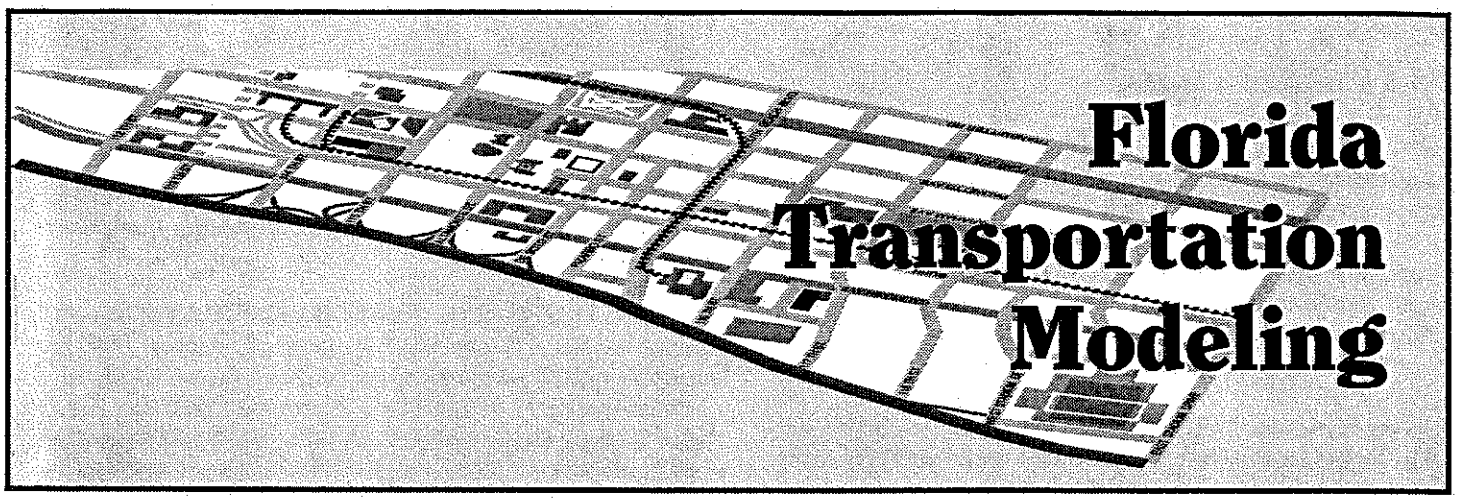

Volume 4 April 1997

In This Issue

Model Task Force Technical Team to meet April 9

The Model Task Force Technical Team will meet for the first time in over a year to discuss the results of several modeling research projects performed on behalf of the task force. The meeting has been set for the following time and place:

1997 MODEL TASK FORCE TECHNICAL TEAM MEETING
Wednesday, April 9, 1997 (9:30 - 4:00)
FDOT District 5 Orlando Urban Office
5151 Adanson Street, 2nd Floor (Conference Room)

The following day, Thursday, April 10, the **GIS for Transportation Models (GIS-TM)** Subcommittee of the Model Task Force will meet at the same location, from 8:30 to 3:30pm.

The agenda at Wednesday's Model Task Force meeting will include the following:

- Update on Statewide Modeling Efforts and Federal TMIP
- Two-Digit Area Type/Facility Type Coding Definitions, SPDCAP Table, and Multiple BPR Curves
- District 4 Enhanced Life Style Trip Generation Model Research Project
- Demonstration of FSUTMS/ArcView Conversion Program
- Status Report on ZDATA2 Development Study

Several other modeling issues will be discussed in a round table format:

- Initiating the Freight Modeling Subcommittee (see below)
- Converting the Statewide Model into FSUTMS Universal Menu Structure
- Site Impact Manual Progress Report
- RISC Platform -- Upgrade Operating System or Switch to X32?
- Establishing a Central Repository for Data on DOT Mainframe or FTP Server
- Internet or Intranet Page for the Model Task Force
- Electing Model Task Force Chairs

GIS-TM Subcommittee Meeting

As indicated above, the "GIS for Transportation Models" (GIS-TM) Subcommittee of the Model Task Force will hold its first face-to-face meeting the day after the Model Task Force Technical Team meets. The GIS-TM Subcommittee will discuss the current status of GIS in the Department, future directions, issues, and needs around the state. Several demonstrations will be presented, showing several applications of how GIS is helping transportation planners today. Anyone interested in GIS issues is invited to attend the meeting.

Questions about the GIS-TM subcommittee and its upcoming meeting should be directed to Vidya Mysore of the FDOT Systems Planning Office in Tallahassee: (904) 922-0444.

Freight Modeling Subcommittee Initiation

The Systems Planning Office conducted an FSUTMS training workshop survey at the end of last year. Around 50% of the respondents indicated that they would like to attend the Freight Modeling Workshop. We have also received various inquiries regarding freight modeling. ISTEA requires that States and MPOs consider urban freight in their long range plans. However, most Florida agencies have little experience with freight modeling. This deficiency indicated the need to form a Model Task Force Freight Modeling Subcommittee. The new subcommittee will serve as a forum for modeling practitioners to discuss and seek guidance on technical and policy issues regarding freight modeling. The subcommittee can also help planners locate available data and freight-related forecasts and provide techniques and parameters to develop commercial trip tables. For more information or to volunteer to serve on this subcommittee, call Huiwei Shen at (904) 488-4642.

Tech Notes

By: Harry Cramling, Systems Planning Office

FSUTMS, Version 5.20 (X32 only) was shipped to all Version 5.10 users licensed through the Systems Planning Office. This was necessary because the rounding of real numbers is handled differently with current compilers than in the past. For example, a highway link having a speed of 40 miles per hour (1.5 minutes per mile) and a length of .75 miles would have a travel time of 1.125 minutes. Previous versions rounded this to 1.13 minutes, while version 5.10 rounded to 1.12 minutes. This does not seem very significant and usually caused only minor differences. However, in rare cases, corridor traffic could be sufficiently altered so as to have significant impact.

Version 5.20 supports selected link and selected zone analysis in areas that utilize the Toll Facilities Model **without HOV** present. The TranPlan Manual incorrectly states that "Load Selected Links" must not be specified if the toll model is used.

TMIP

TRANSIMS capabilities demonstrated at TRB meeting

by Ram M. Pendyala, Civil & Environmental Engineering, Univ South Florida

As part of Track C of the federal Travel Model Improvement Program (TMIP), researchers at the Los Alamos National Laboratories (LANL) are in the midst of a multiyear effort to develop a new generation of integrated travel demand forecasting and air quality analysis tools called TRANSIMS. TRANSIMS analyzes travel demand at a very disaggregate level, focusing on modeling the behavior of the individual traveler making trips and the individual vehicle using the transportation network. TRANSIMS simulates the movements of individual travelers and vehicles on a second-by-second basis, thus allowing an extremely detailed analysis of transportation network performance and air quality.

