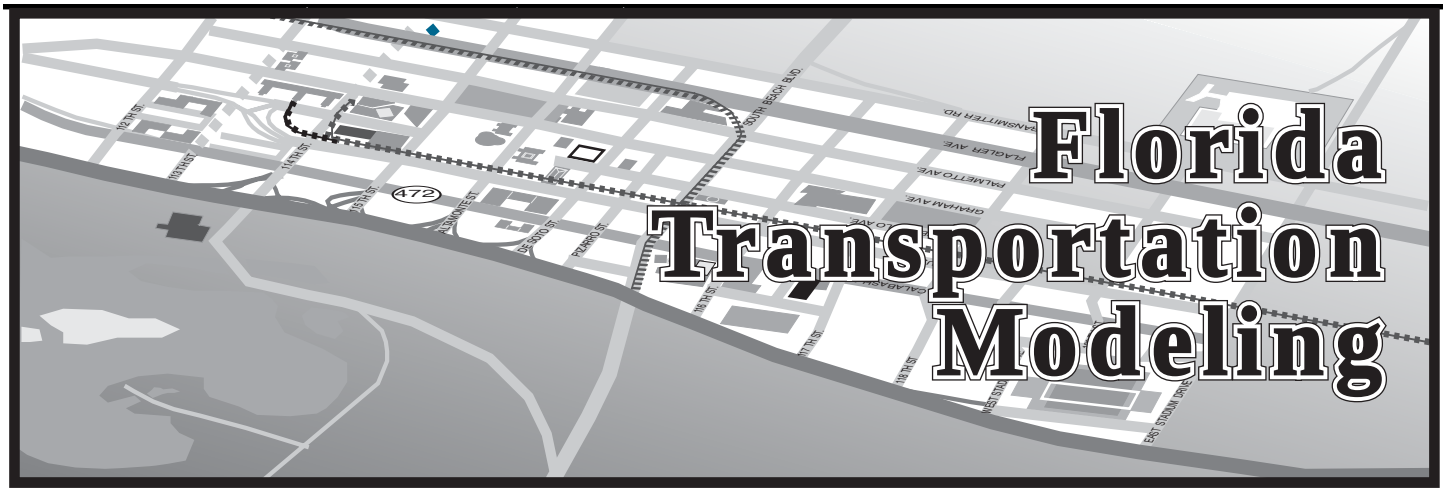

Volume 21

November 2002

The Future of Transportation Modeling in Florida …

By FDOT Systems Planning Staff

What are the transportation planning and modeling software packages and tools that we will be using for the next 10 or 20 years in Florida? Fasten your seatbelts and come along for the ride as the **Florida Statewide Model Task Force (MTF)** embarks on a pioneering comprehensive and rigorous review and evaluation of transportation modeling methods, software, and tools with a view to advance the state-of-the-art and the state-of-the-practice of transportation modeling and planning in the state. Over the past two decades, there have been numerous significant developments in the transportation modeling software industry brought about by advances in computational power and software capabilities. At the same time, planners are being asked to address a host of new planning issues and policies that call for the enhancement of the FSUTMS toolbox.

In recognition of the developments in the transportation modeling software industry and the new planning questions facing transportation professionals today and in the future, the MTF convened a **Blue Ribbon Panel (BRP)** in April 2002 to obtain guidance on modeling methods and needs in the new millenium. The BRP submitted a report (see http://www11.myflorida.com/planning/systems/stm/mtf/02docs/BluRibPn.pdf) recommending that the state conduct a comprehensive review and evaluation of transportation modeling methods and software for possible adoption in the state. The BRP provided guidance on the overall process and the specific selection criteria that the MTF should consider in its deliberations.

At the last MTF meeting (also held in April 2002), a resolution to undertake a comprehensive review and evaluation of transportation modeling software was passed. In addition, attendees participated in group discussions to rate the criteria identified by the BRP with respect to their relative importance in selecing transportation modeling methods and software for adoption in Florida. The modeling community in the state got its first look at the state of the transportation modeling software industry as Caliper Corporation (TransCAD), Citilabs (CUBE), Inro Consultants (EMME/2), and PriceWaterhouseCoopers (TRANSIMS) made brief presentations describing the features and capabilities of their respective modeling software.

The MTF requested the FDOT Systems Planning Office to initiate a research project with the University of South Florida College of Engineering to coordinate and facilitate the transportation model review and evaluation study. The one-year study provides for the rigorous analysis and benchmark testing of alternative transportation modeling methods and software available in the market today. At this time, the four packages included in the evaluation process are:

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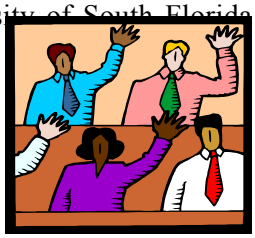
The Future of Transportation Modeling in Florida ... *Continued*

- TransCAD (Caliper Corporation, http:// www.caliper.com)
- CUBE (Citilabs, http://www.citilabs.com)
- EMME/2 (INRO Consultants, http://www.inro.ca)
- VISUM (Innovative Transportation Concepts, Inc., http://www.itc-world.com)

However, in order to ensure that all modeling software vendors have the opportunity to participate in the study and that the state does not accidentally miss any modeling software, a broad solicitation inviting the participation of modeling software vendors has just been published in the October issue of the Urban Transportation Monitor. Vendors interested in participating should review the solicitation in the Monitor and contact Dr. Ram M. Pendyala at the University of South Florida (pendyala@eng.usf.edu) for further information.



