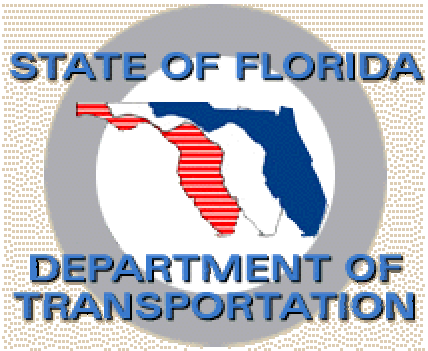
Future Direction for Florida's Transportation Models

Report of the
Florida Statewide Model Task Force

BLUE RIBBON PANEL



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DISCLAIMER

This report constitutes a summary of the deliberations of the Florida Statewide Model Task Force Blue Ribbon Panel during its meeting on April 2-3, 2002. The contents of this report do not reflect the opinions or views of the model task force or the Florida Department of Transportation. This report does not constitute a regulation, standard, or specification. It is only advisory in nature.

TABLE OF CONTENTS

1. INTRODUCTION 4
2. TRANSPORTATION MODELING IN FLORIDA 5
3. FRAMEWORK OF PANEL DISCUSSION 8
4. CURRENT AND EMERGING ISSUES IN TRANSPORTATION PLANNING 10
5. TRANSPORTATION POLICIES AND SOLUTIONS/STRATEGIES 13
6. MODELING DIRECTIONS 17
   6.1 Strategic Directions 18
   6.2 Tactical Directions 22
   6.3 Detail-Oriented Model Enhancements 24
7. TRANSPORTATION MODEL FUNCTIONALITY AND SOFTWARE SYSTEM CRITERIA 25
8. SYSTEMS MANAGEMENT AND ADMINISTRATIVE CRITERIA 28
9. A METHODOLOGY FOR EVALUATION OF ALTERNATIVE SOFTWARE OPTIONS 31
10. AN ACTION PLAN FOR THE STATE 33

1. INTRODUCTION

Various transportation initiatives such as the Transportation Equity Act for the 21st Century (TEA-21) have brought new challenges to transportation planning. Emphasis on emerging issues such as community impact assessment and planning intermodal and freight transportation facilities have placed greater demands on travel demand forecasting models. Florida's explosive growth has further contributed to the need to maintain technologically and methodologically sophisticated transportation modeling tools.

At this time, all metropolitan areas in the State of Florida run models based on a uniform framework - the Florida Standard Urban Transportation Model Structure (FSUTMS). The Florida Statewide Model Task Force is a forum for state, local and private agency transportation planners to discuss ways to improve the model. At its Fall 2001 meeting, the task force approved a motion to form a blue-ribbon advisory panel of five to seven national experts as a means to evaluate the strengths and weaknesses of the current modeling framework and determine whether additional modeling methods and tools should be added to the FSUTMS toolbox.

After a nationwide search of modeling experts and open call for nominations, the Model Task Force identified a seven-member blue-ribbon panel representing a broad range of knowledge and experience in the development and application of different modeling tools. The panel members were asked to review the current status of transportation modeling in Florida and offer insights into the future directions of transportation modeling that the state should consider.

The blue ribbon panel was convened for a two-day meeting on April 2-3, 2002 at Metroplan Orlando. The panel was charged with assessing the future travel demand modeling needs in Florida and making recommendations about the various modeling methods, tools, and options that are becoming available. The specific objectives of the blue ribbon panel were as follows:

- To advise the Model Task Force on emerging and new directions/approaches to transportation modeling

- To assess the current modeling process/procedures/methods used in Florida with respect to their strengths and limitations in meeting future transportation modeling needs and incorporating emerging and new directions/approaches
- To inform the Model Task Force about other available and emerging modeling tools and platforms with respect to their capabilities and suitability to meet Florida's future transportation modeling needs

This report summarizes the discussions and results of the blue ribbon panel meeting. As a next step, it is envisioned that a series of small group and full model task force discussions of the recommendations of the blue ribbon panel and the pros and cons of the available options will take place at the April 18, 2002 Florida Model Task Force meeting. Vendors of several major travel demand software packages are scheduled to make presentations and demonstrations of their modeling systems to familiarize Model Task Force members with various technology options and software development plans for meeting emerging challenges in modeling. An evaluation committee will be formed to assess the strengths and weaknesses of major transportation modeling software packages based on evaluation criteria recommended by the blue ribbon panel. The recommendations from the blue ribbon panel and the evaluation committee will help the Florida Model Task Force formulate strategies for improving Florida's future modeling process and responding to emerging paradigms in transportation modeling.