The development of TRANSIMS has been going on for a little over two years, and for the first time, professionals from around the world were given a glimpse of the future of travel demand modeling at the recent Transportation Research Board (TRB) meeting in Washington D.C. In concert with Muse Technologies, a firm that specializes in three-dimensional computer visualization, LANL demonstrated the traffic network microsimulator module of TRANSIMS using an impressive array of hardware and software capabilities. Using a portion of the highway network of the Dallas-Fort Worth metropolitan area (the site of the first Interim Operational Capability test of TRANSIMS), LANL demonstrated how TRANSIMS could simulate the movements of individual vehicles and travelers on a second-by-second basis. The three-dimensional computer visualization capability provided by Muse Technologies allowed one to observe the formation, dissipation, and movement of shockwaves as traffic volumes varied on individual links of the network.

LANL is now wrapping up the first Interim Operational Capability (IOC) test of TRANSIMS and is putting finishing touches on the traffic network microsimulator module. The TRANSIMS development effort is now moving to the next phase with an IOC test planned for Portland, Oregon. This IOC test will focus on the development, refinement, and application of the intermodal route and travel planner module of TRANSIMS. Given a set of activities (and therefore, trips) that a person needs to pursue in a day, this module determines route plans (travel itineraries) that the person is likely to follow in order to accomplish those activities. As the person (traveler) implements the route plans over the course of an entire day, one or more activities may be dropped, added, or rescheduled. At this time, TRANSIMS does not have an activity generation module and therefore develops sets of activities (to use as input to the travel planner) randomly. The formulation of an activity generation module is a future task in the overall TRANSIMS development effort.

TMIP to consider beta testing interim products in Miami

by Bob McCullough, FDOT Systems Planning Office

The USDOT's Travel Model Improvement Program (TMIP) has embarked on a long-term multi-year effort aimed at developing the next generation of multimodal travel modeling tools by contracting with the Los Alamos National Laboratories (LANL) to develop the Transportation Analysis and Simulation System (TRANSIMS). While the delivery of TRANSIMS in a form that is ready for implementation is still several years away, several interim products are now available from LANL and the TMIP.

The Travel Model Improvement Program is interested in applying and testing these products in a controlled laboratory environment using real-world data. If the products successfully complete extensive testing, it is anticipated that these products would be distributed widely to state and local transportation agencies in the country. In this context, the Federal Highway Administration and the Federal Transit Administration (major sponsoring agencies of TMIP) have expressed interest in beta testing the products using the Miami urbanized area as a test site. It is felt that Miami, with its multi-cultural, multimodal, and diverse land use system, would serve as an ideal urban environment for testing products that would be part of the next generation of travel demand forecasting tools.

At this time, the Systems Planning office of FDOT is holding discussions with TMIP, the Dade County MPO, and the FHWA regional office to see how best these beta-testing efforts could be coordinated and conducted while ensuring sufficient feedback and review that is vital to the success of any beta-testing effort. It is envisaged that a proposal, jointly prepared by participating agencies in the state, will be submitted to TMIP for final approval. Further details regarding these efforts will be provided in subsequent issues of this newsletter.

The following provides a brief description of the interim products that are now available for beta testing.

1. Baseline Synthetic Population Generator

TRANSIMS deals with the analysis and modeling of travel patterns for individual behavioral units rather than zonal aggregations of households. Therefore, the first step in TRANSIMS involves the generation of individual households and their socio-economic/demographic characteristics. The individuals within these households are used as travelers in subsequent stages of TRANSIMS. The population is created using 1990 Census data and is aged to the desired forecasting date. At this time, only the creation of the baseline or current year population (without "aging") is possible using the interim product available.

The 1990 Census data used to develop the baseline population includes the Census Standard Tape File 3 (STF-3) and the Public Use Microdata Sample (PUMS). Distinct households are created for each census tract or block group area, depending on the user's choice. The procedure involves four stages. First, for each census tract in question, the census summary tables from STF-3 and the corresponding PUMS sample are grouped by family and nonfamily households. Second, for each type of household, a multi-dimensional table of all of the demographics available in STF-3 is constructed. Households are created in the third step by random selection of similar households in the PUMS sample (according to the probabilities in the constructed demographics table). The demographics tables are constructed using iterative proportional fitting methods while ensuring that the marginal distributions (row and column totals) replicate the census data. The last stage consists of aging the population to the desired date (not yet available).

2. Traffic Flow Microsimulator

The TRANSIMS traffic flow microsimulation model mimics the movement and interaction of travelers and vehicles throughout a region's transportation network. The approach used in the traffic flow microsimulator of TRANSIMS is called "cellular automata (CA) microsimulation." Cellular automata traffic models divide the transportation network into a finite number of cells. Each cell is approximately equal to the length of a vehicle. At each time step of the simulation, each cell is examined for the presence of a vehicle. If a vehicle is present in the cell, the vehicle is advanced to another cell according to a simple rule set, similar to that of traditional car-following models. A cellular automata microsimulation is low fidelity, but provides a means of simulating large numbers of vehicles and maintains a fast execution speed. Increasing the fidelity by decreasing the cell size, adding vehicle attributes, and expanding the rule set results in slower computational speed.

The primary output of the microsimulator is the second-by-second location of each traveler. Information on positions, velocities, accelerations, decelerations, and travel time is obtained from the microsimulator with a view to enhance air quality modeling.

3. Multicriterion Equilibrium Traffic Assignment: The Bicriterion Model, T2

Research into people's route choice behavior has shown that there are several criteria or factors that determine the path selected for a trip or travel itinerary. These criteria include time, cost, presence of intervening opportunities along the route to accomplish activities (trip chaining), stops planned in advance, and safety. TMIP has been attempting to develop multicriterion traffic assignment models to better represent the route choice behavior of people. Current traffic assignment models consider only travel time in determining the path chosen for trips between zone pairs.

At this time, T2, a bicriterion model, has been developed. This model accounts for two criteria: namely, travel time and out-of-pocket cost, in determining the best path between zone pairs. The T2 model generalizes conventional traffic assignment by relaxing the value-of-time parameter in the generalized-cost function from a constant to a random variable, with an arbitrary probability density function. In this way, it accommodates differing values of time across travelers, trip purposes, and O-D pairs. Planned future work will increase the number of criteria from two to many and implement the model as a dynamic assignment.

Activity surveys planned in two urban areas of Florida

by Ike Ubaka, AICP, Public Transit Office, FDOT Central Office

The FDOT Research Center is funding a research project titled "Integrated Transit Demand and Supply Modeling Using Comprehensive Travel Behavior Data." The project is aimed at enhancing transit models in order to better address the wide range of transit policy and operational questions facing planners. The project involves the development of an integrated model of transit demand and supply that explicitly recognizes the two-way relationship between them. The model will consist of an iterative feedback loop that would allow the modeling of transit system supply attributes as a function of demand patterns. It is envisioned that this feature would help planners identify efficient and cost-effective transit service configurations that can best serve various transit demand levels. The model system will be estimated using extremely detailed travel behavior data that explicitly includes information regarding people's transit choice behavior under alternative transportation scenarios.