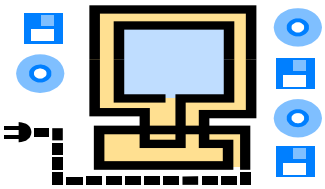
In order to bring a broad modeling and planning perspective to the study and tap into the vast modeling expertise in the state, the MTF established a project steering committee. The project steering committee is responsible for providing guidance and direction to the study while simultaneously participating directly in the model review and evaluation process. The steering committee consists of:

Name and Agency	District Team	MPO Team	Consultant Team
Danny Lamb, FDOT District 7	X		
Dennis Hooker, Metroplan Orlando		X	
Shi-Chiang Li, FDOT District 4		X	
Frank Baron, Miami-Dade MPO, Freight Subcommittee		*	
Mike Neidhart, Volusia MPO, Trip Distribution Subcommittee		X	
Imran Ghani, FDOT District 2, Trip Generation Subcommittee	*		
Gary Kramer, West Florida RPC, Land Use Subcommittee		X	
Glen Ahlert, Lee County MPO, GIS Subcommittee		X	
Kevin Feldt, JTA, Transit Subcommittee		*	
Suraya Teeple, FDOT District 2	X		
Joan Shen, FDOT District 4	X		
Scott Leftwich, Leftwich Consulting Engineers, FDOT District 5	X		
Bill Olsen, FDOT Turnpike District	*		
Paul Larsen, Palm Beach County MPO		X	
Bud Whitehead, Hillsborough County MPO		X	
Ossama Al-Aschkar, Broward County MPO		X	
Ken Kaltenbach, The Corradino Group			X
Dan Macmurphy, URS Corporation			*
Mike Doherty, URS Corporation			X
Tom Rossi, Cambridge Systematics			X
Wade White, Gannett Fleming			X
Rob Schiffer, Cambridge Systematics			*
William Roll, Tindale-Oliver			X
Arturo Perez, Leftwich Consulting Engineers			X
Dane Ismart, Louis Berger Group			X

*Indicates Team Leaders and Alternate Team Leaders

The steering committee was split into three primary groups (i.e., the FDOT District group, the MPO group, and the Consultant group) to facilitate coordination and ensure representation from all stakeholders. Each group was assigned a team leader and an alternate team leader to help coordinate communication among the three groups. Under the leadership of Bob McCullough, Central Office Systems Planning staff including Huiwei Shen, Terry Corkery, Harry Gramling, and Vidya Mysore are providing staff support to the project.

The Future of Transportation Modeling in Florida ... *Continued*



The project steering committee held its first full meeting on August 27, 2002 at the Metroplan Orlando complex. The steering committee used the opportunity to flesh out details regarding the project tasks, procedures for conducting the model evaluation and review, and the roles and responsibilities of the steering committee, consultants, vendors, and MTF. The study currently includes the following broad tasks:

1. Study coordination and setup
2. Review of transportation modeling methods and software
3. Survey of transportation modeling and planning professionals in Florida
4. Analysis of survey results
5. Development of transportation modeling software evaluation matrices
6. Conduct of a benchmarking study to evaluate relative performance and capabilities of modeling software
7. Development of specific recommendations for consideration by MTF
8. Development of transition plan to facilitate implementation of MTF decision

At this time, the study team is focusing on Tasks 2 and 3 outlined above. In the context of Task 2, each of the four vendors has been asked to provide a two-day hands-on computer workshop/demonstration (15 computers for evaluators) session of the capabilities and features of their respective software products. In addition, each of the vendors has been asked to provide 12 one-year complimentary copies/licenses of their software product(s) so that the steering committee members can directly review and test the software over the course of the one-year study period.

The four workshops have now been scheduled; due to space and computer limitations, only steering committee members were invited. However, "drop-in" attendance will be accommadated for those on "observer" status.These two-day demonstration sessions are scheduled as follows:

- VISUM: October 16-17, 2002, Orlando
- CUBE: November 6-7, 2002, Atlantic Beach
- EMME/2: November 20-21, Tampa
- TransCAD: December 4-5, Orlando

The vendors are provided with a copy of the Broward County model data sets and FSUTMS files so that they can show the capabilities and features of their software in the context of a "Florida-based model." Following the conclusion of all demonstration sessions, the steering committee will meet on December 17 at the University of South Florida, Tampa to develop a progress report for submission to the MTF.

Additionally, to ensure all modelers in Florida participate in this evaluation process, the study team developed a web-based survey available to all transportation modeling and planning professionals in the state. The survey will provide professionals in the state an opportunity to offer their input to the study regarding criteria and issues of importance that should be considered in the transportation modeling software evaluation process. The web-based survey will be announced and open to respondents during the month of November 2002. The results of the survey will be tabulated for use by the steering committee at the December 17 meeting in Tampa.

In view of the schedule of the vendor demonstration sessions and the steering committee meeting, the usual Fall meeting of the MTF (originally scheduled for October 2002) has been moved to January 8-9, 2003. This January meeting of the MTF provides the opportunity to discuss and refine the methodology for the benchmarking study that constitutes the second phase of the model evaluation study. The benchmarking study is currently scheduled to take place in Spring 2003.

Questions regarding the model review and evaluation study should be directed to Huiwei Shen, FDOT Central Office, Systems Planning at (850) 414-4911. Periodic updates on the progress of this project will be provided through the *Florida Transportation Modeling* newsletter and posted on the Systems Planning Office's website (www11.myflorida.com/planning).

Integrating ITS into the Transportation Planning Process

By Imran Ghani, FDOT-District Two and Christopher Francis, FDOT-Systems Planning Office

As America's urban areas grow, congestion on the roadways has become challenging. Unable to build roads fast enough to keep up with demand, traffic engineers are looking at way of maximizing the efficiency of existing infrastructure. Intelligent Transportation Systems (ITS) which includes services such as in-route driver information, incident management, route guidance and traveler services information are now being looked upon as tools to enhance the operational performance of existing transportation infrastructure.