2. TRANSPORTATION MODELING IN FLORIDA

Transportation models in Florida have been characterized by their uniformity in structure and framework. FSUTMS represents a uniform modeling structure that is applied in all metropolitan areas of the state. A few key aspects in which uniformity in FSUTMS may be seen include:

- ***Software Engine***: FSUTMS currently uses a TRANPLAN software engine.
- ***Database Names***: Input and output databases have common naming schemes.
- ***Database Formats***: Input and output databases have common formats and structures.
- ***Networks***: Model networks are coded and represented in a uniform manner.

The uniformity in transportation modeling in the state has served several important purposes. These include, but are not necessarily limited to:

- ***Training and Support***: As the entire state utilizes a common modeling system, the state has been able to provide very strong technical support and training on a statewide basis. The high level of training and support has proven crucial to the development and application of transportation models in the state.
- ***Technology Transfer***: The uniformity in transportation modeling has facilitated a high level of technology transfer among and within agencies and among and within the consulting industry. Agencies and consulting firms are able to discuss and exchange information on modeling and help each other enhance the model system.
- ***Data Sharing***: Because of the common modeling structure and database formats, FSUTMS has allowed the exchange of data and model parameters among agencies. This has helped smaller urban areas that may not have the resources to collect data on their own.
- ***Credibility***: The adoption of a uniform modeling structure by the entire state has provided strong credibility to the modeling process and has served the state and various agencies well in litigation.
- ***Universal Applicability***: The strong support and technical training program coupled with a strong technology transfer capability has made it possible for small MPO's and consulting firms to run the model and use it for various planning studies and applications. Even the smallest MPO in the state with a planning staff of just one or two individuals is able to run and maintain the model.
- ***Best Practice***: Transportation model development and application in the state of Florida is based on best available practice and the ability to provide support and train users in the use of best practice methods. In general, model developments in the state have not been geared towards experimenting with new theoretical approaches that are just beginning to emerge on the horizon and have not yet matured and been tested widely.

The modeling community in the state considers the TRANPLAN-based FSUTMS to have served the state very well for over a decade. As the state moves forward in tackling emerging planning issues, answering new policy questions, and testing new transportation solutions, the model task force believes that the time has come to assess the modeling needs of the state and identify the best set of software packages that should be included in the FSUTMS toolbox. In

addition to emerging transportation planning issues and policy questions, other considerations that motivate the examination of alternative transportation modeling platforms include:

- ***Methodological and Technological Developments***: In the recent past, there have been several methodological and statistical advances in travel demand modeling. What techniques and statistical methods should the state incorporate into FSUTMS? Looking five, ten, or fifteen years into the future, what is the set of methodological and technological/software capabilities that the state should have in its suite of tools?

  In this context, it should be noted that the extent to which methodological and technological issues contribute to model system performance vis-à-vis input data accuracy and quality has not yet been determined. The state has not conducted rigorous studies to isolate the effects of input data errors on model performance and overall model forecast errors. Thus, while methodological and technological developments may certainly enhance model performance in the state, the quality of the input data and its forecasts should not be overlooked. Methodological and technological developments may also help in improving the quality of the input data that feeds transportation models in the state.

- ***Maintain and Further Enhance Credibility***: As models are called upon to answer new policy questions and tackle emerging planning issues, there is a need to ensure that models used in the state are credible and would stand up to question in a court of law. The assessment of transportation modeling tools in Florida would help maintain and further enhance the credibility of transportation modeling in the state.
- ***Evolution in Industry***: There has been a natural evolution in the transportation modeling software industry. New software packages have been developed, other software packages have matured and been enhanced over the past decade, and others are potentially in the process of being phased out. There is considerable uncertainty regarding the continuation of a high level of support and enhancement of TRANPLAN.
- ***Levels of Accuracy and Spatial Aggregation***: Models are increasingly being used to perform analysis at smaller and smaller levels of geography including subareas, corridors, and intersections. The assessment will help determine whether

microsimulation approaches or other emerging methods and tools need to be added to the FSUTMS toolbox.

