: Integrated Transportation Management System
- MD: Miami-Dade
- MPO : Metropolitan Planning Organization
- Ortho: Aerial Photos
- PMS: Pavement Management System
- RHIS: Railroad / Highway Inventory System
- TAZ: Traffic Analysis Zone
- TDMS: Transportation Data Management System
- TI: Transportation Infrastructure
- TM_H: Travel Mode - Highway
- TM_OM: Travel Mode - Other Means
- TM_PT: Travel Mode - Public Transportation
- (x): Number of files. Most files will contain multiple fields and / or layers.
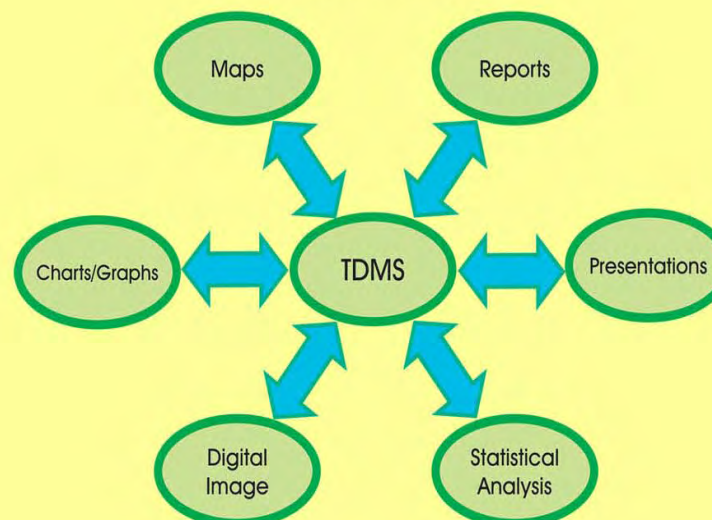
This assembly process will be needed from time to time as more data is added to the system. Templates for various types of common outputs are already included in the TDMS. Additionally, the original software documentation for both Access and ArcView contain all the information needed to assemble those products as well.

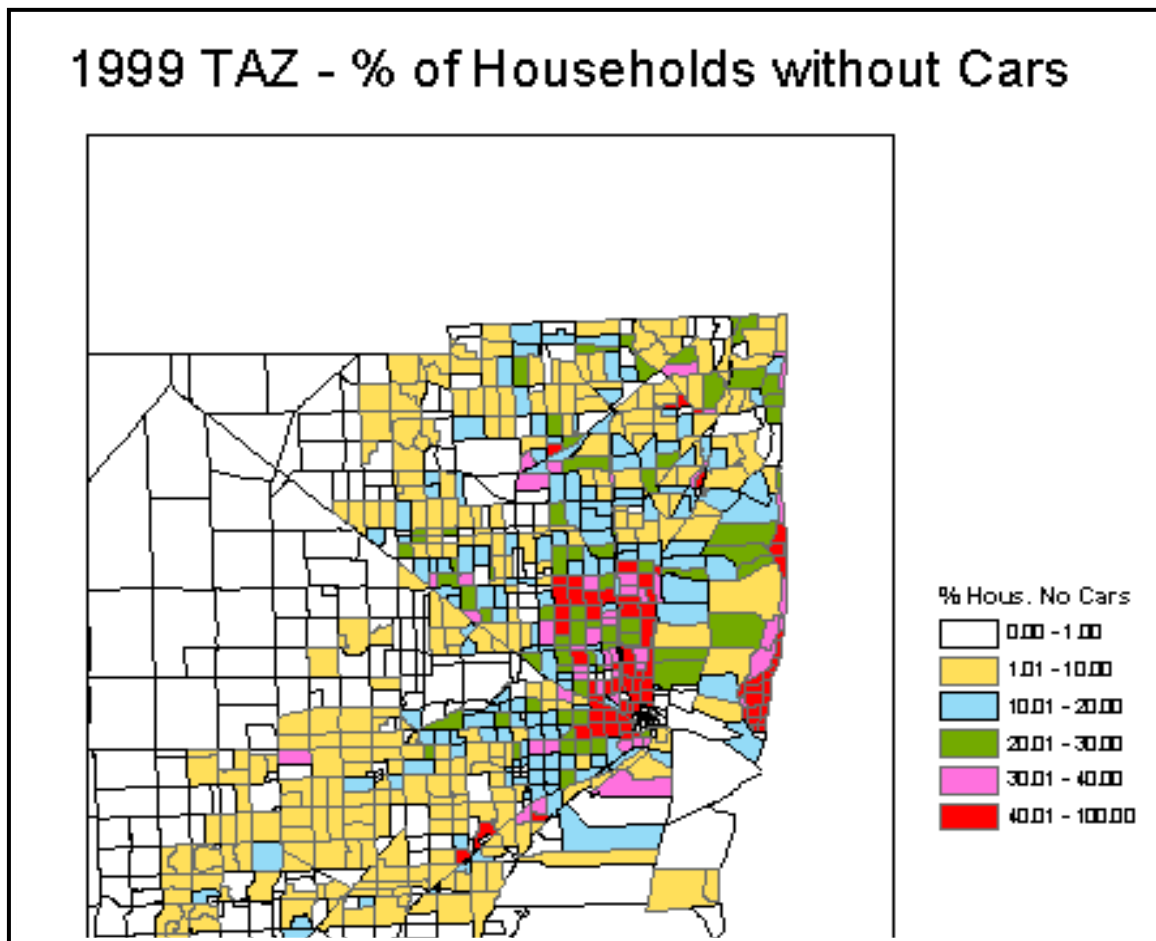The main capabilities and features of the system are listed below:

Capabilities

- Maps
- Reports
- Charts/Graphs

- Presentations
- Digital Images
- Internet Maps
- Statistical Analysis

Features

- GIS/Data Integration
- Graphic User Interface
- Ease of Use
- Easy Data Input/Accessibility
- Compatibility with Existing Databases
- Expandability
- Built-in Data Documentation (Metadata)

1999 TAZ - % of Households without Cars

% Hous. No Cars	
	0.00 – 1.00
	1.01 – 10.00
	10.01 – 20.00
	20.01 – 30.00
	30.01 – 40.00
	40.01 – 100.00

Web Map- Bicycle Routes & Paths

35000 ft

System Support

The training provided as part of this project was extensive. This training took two different forms: a) continuous hands-on training of MPO staff throughout the system development stage, and b) one half-day product orientation/hands-on demonstration sessions at project completion. Additionally, a training manual was developed to aid in the training of other MPO staff that may get involved with the TDMS in the future.

The level of training provided in this project was sufficient to allow the MPO to use the system within the parameters that it was created for. From time to time, however, the MPO may want to expand on the utilization and/or may run into special circumstances where technical assistance may be needed.

System maintenance includes both keeping the system running smoothly as well as major updates that may be needed from time to time. MPO staff is trained to handle most of the routine maintenance. However, major system overhauls, updates or changes may be more effectively carried out by the consultant's team. This type of assistance may also be needed when other priorities prevent the MPO staff from performing the needed maintenance or when the amount of staff needed and/or the deadline are critical factors.

Other Documentation

The following documents represent additional information that explain, in more detail, the development and structure of the system, available data and sources, software capabilities and use, etc.

- Executive Summary
- Final Report
- Training Manual
- PowerPoint Presentation
- Access 2000 Documentation
- ArcView 8.1 Documentation
- HTML ImageMapper Manual

These documents were delivered to the MPO as part of the final product package.

**For further information regarding the
Transportation Data Management System (TDMS)
please contact:**

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