To ensure a consistent National ITS Architecture (NITSA), the "Transportation Efficiency Act for the 21st Century" (TEA-21) mandates that Integration of Intelligent Transportation Systems (ITS) into the transportation planning process. Each state is required to develop an ITS element in its Long Range Plan to be consistent with NITSA.

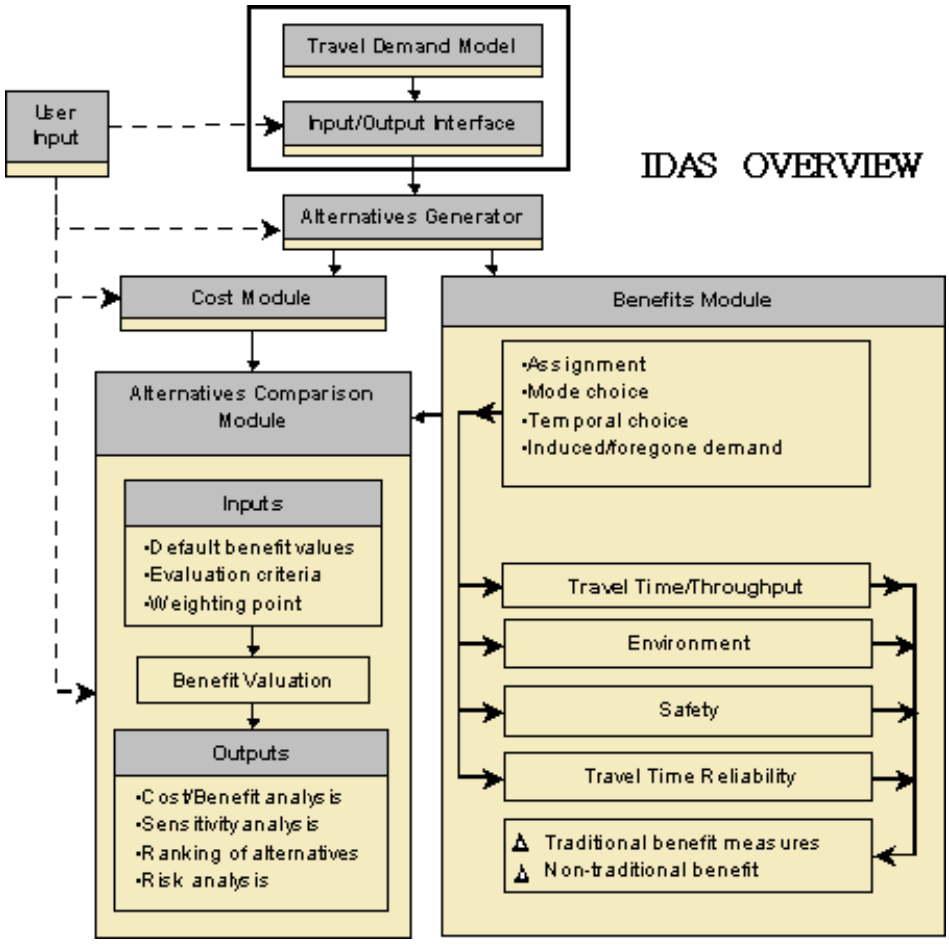
To meet this challenge, Florida Department of Transportation (FDOT) has established an "ITS Office" to facilitate and guide the state agencies in their efforts to develop ITS Architecture compliant with National standards as part of ITS planning and project development .

Recognizing the potential of ITS on travel behavior, the Model Task Force created an ITS Subcommittee. Comprised of ITS engineers, modelers and representatives of State ITS office, the committee has been looking at addressing issues related to ITS in the context of modeling. The subcommittee provides an opportunity to transportation planners and ITS engineers to interact effectively to get an overall understanding of how ITS technologies would impact the planning processes and modeling procedures.

One of the first initiatives of the committee was to help Metropolitan Planning Organizations implement Federal "Rule 940" which requires them to prioritize ITS projects. The process of determining benefits and cost associated with each ITS improvement can get very complicated which is why the committee chose to rely on a sketch planning tool called IDAS (ITS Deployment Analysis System).

ITS Deployment Analysis System (IDAS) is a sketch planning software tool that can be used to estimate the impacts, benefits, and costs resulting from ITS deployments. Developed by the FHWA, IDAS is intended to assist public agencies and consultants to evaluate ITS investments as an "alternatives analysis system." It enables systematic assessments and quantitative evaluations of relative benefits and costs of more than 60 types of ITS investments in combination or in isolation. IDAS relies on traditional Travel Demand Model input/output to carry out the deployment analysis.

IDAS systematically assesses ITS improvements and is used to determine the benefits and costs of alternative deployment options. Quantification of ITS benefits is difficult using the traditional planning models, as these models are not sensitive to benefits derived from ITS technologies. IDAS has the potential to do a benefit /cost



ITS DEPLOYMENT ANALYSIS SYSTEM (IDAS)

Continued

analysis for each ITS options. A benefit/cost summary report is produced containing all the options in order to compare and select those options providing maximum benefit.

IDAS operates as a post-processor to a travel demand model and implements the modal split and traffic assignments steps associated with the four-step process. These steps are key to estimate changes in modal, route and temporal decisions of travelers resulting from ITS technologies. The set of impacts evaluated by IDAS include changes in user mobility, travel time/ speed, travel time reliability (non-recurring congestion duration), fuel costs, operating costs, and emissions.

IDAS can use the existing FSUTMS data as input provided it is formatted to its specifications. Seizing on this opportunity to bring together planners and traffic engineers, the ITS subcommittee and Systems Planning Office initiated a study to develop an interface between FSUTMS and IDAS. An interface designed to translate FSUTMS data into IDAS compatible data with minimal input from user, but flexible enough to be used with various local, county, regional and statewide mode. While the interface will allow IDAS to read Florida models, the ITS Office is currently developing a "Florida Specific" database of user benefits and costs to replace the default national database.