At this time, the project has reached the data collection phase of the study. Recent developments in travel behavior data collection have focused on the notion that people make trips to engage in activities that are distributed in time and space. In accordance with this paradigm, most travel data collection efforts in the past few years have been activity-based, where individuals are asked to provide detailed information on the activities they pursue over a 24- or 48-hour period. Several articles have appeared in the published literature on the richness of activity data and their ability to capture short and nonmotorized trips that traditional trip diary surveys tend to miss.

In this project, activity-based travel behavior data will be collected in two urban areas (one large and one small) of the state. While Miami has been chosen as the large urban area, a final decision is going to be made very shortly regarding the small urban area. Two small urban areas, the Pensacola Urbanized Area and Volusia County have expressed an interest in participating in the study. Discussions are being held with the respective MPOs and statistics on the population and transportation system characteristics are being compiled for each of the two areas to aid in making the final decision.

FDOT is currently reviewing a draft report that details the survey methodology, sampling scheme, and survey instrument. A copy of the report has also been sent to participating local agencies for their review and comment. Upon finalizing the survey methodology, a pilot test will be conducted in early April while the actual survey will be conducted in early May of this year. The survey instrument has been designed with a view to collect rich demographic, socioeconomic, and activity-based travel behavior data. In addition, a stated preference component has been included to measure the behavioral adaptation of individuals to hypothetical changes in the transportation system. The draft survey instrument collects information on how people may adapt in response to the following transportation system changes:

- Implementation of parking pricing at work locations
- Implementation of congestion pricing during peak commute periods
- Significant improvements to transit service
- Significant improvements to bicycle and pedestrian amenities
- Introduction of dedicated HOV lanes along commute routes

Through this newsletter, the transportation planning and modeling community of the state will be kept up-to-date on the progress of this project. Any questions or requests for information may be directed to me at (904) 488-7392, or to the Principal Investigator, Prof. Ram M. Pendyala with the Department of Civil and Environmental Engineering at the University of South Florida, (813) 974-1084.

GIS-TM: FSUTMS/ArcView Integration, Phase I

by Vidya Mysore, FDOT Systems Planning Office; and Kang Ming Xu PBS&J Miami

The Systems Planning Office, in cooperation with the Model Task Force, is in the process of launching its first endeavor into Geographic Information Systems for Transportation Models (GIS-TM). A new project has been established to develop a program to integrate FSUTMS and ArcView. The objective of this task is to produce a set of ArcView programs to import, edit and export FSUTMS input and output files. Phase I of the project will involve highway network files and later, Phase II will develop procedures for transit networks.

FSUTMS models are spatial and data intensive, and although spatial-based queries and modifications can be made in the FSUTMS model environment, desktop GIS software such as ArcView is better suited to performing such analysis. In ArcView, for example, data for nodes or links within a particular geographic area can be efficiently selected, modified, and displayed. ArcView provides powerful graphical data base query capabilities that are useful in examining both the effects of changes in network attributes on demand and the impact of demand changes on network performance.

Several attempts have been made to integrate transportation modeling data with GIS both at the national and local level. One such activity FDOT would like to recognize at the national level is the Federal Highway Administration (FHWA) Technology Transfer Center, working with the Center for Transportation Research and Education at Iowa State University. The goal of this project was to develop user-friendly, Windows programs capable of combining transportation planning models and desktop GIS packages. To minimize costs and the "learning curve," smaller urban areas represent the initial focus. However, the tools are also applicable to larger urban areas. To demonstrate the program in varying GIS modeling environments and to assist the largest number of users in the short run, TRANPLAN (Urban Analysis Group) was integrated with several desktop GIS platforms. Four GIS packages were

selected for the study: ArcView (ESRI), Atlas GIS (ESRI), MapInfo (MapInfo Corp.), and Maptitude (Caliper Corp.). FHWA's project has been completed and has produced a report with a comparative analysis of the four integrated environments. The report summarizes system development activities, evaluates the GIS packages, and draws conclusions based on the utility of each environment as interpreted by the developers. The report concludes with suggestions for future tool development and actions that would improve decision making through GIS integration with transportation models.

Within Florida, there have been several initiatives in the transportation modeling community to integrate FSUTMS with desktop GIS software. The earliest work to integrate FSUTMS and ArcInfo, presented by Shi-Chiang Li (FDOT District 4) and Kangming Xu (PBS&J) at the 1995 FSUTMS Special Update Workshop, requires the use of dBase, ArcInfo and ArcView. Earlier this year at a Southeast Florida FSUTMS Users Group meeting, Kangming Xu, with the support of District 4 and District 6 planning offices, presented his latest work integrating ArcView and FSUTMS. This program is written in AVENUE (ArcView's programming language), providing easy-to-use point-and-click end products, with intuitive Graphical User Interfaces (GUI). The Tampa Bay User group is also working toward integrating FSUTMS with GIS.

Building on the experiences of FHWA's and PBS&J's previous programs, the Systems Planning Office has executed a new task work order to further develop the integration of FSUTMS and GIS. The study will assisted through technical guidance from the Model Task Force. PBS&J has generously offered to donate the source code from their work with AVENUES as input to this study. The objectives of the task are categorized into four stages:

Stage 1-- Produce, Refine, and Test FSUTMS/ArcView Integration Programs. This stage will involve producing, identifying, refining, and merging the existing software written by other groups mentioned earlier in this article. Merging of these programs will be generate a strong, robust and easy-to-operate software package. The complete integration will have four modules:

1. Generate FSUTMS highway and node to shapefile (GIS) coverages.
2. Convert FSUTMS link-associated attributes in a loaded/unloaded highway network into a data base file.
3. Export link data base to FSUTMS LINK file format.
4. Generate FSUTMS LINK and XY files from shapefile (GIS) coverages.

Central Office and District staff will conduct beta testing of the new software. They will test several models ranging from small to medium level, from different FDOT districts.

Stage 2-- Incorporate Customized Graphic and Data Display and Query Capabilities. This stage will consist of producing the customized templates for graphic display and plotting/printing functionalities for the network and node coverages.

Stage 3-- Document Processes and Programs. This stage will include complete documentation of all programs and processes developed. Detailed flow charts will be prepared to describe the program inputs, outputs and execution. Documentation will take the form of a Users Manual providing a step-by-step methodology for data preparation, editing, and program execution. Typical error statements will be defined in an appendix for prompt resolution by future users of the software.

Stage 4-- Conduct Training Workshops. This stage will comprise a series of training workshops, one held in each District office, to describe data preparation, program execution and system requirements.

All four stages are scheduled to be completed by the end of summer 1997.

GIS-T:

Central and District Offices implement GIS project

by Albert Dominguez, FDOT District 6 and Carmel Diao, FDOT Office of Information Systems, FDOT GIS Functional Team Leaders

Since the last Executive Steering Committee meeting and the first successful demonstration of the Work Program (WPA) GIS Application pilot in September, 1996, many districts have requested similar GIS capabilities for their districts. As such, an ambitious deployment strategy for the work program GIS application has been developed: implementing the WPA GIS in every district by the next gaming cycle. Leena Patil, the District 2 representative and the pilot's main proponent is currently working to make this happen. Also participating in the WPA/GIS project are Districts 1 and 4. Another foundational project, the Cartographic Set in District 6, has just hired Post Buckley, Schuh and Jernigan for project scope and development.