In this context, it is important to realize that modeling in Florida has been characterized by strong technical support and user training in methods and tools that constitute good practice. In the spirit of continuous improvement, the statewide model task force is now taking a broader look at the complete modeling suite available to modelers in the state. Some of the questions that the model task force desires to have answered prior to making a decision about new modeling platforms to be incorporated into FSUTMS include:

- What transportation modeling software or platform should serve as the main engine of FSUTMS?
- What additional tools or modeling software should be included and interfaced with the FSUTMS engine (e.g., GIS-TM, ULAM, IDAS, STEAM, transit accessibility and ridership forecasting models, etc.)?

Answers to these and other questions about model development and application in the state of Florida will provide the information necessary to set future directions for modeling in the state.

3. FRAMEWORK OF PANEL DISCUSSION

The blue ribbon panel set out by establishing a framework that would help organize and guide the panel deliberations. Within the context of a two day discussion, the panel felt that it would not be able to identify or recommend one or more specific software platforms for incorporation into FSUTMS. In the absence of a comprehensive study of the current specifications and capabilities of FSUTMS and the latest developments in the transportation modeling software industry, the panel considered it impossible to perform a rigorous evaluation of all software packages with respect to various criteria and identify one or more packages for adoption. In addition, the panel did not have sufficient information to identify the specific criteria that the state considered important in its software selection process. The panel felt that it would be able to provide guidance with respect to the methods, criteria, and issues to be considered in evaluating alternative options; armed with such guidance, the model task force may then undertake a full-scale comprehensive evaluation of alternative platforms before deciding the future of transportation modeling in the state.

The panel felt that a comprehensive evaluation of alternative modeling platforms should be aimed at answering the following four questions:

1. What are the current and future specifications (methods, parameters, software functionality, etc.) of the different modeling options?
2. What are the criteria to be used in evaluating alternative options?
3. Which of the criteria are important for the state and help distinguish among the options?
4. How do the alternative options rate on the various criteria identified under Question 3?

The panel felt that answers to these four questions would help the model task force identify one or more software platforms that best meet the needs of the state.

In this context, the discussion of the blue ribbon panel was centered around four broad themes as follows:

1. ***Current and Emerging Issues***: This category is geared towards setting the stage for determining future directions for transportation modeling in Florida. Current and emerging issues in transportation planning and modeling play a critical role in defining the methodologies and capabilities that need to be incorporated into transportation models. Therefore, the panel felt that it would be useful to first identify the current and emerging issues in transportation planning. Within this broad category, the panel also included the identification of transportation policies, strategies, and solutions as a subtask. Transportation models need to be able to respond to and model the impacts of alternative transportation strategies, policies, and solutions as planners address current and emerging issues in transportation planning and modeling.
2. ***Modeling Directions***: This category deals with an array of items that include modeling paradigms, modeling methodologies, spatial and temporal aggregation, and model specification and definition. In recent years, there have been considerable developments in the travel demand modeling arena with respect to modeling structures, paradigms, and specifications. The blue ribbon panel utilized this category to help identify the variety of developments occurring in the modeling arena and to provide guidance on the strengths and weaknesses of alternative methods and criteria that should be applied in choosing among them.

3. ***Modeling Software Capabilities and Functionality***: In addition to methodological considerations, there are many software-related capabilities and functionality that are crucial to the selection of modeling platforms for FSUTMS. Under this category, the blue ribbon panel identified the myriad model features, characteristics, and software capabilities that need to be considered in choosing a transportation modeling platform. The blue ribbon panel also utilized this opportunity to identify and define examples of options or platform alternatives that may be considered by the model task force.
4. ***Administrative and Management Aspects***: Finally, the blue ribbon panel addressed the administrative and management issues related to adopting a platform to support transportation modeling needs in the state. Various administrative and management aspects such as training and technical support, vendor viability, and cost fall under this category. The blue ribbon panel recognized that administrative and management issues often play a very important role in determining the appropriate modeling software platform.