The IDAS/FSUTMS interface should be completed by March 2003. Once tested, it will become a part of the FSUTMS tool-box. Systems Planning Office is currently is the process of organizing a two-day workshop to familiarize FSUTMS/IDAS user with FSUTMS and IDAS.

For more information on IDAS, please visit: http://idas.camsys.com. IDAS can be purchased at: www-mctrans.ce.ufl.edu/

For assistance on IDAS, please contact Christopher Francis of System Planning Office at: Christopher.francis@dot.state.fl.us or (850) 414-4901 (SunCom: 994-4901).

Research Projects on a Roll...

By Terrence Corkery, FDOT - Systems Planning Office

Several key research projects for the **Florida Model Task Force (MTF)** will be completed within the next several months and draft research reports will be circulated among MTF members and respective subcommittee members for review and comment. This article provides a brief progress report on the ongoing research projects.

Development of Statewide Travel Demand Model (Year 2000)

The new Statewide Travel Demand Model calibrated to a year 2000 baseline is in final stages of completion. A new statewide model network that uses the state basemap as a foundation has been developed with key linkages to both statewide databases such as the RCI and TCI and to the local model networks. The new statewide model network is going through final quality checks where corrections to network attributes are being made according to the data available in local model networks. In addition, the research team has completed the development of new zonal data files for rural areas in the state using the latest Census 2000 SF1, SF2, and SF3 databases. The new statewide travel demand model will have more than 3,500 zones and 25,000 links and has been developed to be consistent with the new statewide highway freight model and all local model geography and networks. Calibration, validation, and the development of interfaces for the 2000 statewide travel demand model is ongoing. Model completion is scheduled by the end of this calendar year. The Central Office contact for this research project is Vidya Mysore (vidya.mysore@dot.state.fl.us).

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Research Projects on a Roll... *Continued*

Development of Urban Freight Transportation Modeling Procedures for FSUTMS

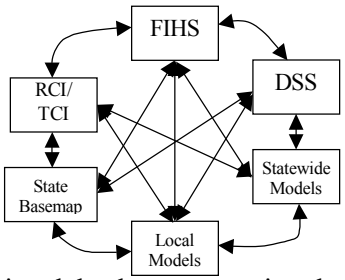
Greater emphasis on the efficient and safe movement of freight, goods, and services, both within and outside urban areas,stresses the recognition of key intermodal connections at airports, seaports, rail and truck terminals, and warehousing facilities. The need to develop new freight transportation modeling tools for Florida is being addressed through two major efforts. First, a new statewide highway freight model with intermodal facilities has been developed for statewide freight transportation planning applications. Second, new default urban truck travel demand models are being developed for incorporation into the standard Florida model, FSUTMS. The urban truck travel demand modeling procedures take into account trips by truck type representing the movement of both goods and services. The research team completed a national review and synthesis of all urban truck travel demand models, and has developed a set of default truck trip generation equations and trip distribution modeling procedures for incorporation into FSUTMS. These default procedures will be applicable in urban and regional models that rely on the default FSUTMS routines for estimating urban truck travel. Draft documents describing the proposed models are currently under preparation for review by the Model Task Force Freight Subcommittee members. The Central Office contact for this research project is Huiwei Shen (huiwei.shen@dot.state.fl.us).

Time of Day Modeling Processes for the Florida Standard Model

A major emphasis of the USDOT's Travel Model Improvement Program (TMIP) is the development of the time-of-day modeling processes for better estimating traffic by time of day period. Time of day modeling is particularly useful in the context of estimating design traffic, planning transit service, and evaluating the impacts of transportation policies. This project involves a two-pronged approach. First, default time of day factors that can be used to obtain trip tables (by purpose) by time of day block are being developed. Time of day factors are derived from a combination of sources including previous time of day modeling studies conducted in Florida and household travel survey data collected in various metropolitan areas of Florida. Second, multinomial logit models (used to determine travel modes, i.e. auto, transit, carpool, ...) of time of day choice are estimated using household travel survey data collected in Southeast Florida. The models include socio-economic variables and network level of service variables as explanatory factors of time of day choice behavior (why people travel at different times). These models can be used to estimate customized time of day factors that are applicable in a local context (without necessarily relying on the default time of day factors). The research team is in the final stages of refining the time of day choice model specification. Reports describing the time of day choice modeling are currently under preparation and will be distributed to the Model Task Force members for review.The Central Office contact for this research project is Terry Corkery (terrence.corkery@dot.state.fl.us).

Development of Data Integration Procedures (How to organize and use Florida modeling data)

The development, calibration, validation, and application of transportation models requires the organization, merger, matching, manipulation, and integration of many different state-level and local databases. Such databases include census databases, Tiger line files, local and statewide networks, traffic counts, roadway characteristics inventory (RCI), work program information, and other third-party commercial products that may have useful information for modeling purposes (e.g., InfoUSA employment data, REEBIE freight movement data, GDT network data). Much time and effort is spent in attempting to integrate and match these databases and then further repeat the process every few years to maintain an up-to-date system. In this research project, the Central Office is coordinating the development of GIS-based data and network integration procedures and systems that would allow seamless transfer and matching of attributes (spatial and non-spatial) across databases. The research team has compiled detailed information about all of the databases that are typically used for transportation modeling and planning in the state. Sample databases and detailed information about their format and structure have been obtained with a view to developing a seamless data integration framework. The development of a relational database system involves the establishment of a unique key field together with a set of relationships that would provide a mechanism for matching, checking, and updating databases. The research team has completed the development of the data integration framework and is currently in the process of developing a relational database system consistent with the envisioned framework. The Central Office contact for this research project is Vidya Mysore (vidya.mysore@dot.state.fl.us).