The Right of Way Office project, the first GIS project implemented under the statewide budget issue, is currently expanding its project to include additional functionalities. Central Office's TransportationStatistics Office (TSO) and the Survey and Mapping Office (SMO), and District 4 are currently involved in the first pilot project, Street Network. District 4 used Global Positioning Systems (GPS) to collect information to add off-system roads. The TSO component will work mainly on ways to improve the existing 1:24000 basemap. The SMO component will address the feasibility of developing a civil engineering design (CED) level map for the Department.

There are more projects being developed in Central Office, including Safety Office GIS and State Permits GIS. Similarly, efforts are underway in the Systems Planning Office to integrate FSUTMS with ArcView GIS. These projects promise to impact greatly the Department's delivery of services to the public.

If you would like more information on the projects, please contact Albert Dominguez at (305) 377-5893 or Carmel H. Diao (904) 414-9277.

GIS-T standards to be developed at FDOT

by Carmel Diao, FDOT Office of Information Systems

The Florida Department of Transportation has embarked on an extensive standards development initiative as part of a multi-year, agency-wide Geographic Information System (GIS) for Transportation. The GIS Functional Team (GFT) is developing an initial GIS-T Standards Reference Manual which will give the Department a reference overview of existing GIS-T-related standards and documents. The document will give the Department an overview of the standards development process and a better appreciation of the need for and purpose of these standards.

How standards will help guide GIS developers

Standards are the operating conventions which enable members of an organization to work together. In the most general terms, FDOT GIS must provide a framework which enables various central and district offices to work effectively and efficiently and provide easily accessed information for GIS data and application users.

In the past few months, the GFT has focused its work on the following standards: linear referencing, data collection, data conversion, database and data archiving, GIS layering, cartographic standards, cartographic output, application frameworks and user interfaces, and metadata standards. Standards are not restrictive regulations, but rather general guidelines for GIS developers and users which allow them to realize tangible operational advantages. The standards will foster the sharing of information and aid in the portability of applications developed by providing common standardized methods and procedures for many facets of GIS work. The development of standards should proceed along the life cycle process and should meet both the internal needs in the initiating unit as well as across the department and division lines. The long term goals of the standards development process are as follows:

a. To provide a framework for systematic, orderly and efficient development, deployment, implementation, maintenance/upkeep and usage of an agency-wide integrated GIS

b. To assure that GIS data and applications are usable, transferrable and shareable

c. To assure the data quality and fitness for use of data and GIS applications

Input/support for the proposed standards will be solicited statewide. The development of standards with departmentwide consensus is critical to the successful implementation of FDOT's GIS. Even appropriate and reasonable standards are difficult to implement if they have not been presented incrementally to user offices.

For additional information on the statewide GIS project, please contact Carmel H. Diao at (904) 488-1954.

Highway Capacity Analysis techniques are changing

by John D. Zegeer, Chair of TRB Committee on Highway Capacity and Quality of Service

In 1994, the Transportation Research Board published an update to the 1985 Highway Capacity Manual (HCM). This document (and the companion software) provided a current set of analysis procedures for a wide range of transportation facilities. The table of contents to the HCM illustrates the range of facility types which can be analyzed:

1. Introduction, Concepts and Applications
2. Traffic Characteristics
3. Basic Freeway Sections
4. Weaving Areas
5. Ramps,and Ramp Junctions
6. Freeway Systems
7. Multilane Rural and Suburban Highways
8. Two-Lane Highways
9. Signalized Intersections
10. Unsignalized Intersections
11. Urban and Suburban Arterials
12. Transit Capacity
13. Pedestrian
14. Bicycles

The 1997 Update to the HCM

Advances are continuing to be made in the determination of capacity for all facilities and in the selection of appropriate performance measures to determine levels of service. The FHWA, National Cooperative Highway Research Program (NCHRP), the Transit Cooperative Research Program (TCRP), and State Departments of Transportation have funded numerous research efforts to enhance our understanding of capacity and traffic flow. This has resulted in the decision to publish a 1997 Update to the HCM. That update will contain the following revised chapters:

- The Basic Freeway Sections chapter (Chapter 3) will include a revised procedure where capacity is primarily based on a measurement of density. The capacity of a freeway lane will vary by the free-flow speed (from 2250 pcphpl for a 55 mph free-flow speed to 2400 pcphpl for a 70 mph free-flow speed).

- The Signalized Intersection chapter (Chapter 9) is one of the most widely used chapters in the HCM. The 1997 Update will include the findings from recent research on actuated signals. The delay equation will be modified to account for signal coordination, over-saturation, variable length analysis periods, and the presence of initial queues at the beginning of an analysis period. The measure of effectiveness (MOE) will be changed from average stopped delay per vehicle to total delay. Adjustments will be made to the permitted left turn model and the left-turn equivalence table. Additional guidance will be provided on the use of the CBD adjustment factor, the application of lost

time, and the proper use of the lane utilization factor.

- The Urban and Suburban Arterials chapter (Chapter 11) will incorporate changes to the Signalized Intersection chapter which affect Chapter 11. The effect of the filtering/metering of arriving platoons by upstream signals (which reduces the randomness of arrivals) will be introduced. A fourth arterial classification to account for "high speed" arterials will be included. And, additional sample problems (dealing with arterials controlled by both signals and stop signs and dealing with two-lane arterials) will be provided.

- The Unsignalized Intersections chapter (Chapter 10) has been completely revised to incorporate the results of a nationwide research project in the United States at two-way and four-way stop-controlled intersections. The impact on capacity at a two-way stop-controlled intersections due to the presence of an upstream traffic signal and a procedure for accounting for two-stage gap acceptance (when motorists cross one stream of traffic, then store in a median area to enter or cross a stream of traffic in the opposite direction) are provided. General guidance for estimating the capacity of roundabouts will also be provided.

- By the end of 1997, a Windows-based software package will be available from McTrans to assist in the application of the 1997 updated procedures.

- A Metric User's Guide will be prepared as a companion to the 1997 Update to the HCM. This will allow the analyst to make metric conversions where appropriate. In the Year 2000, the HCM itself will use metric units.

Looking Ahead to HCM 2000

Despite the extensive number of improvements which will be incorporated in the 1997 Update of the HCM, plans are already underway for a complete revision of the HCM in the Year 2000. The HCM 2000 will incorporate a number of ongoing research efforts:

- NCHRP is sponsoring a Weaving Area Research Project.

- FHWA is sponsoring a Freeway Systems Research Project.

- NCHRP is sponsoring a Two-Lane Highways Research Project and FHWA has provided additional funding to develop an enhanced simulation package for operational analysis of two-lane highways.