The remainder of this report summarizes the deliberations and recommendations of the blue ribbon panel within each of the four topic areas.

4. CURRENT AND EMERGING ISSUES IN TRANSPORTATION PLANNING

The blue ribbon panel recognized that there are numerous planning issues that drive the development and enhancement of transportation models. As such, the panel did not work on developing a comprehensive and exhaustive list of issues that transportation planners are confronting in the current context and might confront in the future. Instead, the panel worked on developing a list of issues that represent the diversity of application contexts in which models are likely to be applied today and in the future.

The key planning issues and contexts identified by the blue ribbon panel may be summarized as follows:

1. ***Capacity Deficiencies and Congestion***: Addressing capacity deficiencies in the transportation system and solving congestion and bottlenecks in transportation networks continue to be major issues addressed by transportation planners. Models should be able to identify capacity deficiencies and congestion points in the system and model the

potential effects of alternative policy actions and solution strategies that might be considered.

2. ***Transportation – Land Use Interaction***: The interactions between land use and transportation and the feedback loops that characterize the transportation – land development cycle are important components of the urban transportation planning process. Models should be able to reflect the feedback relationships between transportation and land use as they might be used to gauge the effects of various land use and smart growth initiatives.
3. ***Economic Development Impacts of Transportation***: As transportation investments are increasingly seen as important ingredients driving economic development, planners are being expected to able to model the economic impacts of alternative transportation plans. It is likely that transportation models will be increasingly asked to address questions of economic impacts in the future.
4. ***Freight Mobility Strategies***: Recent federal and state initiatives have greatly emphasized the need for enhancing freight and truck mobility through the development of appropriate freight mobility strategies. While freight mobility is often associated with economic development, freight mobility also has far reaching safety and system performance implications. Models will be increasingly expected to help evaluate alternative freight mobility options.
5. ***Air Quality***: It is conceivable that Florida, with its high growth rates, may have some non-attainment areas in the not-so-distant future. The models should be able to adequately address air quality impacts of alternative transportation plans. The EPA guidelines do call for the use of feedback loops in transportation models and the use of time of day models to help better address air quality impacts of transportation. The transportation model incorporated in FSUTMS should be able to provide the information needed by air quality models such as MOBILE6.
6. ***System Preservation, Maintenance, and Operations***: Increasing attention is being paid to system preservation and maintenance including operational enhancements. Ramp metering, pavement condition monitoring, and other applications that are aimed at system preservation and operations may call for enhanced modeling capabilities including greater GIS functionality and microscopic traffic flow analysis.

7. ***Safety***: Even though safety has traditionally been the domain of traffic engineers, it is increasingly being considered in transportation planning processes. A new NCHRP project on the incorporation of safety into the long range transportation planning process is about to be initiated. Models may be expected to be able to estimate the expected number of accidents and incidents by functional classification and geographical location. Models may also be expected to analyze the impacts of alternative transportation plans on safety.
8. ***Security and Emergency Evacuations***: With the recent emphasis on transportation security, the question arises as to whether models are equipped to deal with and respond to transportation emergency situations. Such situations may include attacks that compromise the transportation system, hurricanes, earthquakes, floods, and other catastrophic events that often call for mass evacuations or shut downs. Planners are likely to be asked to model the impacts of alternative strategies in response to such emergency situations.
9. ***Equity***: While environmental justice is a term that is being used widely in the transportation planning profession, it continues to be a term that is not very well-defined. Moreover, there is no law that requires it. The panel felt that various issues related to environmental justice, community impacts, and social considerations may be broadly classified under the term of equity. Planners need to be concerned with who is affected by a transportation action, how many of each demographic or social group are affected, and what might be done to mitigate any adverse impacts. Models may be called upon to answer such questions.
10. ***Resource Allocation and Project Selection***: In a world of multimodal transportation systems, balanced transportation system development, and project trade-offs, it is imperative that models provide the information needed to make key resource allocation and project selection decisions. How is money allocated to address the various issues identified in this section? Models should be able to adequately evaluate alternative solutions and strategies and help decision makers allocate resources in the best way possible. This is probably one of the most important bottomline-type issues that needs to be considered in model development and application. How can the model be developed and applied such that the information it provides translates into effective resource allocation decisions.