Research Projects on a Roll... *Continued*

Development of Tools for Network Matching and Integration

Data and network integration often calls for the "conflation" of multiple networks and databases. Networks obtained from local models and local jurisdictions, statewide models and databases, federal sources, and commercial enterprises often need to be matched together to facilitate data exchange and integration. Matching of networks and databases involves not only matching multiple networks in a spatial sense but also involves developing relationships among them to facilitate data integration as described in the previous research project. This research project is aimed at developing a suite of conflation tools for matching, integrating, and relating multiple networks and databases so that one can accomplish data integration in a seamless fashion. The research team compiled a variety of networks and databases that may typically need conflation and matching in modeling and planning applications in the state. A suite of conflation tools that develops relationships among these networks and databases has been developed. The tools are currently going through a series of quality checks to ensure that they are robust and would apply to the various database formats and structures often encountered in the state. GIS-based user interfaces are going to be developed in the near future to allow user-friendly interaction with the conflation tools. The conflation tools constitute mechanisms by which data integration can be accomplished on a continuous basis as networks and databases get updated over time. An initial demonstration of the network conflation tools will be made to the GIS Subcommittee of the Model Task Force later this calendar year. The Central Office contact for this research project is Vidya Mysore (vidya.mysore@dot.state.fl.us).

Development of Activity-based Travel Demand Modeling System for Florida (FAMOS) (relating type of travel to daily activities, i.e. work, shop, recreation)

The development of activity-based travel demand modeling systems has been gaining considerable momentum around the world over the past decade. With the availability of activity-based travel survey data sets and the advances in computational power and statistical methodologies, the development and implementation of full-scale activity-based model systems is becoming a reality. As an initial experimental effort in this direction, the Central Office initiated the development of the Florida Activity Mobility Simulator (FAMOS), a comprehensive activity-based microsimulation model system estimated and calibrated on household travel survey data collected in the Southeast Florida region. The research team has completed the development of all components of the model system and is currently in the final stages of model calibration and validation. The model system is capable of simulating activity and travel patterns of individual travelers while explicitly recognizing the notion of time-space prisms and the constraints they represent on traveler activity patterns. The Central Office contact for this research project is Ike Ubaka, Public Transit Office (ike.ubaka@dot.state.fl.us).

The University Of Florida Land Use and Transportation Modeling Research Programs

By Mike Brown AICP

The University Of Florida has recently established the Land Use and Transportation Modeling Research Program (LUTMRP) in Gainesville. LUTMRP is a basic and applied research facility in the University of Florida, Department of Urban and Regional Planning. The Program is designed to advance the state-of-the-art of transportation/land use modeling technology. LUTMRP's mission is to provide a wide range of services designed to make the intellectual resources of the academic community available and relevant to the transportation and urban planning profession providing a wide variety of useful information, analytical tools and services. The program seeks to make available in a coordinated manner the resources of a number of well established and experienced university research facilities to the planning community in Florida. LUTMRP provides technical assistance to support local planning agencies for the following types of activities:

- To support the research and development of enhancements to the current land use and transportation models and the development of new analytical tools when needed.

The University Of Florida Land Use and Transportation Modeling Research Programs *Continued*

- Conduct case studies and validation of various land use and transportation models.
- To assist local planning agencies in the development and review of input data required by various land use and transportation models.
- To assist local agencies in the application of land use and transportation modeling applications in the planning process.
- Provide training, education and professional development in the use of land use and transportation modeling techniques.

The LUTRMP program also provides technical training in land use and transportation modeling as a part of the advanced degree program in the School of Urban and Regional Planning. For more information see are website at: www.geoplan.ufl.edu/classes/lutmrp/ index.html Or contact Mike Brown, LUTMRP Program Manager at (352) 392-0997 Ext. 425, Email: mbb@ufl.edu

Investigation of Transportation and Land Use Interactions with Spatiotemporal GIS

By Fang Zhao, Department of Civil and Environmental Engineering, Florida International University, Shih-Lung Shaw, Department of Geography, University of Tennessee, and Shi-Chiang Li, District 4 Planning and Environmental Management

The importance of land use and transportation interactions is well recognized in the literature. The impact brought by transportation systems on land use is mainly improved accessibility, which in many cases encourages new land developments. Increased land use density and intensity in turn result in traffic congestion, demanding improvements in transportation systems. Currently, FSUTMS takes land use information as input but land use and transportation planning is not well integrated. This is partly due to the fact that effects of transportation system changes on land use, and vice versa, occur at varying spatial and temporal scales. Other questions that need to be answered include how accessibility affects the rate at which land use intensity changes; what is the spatial pattern of land development; and how land developments change travel patterns.

To address the above issues requires the collection and examination of historical data on both transportation projects and land use. In the past, because of the lack of digital data of historical land use changes and transportation systems, as well as the lack of the necessary analysis tools, studies on land use and transportation have been limited to a particular project or a particular area of interest and the spatial and temporal variations between different geographic areas have not been adequately considered. The last two decades have witnessed great advances in computer technologies, digital mapping, and geographic information systems (GIS), including the development of temporal GIS technologies that are capable of supporting analyses of data that have both a spatial context and a time dimension. These advances offer us a new opportunity to examine the land use and transportation co-evolution at a larger scale and at a more detailed level. With understanding gained through such studies, we will be able to better account for land use decisions about transportation investments.