- TCRP has sponsored a research project on the operational analysis of bus lanes on arterials, which will be used to modify the analysis procedures in the Urban and Suburban Arterials chapter.

- TCRP is sponsoring a complete revision to the Transit Capacity chapter of the HCM. In addition, the initial steps leading toward the development of a separate Transit Capacity Manual are underway.

- FHWA is sponsoring a research project on the effects of bicycle and pedestrians on roadway and intersection capacity.

- NCHRP is sponsoring the development of enhanced planning procedures which will provide more accurate predictions of speed and service volumes for all roadway facilities.

- NCHRP is sponsoring research into the capacity of interchange ramp terminals.

- NCHRP is sponsoring research into an improved set of performance measures which will more accurately predict level of service for undersaturated and oversaturated conditions.

- NCHRP is sponsoring a project to ensure the production of HCM 2000. This document will be delivered in three media: a loose-leaf paper document, the calculating software, and a CD-ROM. The CD-ROM will provide a multi-media format for the manual, sample problems, a tutorial, and a link to the calculating software.

How You Can Learn More

The Highway Capacity and Quality of Service Committee (HCQS) of the Transportation Research Board acts as the primary overseer for research and enhancement of the HCM. Responsibility for documenting the various activities of the HCQS has been distributed across several WWW sites. The following home pages provide access to this information:

The HCQS Home Page
(http://traffic.ce.gatech.edu/hcm/overview.htm)
This site documents the ongoing activities (technical and otherwise) of the HCQS committee. Information includes current committee membership, current technical activities, upcoming events and meetings, the email server, and past meeting minutes.

Highway Capacity Manual
(http://www.nmaa.org/hcmweb)
Recognizing a need for increased communication between HCM users and developers, the Federal Highway Administration (FHWA) created a web site with the latest information on training, a data base of current HCM users, and the HCM Advantage - a newsletter dedicated to the HCM user community.

Highway Capacity Software
(Http://www-mctrans.ce.ufl.edu/info-cen/hcs/hcs.htm)
McTrans is responsible for distribution of the Highway Capacity Software (HCS). This site contains information on the latest HCS developments, versions, updates, tutorials, fixes and patches, and other software-related issues.

We welcome your input and participation in advancing our understanding of highway capacity issues.

HNET Study examines roadway capacity issues

by Huiwei Shen, AICP, FDOT Systems Planning Office; Rob Schiffer, AICP and Wiatt Bowers, PBS&J Tallahassee

FDOT/Central Office's HNET Procedural Enhancements Study has made significant progress in the last few months. As discussed in previous issues of *Florida Transportation Modeling*, the study was initiated to determine the best ways to enhance the HNET module to accomodate two-digit area types and facility types. The HNET Study will help the Model Task Force (MTF) develop a statewide standard set of two-digit coding definitions, a default speed/capacity table, and other capacity-related model parameters (i.e., variable UROAD factors and multiple BPR curves).

Since November, efforts have been geared towards the development, evaluation, and refinement of recommended two-digit coding schemes for area types and facility types, and default speeds and capacities. A memorandum describing draft recommendations was provided to members of the MTF HNET Subcommittee for review and comment.

Validation testing of the three networks (Jacksonville, Pensacola, and Indian River County) has continued by evaluating the effects of different initial speeds and capacities. Model validity was evaluated based on VMT, VHT, volume-over-count ratio, root mean square error (RMSE), and estimates of average trip length and intrazonal trip activity. The study has included validation runs with capacities based on the 1965 Highway Capacity Manual (HCM)/1981 FDOT Model Update Task C as well as those from the 1985 HCM/1992 FDOT LOS Manual and the 1994 HCM/1995 LOS Manual. In all three urban areas, the 1965 HCM produced the least acceptable validation results, whereas the differences between the 1985 HCM and the 1994 HCM were generally minimal.

Another recent step in the study involved identifying and testing new default speeds to be used for two-digit networks. Through a series of model runs, a new SPDCAP file was developed with 1995 LOS Manual capacities as well as refined default input speeds. Most recently, we have tested the networks with variable UROAD factors and multiple BPR curves, developed initially as part of the SERPM IV model. Variable UROAD factors were refined to reflect the ratios between LOS C and LOS E capacities for individual facility types, according to the 1995 LOS Manual. Multiple BPR curves allow for better replication of current HCM theory within the FSUTMS equilibrium highway assignment program.

A few definitions...

by Terrence Corkery, AICP, Systems Planning Office

The **BPR curve**, or BPR formula, is an equation developed by the federal Bureau of Public Roads (which later became part of FHWA) used in the FSUTMS trip assignment model. The equation accounts for the increase in travel time on a link from free-flow to capacity-restrained conditions:

$$T_n = T_o \times (1 + 0.15 \times (V/C_p)^4)$$

where: T_n = congested travel time after iteration "n"
T_o = free-flow travel time
V = assigned volume after iteration "n"
C_p = "practical capacity"
(capacity multiplied by UROAD factor)

Multiple BPR curves are modifications of the original default BPR formula. New relationships between travel time and assigned volume have been developed by changing the coefficient (from 0.15) and exponent (from 4) to other values.

The **UROAD factor** in FSUTMS is a number multiplied by roadway capacity (usually at LOS E) to derive "practical capacity," used in the BPR formula. UROAD was the name of the trip assignment model in UTPS, the program FSUTMS is based on. The term **"practical capacity"** refers to the maximum number of vehicles on a roadway at which travelers typically begin to seek alternate routes to their destination. The UROAD program developers felt this trip diversion began to occur when the roadway reached LOS C. LOS C volumes were approximated by multiplying the LOS E volumes by 75%.

Factoring the capacities in the SPDCAP table by 75% in the BPR travel time formula was carried over from UTPS practices. A UROAD factor of 0.75 has commonly been used since FSUTMS was first developed. However, studies in recent years have cited several reasons for changing the factor, or allowing the model to use **variable UROAD factors:**

- the level of congestion drivers find tolerable is generally higher today than decades ago when the factor was first developed
- congestion is tolerated more in large cities than in small cities and rural areas
- trip diversion occurs less on freeways compared to arterials within a grid system
- average speeds on freeways often stay relatively constant even when traffic volumes increase

With the addition of multiple BPR curves we were able to significantly improve our initial validation results in Jacksonville and Pensacola, in terms of volume/count and RMSE, while equaling our results in Indian River County. The testing of variable UROAD factors indicated that model results remained essentially unchanged when switching from LOS C capacities with a UROADF of 1.0 to LOS E capacities with variable UROAD factors calculated from LOS C/LOS E ratios.

Refined input validation speeds, resulting from iterative model testing in the three HNET test areas, were shown to improve highway assignment model performance over that previously achieved through use of the Model Update Task C input validation speeds. An alternative set of speeds, based on LOS Manual free-flow speeds and validated as part of the SERPM IV model, were also tested and will be made available for future FSUTMS model validation efforts. However, because these speeds do not account for typical intersection delay encountered during travel, application of these speeds may require adjustments to friction factors and use of congested skims as input to trip distribution.