In this section, the panel attempted to identify a diverse set of transportation planning issues that planners are confronting and will likely face in the future. There are many different strategies and solutions that can be used to address these issues. Capacity enhancements, transportation policy actions, transportation demand management strategies, operational improvements, and transportation control measures constitute a wide range of solutions that planners can deploy. The panel felt that it is important to identify the many strategies and policy actions whose impacts models will be expected to measure and quantify.

5. TRANSPORTATION POLICIES AND SOLUTIONS/STRATEGIES

The panel recognized that there are different ways in which one can approach the task of developing modeling recommendations. In one approach, one can identify all of the transportation policies, strategies, and solutions that the model should be able to evaluate and then develop recommendations for modeling directions with a view towards making sure that the modeling methodology and tools can do so. Another approach is one where it is simply stated that models are intended to simulate travel behavior as well as possible and in doing so should be able to respond to the large variety of policy actions and solution strategies that planners might be interested in analyzing. While the latter approach is conceptually appealing, it does not necessarily ensure a desired outcome because one has to make sure that variables representing the effects or characteristics of the solution strategy are included in the models. The panel attempted to utilize both approaches in its deliberations by both considering the many policies and solution strategies that planners might be interested in analyzing and the ability of the model system to simulate behavioral patterns. As it is difficult to predict the future, the panel felt that it should offer a list of ways by which issues identified in the previous section may be addressed. The panel believed that the model task force desired a model set that is sensitive to the issues and the solution strategies that might be deployed to address them and therefore considered it important to identify those that can and can not be accommodated in current modeling tools. The purpose of some of the new tools that are being developed is to be able to address every issue and model every solution strategy by looking at the decision making process of every individual in the population.

This section summarizes the deliberations and considerations of the blue ribbon panel with respect to the identification of transportation policies and solution strategies that might be of interest to transportation planners in the state. Once again, the list is not necessarily intended to be comprehensive, but representative of the variety of considerations that go into developing modeling directions.

1. ***Highway-Oriented Policies***: Highway-oriented policies include those strategies that serve different purposes including bringing about mode, time of day, or route/destination shifts in travel behavior and operational improvements to the highway system. The different strategies that come under this category include:
    a. *Capacity increases*: Adding capacity to the highway system in the form of new highways or new lanes on existing highways continues to be a major strategy for tackling congestion.
    b. *Maintenance of Traffic*: Maintenance of traffic is an important issue with respect to the number of lanes available and traffic diversion plans under different conditions.
    c. *ITS*: Intelligent transportation systems include a range of technology solutions and deployments that are aimed at enhancing traffic flow and providing information to travelers. IDAS is a new planning tool that is aimed at being able to perform planning analysis and evaluation of alternative ITS deployments.
    d. *Signalization*: Signalization enhancements constitute operational improvements that models may be expected to tackle; this calls for more detailed network representation at the level of intersection signalization characteristics.
    e. *Pricing strategies*: There are a range of pricing strategies including parking pricing, congestion pricing, and time of day pricing that are intended to alter behavioral patterns. Models should be able to simulate the effects of pricing policies.
    f. *Incident management*: The panel recognized that 50 percent of delay on all freeways is due to non-recurring incidents. Incident management techniques are aimed at reducing the delay due to such incidents. Models should be able to model the impacts of alternative incident management plans. While this may not be so critical from a 20-year forecasting perspective (one can not hope to

forecast incidents 20 years into the future), it may be important from a real-time simulation standpoint.

g. *Construction management*: During highway construction, lanes may be shut down and the shut down may vary by time of day. Models should be able to model impacts of lane shutdowns and traffic diversion that may result from such shutdowns. In this context, dynamic traffic assignment techniques that are intended to potentially capture the real-time routing of traffic in response to traffic and lane conditions are worthy of attention.