To support the storage, visualization, and analysis of historical data, FDOT sponsored a project that is being conducted by Florida International University and University of Tennessee. A prototype temporal geographic information system (GIS) that offers exploratory data analysis capabilities to interactively examine the land use and transportation interaction at user-specified spatial and temporal scales has been designed and implemented. Different from most existing GIS packages that take a snapshot approach to GIS data into separate layers representing different points in time, the prototype GIS developed for this project extends the ArcGIS 8 geodatabase data model to explicitly handle the temporal relationships among the layers and is more effective in analyzing spatiotemporal change patterns. By treating time as an integral component in GIS databases, it is possible to implement temporal relationships such as “before”, “coincide”, “overlap”, and “after” between two different phenomena in order to explore their interactions of various temporal durations (e.g., short-term versus long-term).

In addition to the spatiotemporal GIS databases, a systematic and speculative approach is used to facilitate exploratory data analysis (EDA) that involves searching for patterns and processes hidden in the data sets. Integration of EDA with temporal GIS allows analysts to apply exploratory analysis methods to make sense of large data sets and to access visualization tools to present the patterns and relationships hidden in the data. The spatiotemporal patterns and the summary statistics derived from this interactive exploratory analysis process can be used to help us evaluate the assumptions and modify the structures used in existing land use and transportation models. The results also can suggest additional analyses needed for a better understanding of land use and transportation interaction. Based on the EDA concept, the project implements a spatiotemporal interaction

Investigation of Transportation and Land Use Interactions with Spatiotemporal GIS *Continued*

framework (see Table 1) that can guide analysts through exploratory analysis of land use and transportation interaction patterns.

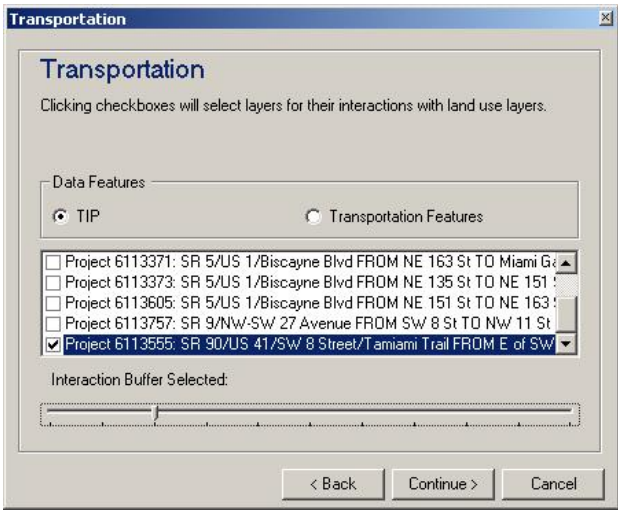
Table 1: Spatiotemporal interaction framework.

	Fixed Component	Controlled Component	Measured Component
Scenario 1	Transportation(space-attribute-time)	Land use (space-attribute-time)	Time
Scenario 2	Transportation(space-attribute-time)	T ime	Land use (space-attribute-time)
Scenario 3	Time	Transportation (space-attribute-time)	Land use (space-attribute-time)
Scenario 4	Time	Land use (space-attribute-time)	Transportation (space-attribute-time)
Scenario 5	Land use (space-attribute-time)	Transportation (space-attribute-time)	Time
Scenario 6	Land use (space-attribute-time) Transportation(space-attribute-time)	Time	

With the new spatiotemporal GIS tool, planners will be able to ask questions such as "where were the areas that started major land developments projects during the one-year, five-year, and ten-year periods after the completion of I-595?"; "what were the traffic volumes on major streets in each census tract with an annual population growth rate over 5% from 1990 to 2000?"; or "where were the vacant land parcels within a 1-mile zone of ongoing transportation projects in 1996?". The spatiotemporal interaction framework provides a systematic and flexible design for transportation planners to explore spatial and attribute changes between the land use and transportation components along the time dimension.

To guide transportation analysts through their explorations of hidden spatiotemporal patterns and relationships of land use and transportation interaction, the project has developed a series of dialog windows based on the spatiotemporal interaction framework as shown in Table 1. An analyst can select among the six scenarios and choose specific data sets related to the land use and the transportation components. Depending on the chosen scenario, the system automatically brings up the subsequent dialog windows to guide the analyst to select specific transportation features or transportation improvement projects (TIPs), control the spatial extent and the attribute values in search for the relationships between transportation and land use data sets, and specify the time windows. For example, figure 2 shows the dialog window that users can select specific TIPs to be included in an analysis.

Figure 2. Dialog window of selecting TIPs for a spatiotemporal analysis.