These findings were discussed via a series of teleconferences with members of the Model Task Force HNET Subcommittee. Recommendations will be finalized at the next Model Task Force meeting.

District 4 study nears completion of base year ZDATA2

by Shi-Chiang Li, FDOT/District 4; Rob Schiffer and Christy Palin, PBS&J/Tallahassee

As discussed in previous issues of *Florida Transportation Modeling*, FDOT/District 4 has been funding a study to evaluate, recommend, and develop alternate methods for producing base year and future year FSUTMS ZDATA2 files. Appropriate base year methodologies have been approved by the study's Technical Review Committee. Efforts are now focused on preparing and refining base year ZDATA2 files for each MPO area within District 4, while finalizing recommendations on land use forecasting methodologies.

The study team has been working closely with Broward and Palm Beach County MPO staffs to prepare base year ZDATA2 estimates for their forthcoming model validation efforts. The base year ZDATA2 files are being developed using 1996 Contacts Influential data which now include actual employment for most employers. Earlier versions of Contacts Influential included only employment estimates by range (e.g., 0-5, 6-10 employees, etc.). ZDATA2 files have also been prepared using ES-202 data for comparison/validation purposes.

Different approaches were used in geocoding and developing ZDATA2 files for Broward and Palm Beach Counties. For Broward County, the data received from Contacts Influential were geocoded to traffic analysis zones using address ranges from an enhanced TIGER/Line map. The data were then summarized by SIC and employment totals by TAZ in a standard FSUTMS ZDATA2 format. Two preliminary ZDATA2 files were prepared. Initially, a file was prepared for 1995 using midpoint estimates of employment size ranges because pre-1996 Contacts Influential data only included employment by ranges. The second file was created by updating the already developed 1995 database to 1996 conditions by replacing midpoint employment estimates with actual employment, where available.

The geocoding process for Palm Beach County was different from that used for Broward County in that the data was not address-matched directly to a TIGER/Line or street network map. Instead, a program developed for the County (as part of a separate Long Range Transportation Study) was used to attach a latitude/longitude coordinate value to each business. After assigning latitude/longitude coordinates to the majority of businesses located in the County, TAZ numbers were assigned to each individual business record using ArcInfo. The TAZ boundary map was overlayed onto the road network and each record within a TAZ's polygon was given that TAZ number. The final step in this process was the production of a ZDATA2 file. A program was created using ArcInfo to summarize the data by SIC and TAZ into a standard FSUTMS ZDATA2 format.

Initial zonal analyses of the data for Palm Beach County showed discrepancies between estimated TAZ employment and expected TAZ employment levels. The TAZ map used initially was created based on County centerline maps (using up-to-date TAZ splits) instead of TIGER/Line data, resulting in businesses sometimes being assigned to the wrong TAZ. This discrepancy was solved by using the TAZ map included with the TIGER 1995 file for Palm Beach County. Edits were made to TAZ boundaries by the MPO planning staff to ensure that the zonal structure of the TIGER-based TAZ map was up-to-date. The data were subsequently reassigned to the correct TAZs and a new ZDATA2 file was created. Data validation is now proceeding at the zonal level.

Consultant staff continues to work closely with Broward and Palm Beach County MPO staffs to finalize the base year ZDATA2 estimates for their forthcoming model validation efforts. Similar work was recently started on Martin, St. Lucie, and Indian River Counties.

Assisting District 4 is Mike Brown of Transportation Planning Services, who is presently testing three alternative future land use models: the Broward Employment Forecasting Model, Simplified Land Allocation Model (SLAM), and Highway Land Use Forecasting Model II (HLFMII) as part of this same study. Recommendations will later be made regarding the applicability of each model for use in MPO areas of the District.

To test these models, actual data from Indian River and Broward County are being used to develop land use forecasts. Current information on vacant land and historical data on development was provided by the two counties. These data are being used for 1985-1990 and 1985-1995 land use forecasts that will be compared with actual development patterns in the two counties.

The ZDATA2 Study Technical Review Committee has requested that the study team research various techniques to incorporate concurrency restrictions into the land use allocation process. They have also requested that modeling approaches designed to identify redevelopment opportunities also be explored for use with the recommended land use models.

Turnpike District holds colloquium on land use models

by Huiwei Shen, AICP, Systems Planning Office

A colloquium on transportation-land use interaction models was held in Tallahassee on January 29, 1997. The colloquium was sponsored by the Turnpike District to invite prominent land use model developers to share their ideas and products with transportation planners in Florida.

Dr. Kazem Oryani from URS's New York office presented an overview on the following transportation-land use interaction models:

- Integrated DRAM-EMPAL model: Entropy Maximization
- Echenique Model: Relative Market Land Prices
- Alex Anas Model: Discrete Choice Behavior and Bid Rent Theory

Dr. Stephen Putman from the University of Pennsylvania and S. H. Putman Associates presented the latest developments with the DRAM/EMPAL and METROPILUS models. The DRAM model forecasts household locations based on travel time or cost and residential attractiveness. The EMPAL model forecasts employment locations based on prior employment location, employment attractiveness, prior location of residents, and travel time or cost.

When EMPAL and DRAM are linked together, employment location and household location forecasts are responsive to changes in the other category. METROPLUS - GIS is an integrated transportation land use modeling package in a GIS environment.

The METPLAN model of Echenique was also presented. This model uses places of basic employment to calculate household locations, then calculates the service employment needed to serve these households. The land-use module of METPLAN incorporates three economic concepts: input-output model, price function, and random utility.

Alex Anas presented his METROSIM model. The model embodies the discrete choice method with economically specified behavior and a market clearing mechanism. The effect of transportation and land use on each other are modeled by addressing three markets: developers, businesses, and households. The METROSIM model incorporates market values and rents, land use regulation, and cost-benefit analysis.

Danny Lamb from FDOT District 7 and Dennis Hooker from the Orlando MPO shared their experiences and insights on land use models with the group.

Metro-Dade integrates Transportation Management Systems

by Jesus Guerra, Metro-Dade County MPO and Timothy Plummer, David Plummer & Associates

The Metro-Dade Metropolitan Planning Organization (MPO) is developing the Dade County Integrated Transportation Management System (ITMS). David Plummer & Associates (DPA) is the MPO's prime consultant for this project. The subconsultants on the project are Transportation Planning Services, Inc. and Sharpton, Brunson and Company. This project follows the development of the Dade County Mobility Management Process/ Congestion Management (DCMMP/CMS) by the MPO with assistance from DPA.

The objective of this study is to develop and implement a transportation information system that will be functionally integrated with Florida Department of Transportation (FDOT) efforts to implement the management systems required by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. The first phase of the project will address the integration of the following four management systems:

1. Mobility Management Process/ Congestion Management System (MMP/CMS);
2. Pavement Management System (PMS);
3. Intermodal Management System (IMS); and
4. Traffic Monitoring System for Highways (TMS/H).

A future phase of the study will address the Public Transportation Management System (PTMS), the Bridge Management System (BMS), and the Safety Management System (SMS).