2. ***Transit-Oriented Policies***: Transit-oriented policies include a range of options that bring about changes to transit level of service. Policy actions include:

   a. *Fares/Pricing*: As in the highway context, transit fares and pricing strategies continue to be an important ingredient in transit planning. Such strategies include not only the actual fare paid (dollar cost) by travelers but also fare options (such as multiday passes, unlimited transfer, etc.).

   b. *Service changes*: Transit service changes include hours of service, frequency and headway, route and stop locations, route and stop amenities, on-board amenities (bikes on buses), and other service characteristics that might affect travel patterns.

   c. *HOV changes*: High occupancy vehicle strategies may be considered both a transit and highway strategy. HOV has already been incorporated into many models currently in place; may need to consider further enhancements as HOV strategies become more varied (e.g., HOT lanes).

   d. *LRT/BRT initiatives*: Light rail transit and bus rapid transit initiatives are being included in increasing numbers of long range transportation plans. Models should be able to evaluate the performance and impacts of these alternative transit technologies.

3. ***Demand Spreading Policies***: There are several travel demand management strategies and transportation control measures that are aimed at spreading (or even eliminating) travel demand. In addition to pricing strategies (already mentioned under highway-oriented strategies), other demand spreading policy actions include:

   a. *Flex-time*: Flextime includes the range of options aimed at changing the time of travel, particularly for the commute trip (that is more peak-period oriented).

Flexible work hours, flexible store hours, and other time of day flexibility that can greatly affect travel patterns may be worthy of capturing in models.

b. *Parking policies*: Many areas are considering parking restrictions, parking pricing strategies, and other parking oriented measures that may affect travel patterns.

c. *Carpooling strategies*: Carpooling incentives and strategies are aimed at bringing about a mode shift; however, this mode shift may also affect time of day choice, destination choice, route choice, etc. Models should be able to reflect the host of changes to travel patterns that might results from carpool incentives.

d. *Technology and E-Commerce*: Technology and electronic revolution has brought about major changes in the way people do business and pursue their lives. Telecommuting, teleshopping, teleworking, etc. are manifestations of the technology revolution. Models should be responsive to technology effects.

In this context, it is important to note that travel demand or behavioral patterns may be affected in numerous ways as a result of these strategies. Trip chaining patterns may be altered; thus one may conjecture that tour based approaches that attempt to represent travel patterns at the level of the trip chain are more able to respond to behavior-altering policies. Similarly, one might consider the effect of day-shifting (beyond simple time of day shifting which occurs in the same day). In day-shifting, one might move an activity/trip from a weekday to a weekend day as a result of a demand altering policy. The question arises as to how a daily model of demand aimed at capturing the typical weekday can represent day-shifting effects. Such methodological issues, however, may not play a big role from a software platform decision standpoint.

4. ***Land Use Strategies***: There are a host of land use policies and strategies that are of interest to transportation planners in today's context of integrated land use – transportation planning.

   a. *Transit oriented developments*: Transit oriented developments, pedestrian oriented developments, and neo-traditional land developments are new land use patterns that models need to be able to represent.

   b. *Mixed land use strategies*: New land development patterns are emphasizing mixed land development patterns. Models should be able to reflect the effects of

such mixed land use strategies where people may begin to walk and conduct more short intra-zonal trips.

c. *Zoning regulations*: Models are expected to be able to assess the impact of zoning regulations on land patterns and travel patterns.

d. *Non-motorized travel initiatives*: Newer land use strategies call for the enhancement of pedestrian and bike facilities and the consideration of pedestrian-friendliness factors in modeling travel demand.

e. *DRI and concurrency*: In Florida, development of regional impacts (DRI) studies and concurrency continue to play a major role in shaping land use and transportation impacts of land development patterns. It should be possible to apply models at the level of individual land development projects and assess projects in the context of concurrency requirements.

5. ***Other Policies***: There are other multimodal policies that may have a bearing on modeling methodology and selection. These include, but are not limited to:

   a. *Truck policies*: Many states and urban areas (including Florida) are considering alternative truck mobility options including truck only lanes, truck restrictions by time of day, and other strategies geared towards enhanced truck mobility. Models should be able to assess the impacts of alternative truck mobility strategies.

   b. *Intermodal connectivity*: Major emphasis is being placed on enhancing intermodal connectivity at airports, rail terminals, truck terminals, seaports, and other intermodal facilities.