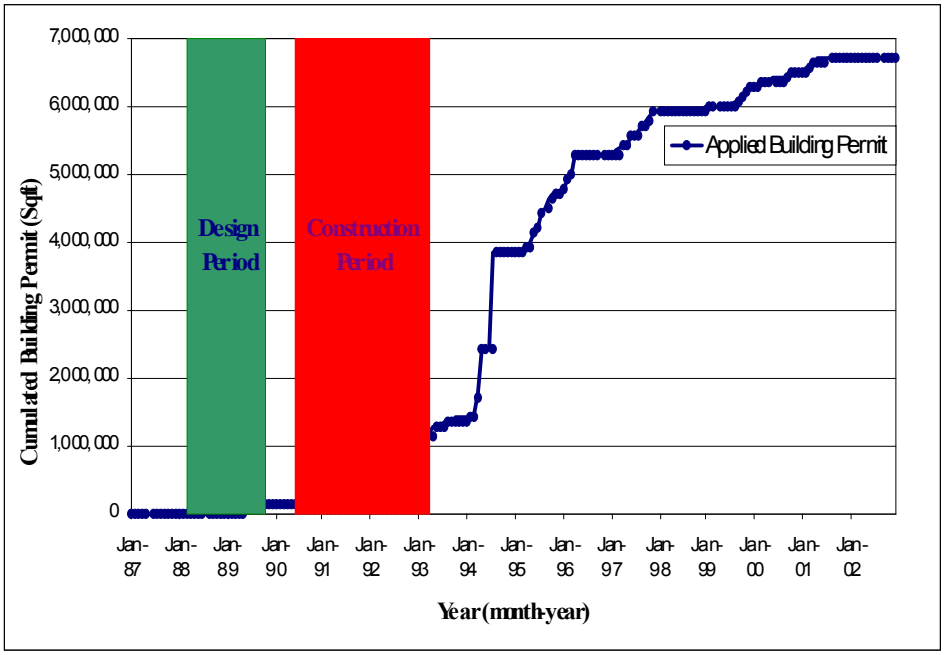


For the final presentation of exploratory analysis results, analysts have options to choose the specific attribute data items to be included in the summary report. The system then generates a hypertext markup language (HTML) file that includes a series of maps showing the changing patterns, a list of changes identified from the analysis, and summary statistics of the selected data items. This HTML file is automatically displayed using a browser at the end of each analysis task. In addition, the system includes an animated visualization tool, written in Java script, to show the dynamic interaction patterns between land use and transportation over time.

Investigation of Transportation and Land Use Interactions with Spatiotemporal GIS *Continued*

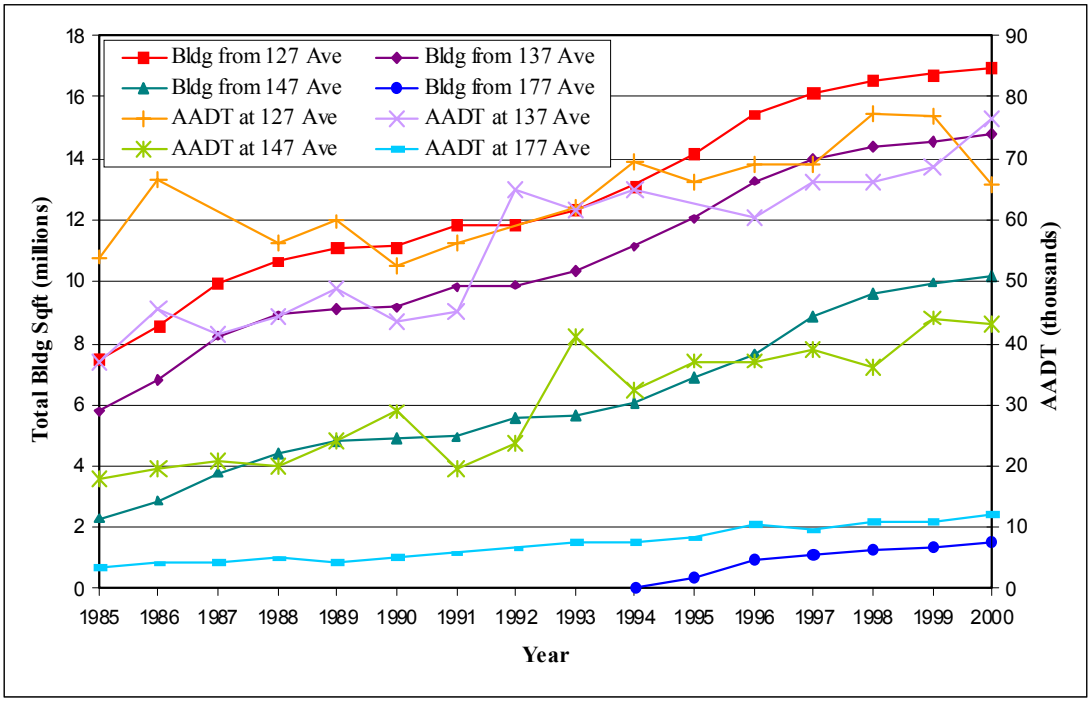
In addition to implementing a prototype temporal GIS, the project has collected and processed large datasets of historical information on properties, building permits, certificates of occupancy, AADT, transportation projects, and project time lines. Statistical analyses are being performed to identify the relationships between land use and transportation projects. Time series analysis has been applied to data such as building permits, transportation improvement projects, and historical AADT. As an example, North Kendall Drive in Miami-Dade County was improved by widening from 4 lanes to 8 lanes between Turnpike and SW 132nd Avenue and adding 2 lanes to the existing 4 lanes between SW 132nd Avenue and SW 152nd Avenue. Construction started on Oct. 29, 1990 and ended on Aug. 31, 1993. Figure 3 shows the growth of the cumulative square-footage of new building permits by month beginning January 1987. A statistical test called the Granger Causality Wald test was applied to examine the relationship between the road widening and the monthly building permit activity, measured in square-feet. The test result showed that the improved accessibility on North Kendall drive is a stimulus to new development, with only a 1% level of uncertainty. Additionally, the number of applications for building permits increased significantly beginning about eight months after the construction was completed (see Figure 3).

Figure 3. Building permits growth with relationship to roadway improvement projects



To illustrate the temporal and spatial variation in transportation and land use changes, Figure 4 plots the patterns of AADT at different locations along North Kendall Drive as well the total building square footage in the influence area of each roadway section where AADT was available. It appears that overall AADT growth did not keep up with the growth in building square feet with the exception of the construction period.