The Dade County MMP/CMS has already been developed and adopted by the MPO. The remaining three management systems will be established in accordance with FDOT and Dade County practices. The basic elements of the ITMS will be:

1. A relational database which will receive and store information from various data sources;
2. An analysis and evaluation component;
3. A visual and graphical presentation component;
4. A report generation component.

In addition to the basic elements, the ITMS will also have components specific to each particular management system. The ITMS program will be based on the GIS software ArcView, and a standard database software package. The ITMS program package will provide the decision makers and officials with important information for selecting cost-effective strategies/projects to improve the efficiency of the transportation system in Dade County.

The ITMS is being designed to accommodate other modules (for other management systems) in the future. Provisions will also be made for data transfer and communication between agencies.

The project is currently in its early stages of development. Please call Jesus Guerra, Metro-Dade MPO at (305) 375-4507, or Tim Plummer, David Plummer and Associates at (305) 447-0900 with your questions and comments regarding this study.

Airport DRI analysis combines GIS with FSUTMS technologies

by Zia H. Mansoor, Leftwich Consulting Engineers, Inc. Orlando

Travel forecasting during the Development of Regional Impact (DRI) Application for Development Approval (ADA) process due to expansion of airports in urban areas requires the use of regional transportation modeling systems. The main tasks of this process are model calibration and sub-area validation which is accomplished by refining the model network and socio-economic data with respect to traffic counts, and the origin and destination (O&D) survey data in the area of influence. Combining GIS technology with conventional transportation models may make it possible to overcome many problems inherent in highly disaggregate analysis of origin and destination characteristics. In the GIS environment, point-based data summarized by conventional zone-based software, such as TRANPLAN can be converted to a common geographic framework. This article describes the airport modeling work done for the Fort

Lauderdale-Hollywood International Airport Development of Regional Impact (DRI) Application for Development Approval (ADA) in Broward County, using Geographic Information Systems (GIS) in conjunction with FSUTMS.

Modeling Methodology

For the preparation of question 21 (Transportation Facilities) of the DRI document for the expansion of the Fort Lauderdale-Hollywood International Airport, travel forecasting was done using the

FSUTMS-based Broward Urban Area Transportation Study (BUATS) model for the Year 2015 Long Range Transportation Plan Update. The BUATS model network incorporates the entire county of Broward. The BUATS urban area is bordered on the north by Palm Beach County, on the west by Collier and Hendry Counties, and on the south by Dade County. For the analysis, the Broward County Urban Area was divided into 12 superzones. Superzones 1 to 9 consist of several Zip-Code areas and model TAZs within the BUATS area. Superzone 10 represents the airport itself, and superzones 11 and 12 represent External Stations located at the southern and northern boundaries of the BUATS area (see Figure 1).

A GIS software program was used to extract the Broward County boundary map and a map consisting of Broward County Zip-Code Boundaries as two separate layers. A geographic file was created using the Year 1990 Broward County model network representing the model TAZs as points. By overlaying the three maps, a final geographic file was created consisting of model TAZs within each of the Zip-Code boundaries. A geographic file was also created representing the superzone boundaries layer. Finally, this layer was overlaid on the model TAZs plus Zip-Code boundaries layer. The result of this procedure enabled the tabulation of data for each superzone containing corresponding Zip-Codes and TAZs.

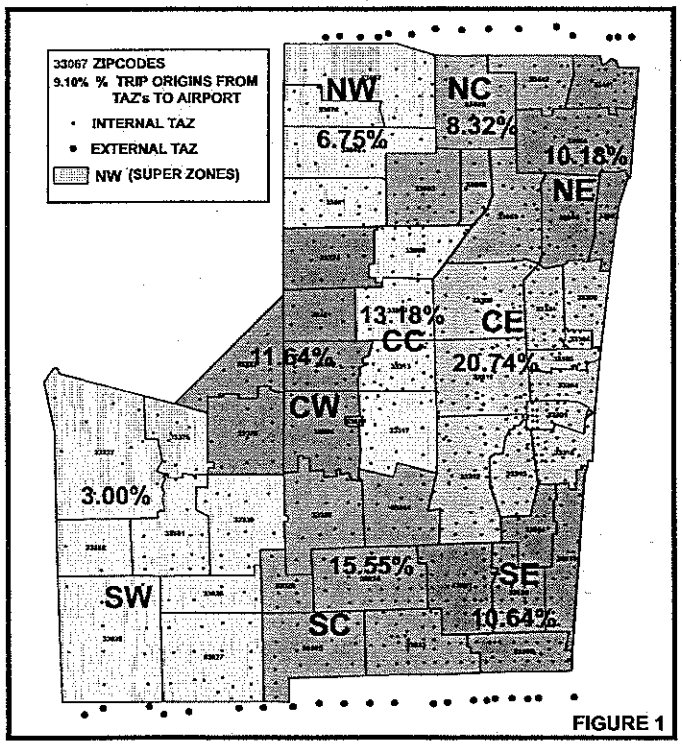

FIGURE 1

The percentage of trips coming to the airport was furnished by the O&D survey summarized by each Zip-Code. Using the GIS database, the O&D survey information was joined to each corresponding Zip-Code boundary in the Zip-Code layer. Next, the superzone boundaries layer was overlaid on top of the updated Zip-Code boundary layer, to obtain the percentage of trip origins from each superzone to the airport. The results of the GIS analysis are presented in Figure 1 which shows the Zip-Code boundaries, BUATS 1990 model TAZs, and percentages of person trip origins as determined by the O&D survey in each superzone.

Sub-Area Validation

Existing TAZs in the study area were split to model the traffic impacts of previously approved DRIs or major land use modifications and refined in terms of size and connectivity. Updated socioeconomic data and revised special generator data for the Fort Lauderdale-Hollywood International Airport were used for an initial run of the gravity model to determine the percentage of trips going to the airport from each superzone. The percentage of person trips from each superzone to the airport zone, as predicted by the model, were obtained by using the Matrix Compress function available in the TRANPLAN software (FSUTMS's engine). Comparisons were made between the initial gravity model run and the percentages furnished by the O&D survey. The results of the initial run showed the percentage of trips from only superzone 6 (CE in Figure 1) were close to O&D survey results.

In order to calibrate the percentages of trips from other superzones to the airport zone as closely as possible to the O&D survey, a post-distribution factoring of the trip table was performed in subsequent gravity model runs. The average trip length was reviewed during gravity model runs. The information was checked for reasonableness and general comparisons were made to the original model. Validation of the model also includes statistical checks on the relation of assigned volumes to actual ground counts. The incremental summaries report includes a percent root mean square error (%RMSE) by volume groups, by total area, and on a link-by-link basis. The %RMSE of the revised model were compared with %RMSE of the original model. Improved statistics were achieved for both the sub-area and the overall model.

Conclusions

This article has described the advantages of integrating GIS software with urban transportation models for airport modeling. One of the distinctions of this effort is that it provides the capability of calibrating trip tables to observed O&D survey results.