What are the modeling directions in which the state should proceed to model the travel behavior impacts of these and other transportation policy actions and be able to assess their effects on the transportation system? The blue ribbon panel attempted to address this question by identifying and debating alternative modeling directions.

6. MODELING DIRECTIONS

The panel viewed modeling directions from three perspectives. In the first perspective, termed "strategic", the panel addressed conceptual paradigm shifts that are occurring in the travel modeling arena. In the second perspective, termed "tactical", the panel addressed practice-

oriented items that define the model structure and features. In the third perspective, termed "details", the panel examined model specification type issues, i.e., the "nuts-and-bolts" of the models. Each of these perspectives is briefly described in the sections below.

6.1 Strategic Directions

Strategic directions refer to conceptual paradigm shifts that are occurring in the transportation modeling arena. Some of the strategic questions addressed by the panel include:

1. ***Four-step vs. Activity-based Modeling***: The major paradigm shift towards activity based modeling is contributing to the increasing interest in the adoption of tour based models. Portland, San Francisco County, New Hampshire, and most recently Columbus, Ohio have moved towards the development and implementation of tour-based models that move away from the traditional four-step trip-based modeling approach. However, the panel felt that these approaches may not yet be ready for full-scale adoption in Florida. There is no software or platform in which these methods and approaches have been implemented in a readily usable form. These methods call for the development of customized software and code, possibly within an existing package such as EMME/2 or TransCAD, for implementation. Thus it would not be possible to evaluate alternative software platforms based on their activity based modeling methodology because none of them have such a model embedded yet. However, the panel felt that the state should consider being in a position to possibly conduct a demonstration project for the new activity-based or tour-based modeling approaches and be mindful of data collection opportunities that may help pave the way for developing and implementing such models in a more long-term model enhancement program. Software platforms should be examined with respect to their ability to incorporate customized code and input-output routines in the context of developing and calibrating new modeling paradigms in the state. The state should consider the evolutionary path that may best facilitate the transition to new activity and tour-based modeling approaches. It is not necessary that the entire model has to be switched over at once; one can just modify one step of the modeling process (say, mode choice) into an activity based or tour based framework. Thus, the transition can be incremental and the evolution can be gradual.
2. ***Trips vs. Tours***: A few panel members felt that the recent move towards tour-based modeling suggests that many models will become tour-based models in about 10 years.

There was a variety of opinions among panel members with regard to the move towards activity-based and tour-based approaches and therefore, the panel agreed that flexibility (to accommodate emerging approaches) is an important consideration in software selection. However, as in the previous item, it is not really possible to evaluate alternative software platforms based on their ability to handle tours. There are no packages that perform tour-based analysis as a standard option; the user must develop customized code and implement within the package. As mentioned previously, the state should be mindful of this trend when it considers alternative modeling platforms. The use of tours as a basis for analysis allows one to better represent inter-dependency among trips, for example, mode choice is done at the level of the tour as opposed to the individual trip.

3. ***Aggregate Application vs. Sample Enumeration (Market vs. Individuals)***: Traditionally, models have been applied at aggregate or market levels. In recent times, there has been increasing attention paid to the disaggregate application of models where pseudo-sample enumeration (i.e., microsimulation) techniques may be applied. In such approaches, models are applied at the level of the individual person and then aggregated up to desired markets. Once again, this is not likely to be a criterion for software selection as this is not a standard capability in any software package yet (except TRANSIMS perhaps); however, the state should be mindful of this emerging trend in model application.
4. ***Temporal Considerations***: There are different temporal considerations in model development and application. What is the temporal resolution that needs to be adopted for models? Trip tables may be derived by time of day, but the trips may still be assigned in a static assignment. Dynamic assignment methods involve assigning trips while considering the dynamic nature of the network; there is considerable variability in the network and therefore paths continuously change and trips are constantly re-routed to reflect new conditions on the network. Finally, real-time traffic microsimulations follow the movements of individual vehicles along a continuous time axis; such models are often referred to as microscopic traffic models as opposed to traditional trip table based macroscopic traffic models. There is a move towards mesoscopic traffic flow models where individual vehicles are tracked in time steps, thus providing a middle ground between macroscopic and microscopic models. The ability to implement or

interface with more real-time traffic microsimulation approaches should be considered as a possible criterion for choosing a software platform. However, validation of mesoscopic traffic microsimulation models may be an issue.