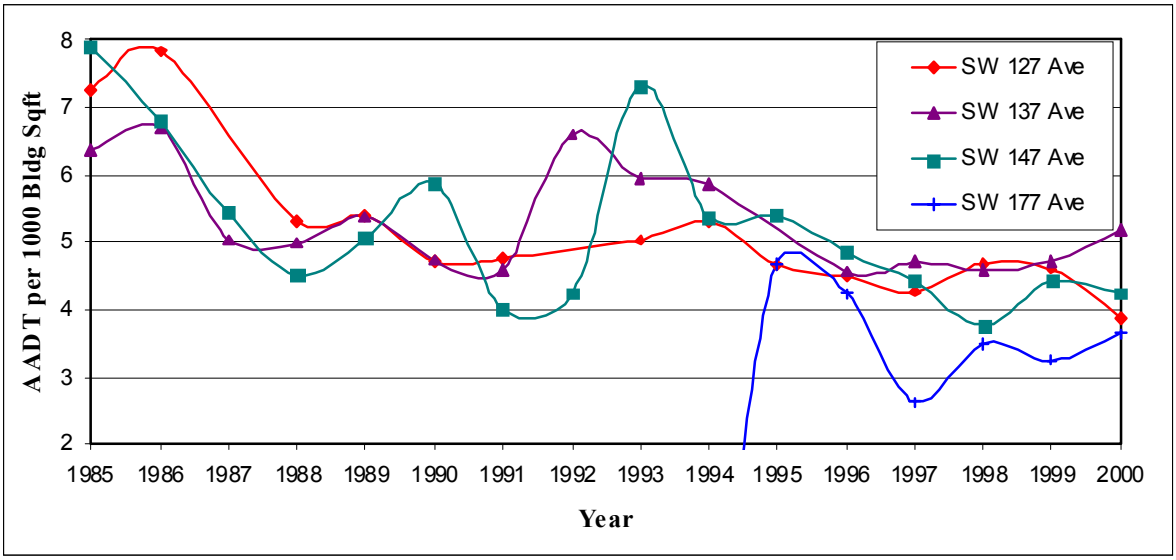
Figure 4. Growth of built developments in square-feet and AADT at different locations



Investigation of Transportation and Land Use Interactions with Spatiotemporal GIS *Continued*

Figure 5 plots the AADT per 1000 square feet of building area between 1985 and 2000 and there is a downward trend except for the construction period. Possible explanations such as congestion levels, types of new development, etc., will be carefully analyzed.

Figure 5. AADT per 1000 building square feet between 1985 and 2000



The project will continue to study the temporal and spatial patterns of land development and transportation improvements. More corridors will be studied and similarities or differences between these corridors will be investigated. Analysis and visualization tools will be further improved and expanded. For more information about the project, please contact Prof. Fang Zhao (305-348-3821, zhaof@fiu.edu) or Prof. Shih-Lung Shaw (865-974-6036, sshaw@utk.edu).

FSUTMS Users' Group News

The **Southeast Florida Users' Group** has scheduled their next meeting on **Tuesday, November 12, 2002**. The meeting will be held at 9:30 AM at the FDOT-District 4 "New Auditorium." The Southeast Regional Planning Model-Version 5 and the latest Census Data release will be the focus of the meeting. For additional information, please contact *Shi-Chiang Li (954) 777-4655*

The next meeting for the **Northeast Florida Users' Group** is set for Friday **November 15, 2002.** A variety of topics will be discussed ranging from the implications of Rule 940, IDAS, ETDM,TAIMS and the next JUATS scope. The users' group meets at the FDOT-District 2 Jacksonville Urban Office-Training Facility. The meeting starts at 2:00 PM and runs until approximately 4:00 PM. For additional information, please contact *Imran Ghani (904)360-5682*

The **Tampa Bay Applications Group** will hold their Awards Banquet on December 9th, 2002 at Landry's Seafood House starting at 6:00 PM.For more information, please contact *Danny Lamb (813) 975-6437*

STATE OF FLORIDA
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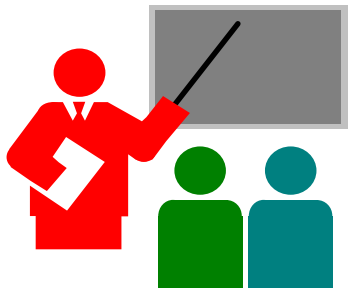
The **Southwest Florida Users' Group** will hold their next meeting after the January MTF meeting.The exact meeting date will be announced. All Users' group meetings are held at the Charlotte County Airport (2800 A-6 Airport Rd., Punta Gorda, FL). For additional information about the group, please contact *Jim Baxter (863) 519-2562*

The **Central Florida Users' Group** will hold their next meeting in January in conjunction with the Florida Model Task Force meeting in Orlando, which will be held on January 8 and 9, 2003. For additional information about the group, please contact *John Zielinski (407) 482-7868*

Basic FSUTMS Workshop - December 9-13, 2002

The Basic FSUTMS Workshop provides an overview of the transportation planning process, travel demand forecasting methodologies, and FSUTMS modules and file formats. Participants will learn to install and execute FSUTMS, interpret the output results, create standard plots, and execute the Visual Planning Environment (VIPER) software. An overview of the GIS-TM (GIS for Transportation Modeling) software is also included.



December 9-13, 2002
Hilton Oceanfront Resort, 2637 South Atlantic Avenue
Daytona Beach Shores, FL 32118
Hotel Phone: 386-767-7350 Room rate: $79.00 Single/Double
Hotel Reservation Deadline: November 20, 2002

Starts 1:00 PM, Monday (12/9) - Ends 12:00 noon, Friday (12/13)

Registration can be completed on-line at: www11.myflorida.com/planning
click on "Training" and "Modeling Workshops"

Be sure to notify us if you are a P.E. needing professional development credit.

Mark your calendar for the **Florida Model Task Force** meeting date:
January 8-9, 2003.
Embassy Suites - Jamaican Court in Orlando (see article, Page 1).

For more information about the workshop or the MTF meeting, please contact Huiwei Shen at :
huiwei.shen@dot.state.fl.us (850) 414-4911

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