Tampa Bay FSUTMS Users Group news

by William C. Sefekar, TBFUG President & Senior Transportation Planner, Hillsborough County Planning & Growth Management Department

The Tampa Bay FSUTMS Users Group (TBFUG) kicked off its 1997 activities with a full program on February 27, 1997 at the Hillsborough County City/County Planning Commission offices in Tampa. Joining us for this most informative session was Bob McCullough, Manager of Transportation Systems Models for FDOT/Central Office; Vidya Mysore, GIS Specialist for FDOT/Central Office; and Rob Coursey from Gannett Fleming. A video recording of the proceedings was made for the first entry into our FSUTMS tape library.

Bob McCullough brought into perspective the role of the State in advancing local modeling efforts, complete with support and technical assistance. Bob came prepared with handouts such as "Updating Forecast Models to Be Consistent with Highway Capacity Manual" and "Beta Testing of Three Interim Products Available From the Travel Model Improvement Program." Copies are available to our members. Vidya addressed the long awaited anticipation of the new GIS platform. The next few months will provide us with a good deal of answers as to when we can get our hands on a GIS interface for the model. Rob Coursey loaded and demonstrated the new X32 version as well as a number of utilities that will prove most useful and agreed to have the programs available on the FDOT Transportation Bulletin Board.

Members on the Move

Robert Pergolizzi, AICP, has joined Florida Design Consultants, Inc. as Vice President of Transportation Planning coordinating traffic studies.

Jerry Graham is joining Post, Buckley, Schuh & Jernigan working with transportation models and GIS applications.

Our next scheduled FSUTMS Users Group meeting will be held in April. Stay tuned for speaker, time and location (tentatively Thursday, April 17). A "brown bag lunch" was held March 20 at the Hillsborough County Planning and Growth Management Department, 601 E. Kennedy Blvd., Tampa. Discussion consisted of data interpretation of the Regional Model, smoothing techniques with User Group members, FDOT, MPOs and the TBFUG Board in attendence.

APPLICATION AWARD

The TBFUG is offering a challenge to all transportation engineers, planner and modelers to submit an entry of your practical experiences/projects using the FSUTMS model, technical breakthroughs/modeling wizardry or just some of your program utilities that improves our modeling capabilities. To sweeten the pot, we will make it monetarily worthwhile. At this time we are looking for at least $ 100 with hopefully a State match on this, the 1st Annual TBFUG Applications Award. Entries should be submitted to the Tampa Bay Users Group by October 1, 1997, along with any preparations, demonstrations or submittals to explain the concept and/or enhancements. Entries will be reviewed for content, functionality, etc. The Award will consist of an award recognition plaque, a free (yipee), 1998 membership and the hard cash, presented to a current 1997 member at our Holiday meeting in December.

Please contact Christopher Hatton at Kimley-Horn and Associates (813-620-1460) to find out more about this exciting opportunity. Good luck!

Southeast Florida FSUTMS Users Group

by Shi-Chiang Li, FDOT/District 4; and Mike Brown, Transportation Planning Services, Inc.

The Southeast Florida FSUTMS Users Group started a new format for the local users group meeting alternating every other meeting as a GIS-T workshop. The first of these series of workshops was held on February 14 at the District 4 offices. Presentations included:

- An overview of the statewide GIS committees and sub-committees by Shi-Chaing Li.
- A demonstration by Vidia Mysore, FDOT Central Office, showing an FHWA research project to develop a GIS network editing software application.
- Kang Ming Xu (PBS&J) demonstrated the ArcView/ Avenue FSUTMS network editing software he has developed.
- A demonstration by Bernard Spinrad (IDAS) of the FDOT District 6 ArcView based pavement management system for state roads.
- A demonstration by Mike Brown (TPS) of the work underway in the development of the District 6 GIS based ISTEA Management Systems and the Dade County MPO ArcView Integrated Transportation Management System.

The next users group meeting will be a presentation by Ken Kaltenbach, (Corradino Group) on the Life Style Trip Generation Model. The meeting will be held on April 18, 1997 at the District 4 Offices. For more information contact Shi-Chaing Li at (305) 777-4655.

1997 FSUTMS training workshop schedule announced

by Huiwei Shen, AICP, FDOT Systems Planning Office

The Systems Planning Office conducted a survey to gather information on training requirements at the end of last year. Over one-hundred responses have been received from FDOT district offices, MPOs, other local governments, and consultants. These responses helped us design our training workshops for 1997.

The following FSUTMS modeling and related workshops have been scheduled:

FREIGHT PLANNING/MODELING WORKSHOP
May 5-7, 1997
Start time: 1:00 pm May 5, 1997
End time: 5:00 pm May 7, 1997
Treasure Island Inn
2025 South Atlantic Avenue
Daytona Beach Shores, FL 32118
Tel: (904) 255-8371
Room Rate: $68.00
Registration Deadline: April 25, 1997

BASIC FSUTMS TRANSIT WORKSHOP
June 9-12, 1997
Start time: 1:00 pm June 9, 1997
End time: 12:00 noon June 12, 1997
Treasure Island Inn
2025 South Atlantic Avenue
Daytona Beach Shores, FL 32118
Tel: (904) 255-8371
Room Rate: $65.00
Registration Deadline: May 30, 1997

ADVANCED FSUTMS TRANSIT WORKSHOP
July 21-23, 1997
Start time: 1:00 pm July 21, 1997
End time: 12:00 noon July 23, 1997
DoubleTree Hotel Tampa Airport Westshore
Tampa, FL 33607
Tel: (813) 879-4800
Room Rate: $65.00
Registration Deadline: July 11, 1997

CALIBRATION WORKSHOP
August 18-21, 1997
Start time: 1:00 pm August 18, 1997
End time: 5:00 pm August 21, 1997
Ramada Plaza Hotel Gateway
7470 Highway 192 West
Kissimmee, FL 34747
Tel: (800) 327-9170
Room Rate: $67.00
Registration Deadline: August 8, 1997

BASIC FSUTMS WORKSHOP
September 15-19, 1997
Start time: 1:00 pm September 15, 1997
End time: 12:00 noon September 19, 1997
Treasure Island Inn
2025 South Atlantic Avenue
Daytona Beach Shores, FL 32118
Tel: (904) 255-8371
Room Rate: $58.00
Registration Deadline: September 5, 1997

FSUTMS MINI APPLICATIONS CONFERENCE, October 1997

ADVANCED SITE IMPACT WORKSHOP, to be determined

GIS APPLICATIONS WORKSHOP, to be determined

Registration forms and agendas for these workshops will be distributed five to six weeks prior to the workshop. While there is no charge for attending the FSUTMS Workshops, pre-registration is madatory. You are also responsible for making your own hotel reservations. If you have any questions or suggestions, please call Huiwei Shen at (904) 488-4642 or fax your requests to her at (904) 921-6361.

This Newsletter is published under contract to the FDOT Systems Planning Office in Tallahassee. All information and materials contained in this newsletter are contributed by FSUTMS users and transportation modelers everywhere. Please contact the editors to submit articles for future issues or get on the mailing list.

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