5. ***TRANSIMS***: The adoption of TRANSIMS would involve buying into the total package – both software and modeling approach. The business plan involves the user interacting with a front end graphical interface to provide necessary input data while the model itself is run at a central location. At this time, it is premature to make any decision regarding TRANSIMS as there has not yet been a full-scale application of the model. The Portland effort is still ongoing and the state can take a "wait-and-see" approach with respect to TRANSIMS. One might however consider separating out the back end of TRANSIMS (namely, the traffic microsimulation module) to do a real-time simulation at a regional scale. It is difficult to advise the state on whether to prepare for TRANSIMS because it is not yet certain whether TRANSIMS is a viable option. A few panel members felt that the state should consider TRANSIMS as an option only after a large and successful track record of TRANSIMS implementation has been developed around the country.
6. ***Variability of Behavior and Traits***: There is considerable variation in human behavior and traits both between persons and within persons over time. There is variability in trip characteristics, variability in traffic volumes from one day to the next, and so on. How does one account for that variability? The random variation in behavior could best be accomplished through probabilistic processes where different answers are obtained every time a simulation run is done using a different random number seed. It is not certain whether this will be received well as people like to see the same answer every time the model is run. The ability to reflect random variability in behavior may be important, but is not likely to be a consideration in software platform selection.
7. ***Household vs. Person***: Different models use different behavioral units for modeling travel behavior. Most models use the household or person as the unit of analysis for trip generation and then trips as the unit of analysis for distribution and mode split. In its new tour-based models, Portland is using the person as the basis for modeling travel at all three stages of the process. Once again, this strategic issue does not really distinguish between alternative software platforms. All software platforms can equally accommodate (or not accommodate) household or person level travel modeling.

8. ***Freight Modeling Considerations***: Modeling freight movements is gaining increasing importance all over the country. Regardless of whether one adopts "truck" based freight models or "commodity" based freight models, there is a need to be able to perform "multi-class traffic assignment" where mixed traffic can be loaded simultaneously onto the network. The ability to perform multi-class assignment is an important consideration in model software selection.
9. ***Integrated Transportation – Land Use Model***: The feedback relationships between land use and transportation are important in the current planning context and are likely to remain important in the foreseeable future. It is critical to ensure that the land use and transportation models used in the state can be linked together to facilitate a feedback loop between them. The use and application of integrated land use – transportation models is complex; most such models are location specific and difficult to validate. As long as the software chosen by the state can accommodate feedback loops with the land use model used in the state, this issue will be adequately addressed.
10. ***Induced Travel***: If induced travel is an issue, then one would need the model system to accommodate a feedback loop such that network accessibility and level of service measures feed back into the trip generation step of the process. In this way, the number of trip productions/attractions can be made sensitive to changes in transportation system performance. The panel felt that induced travel is not a significant enough issue to warrant major shifts in modeling paradigms. Induced travel, if present at all, is very small and pales in comparison to the destination, mode, and time of day shifts brought about by capacity expansions.

In summary, there are several strategic modeling directions that the state should consider as it moves forward, particularly from a long term model development perspective. However, many of these strategic considerations do not necessarily distinguish one software platform from another. These are considerations that the state should keep in mind as networks are developed, new data are collected, and special scripts and routines are written. Modeling platform chosen in the state should at least be capable of accommodating specialized modules in a flexible framework.

6.2 Tactical Directions

Tactical directions address various dimensions that define the model system. Under this category, the panel considered the following items:

1. ***Spatial Aggregation***: Spatial aggregation refers to the geographical resolution used for modeling travel. Whether one is operating at the zonal level or the individual address level, it is important to ensure that the model has virtually no limits on the number of zones or entities that can be modeled. Similarly, with respect to network resolution, it is desirable to have the model accommodate any number of links without running into software and hardware limitations. As the number of zones and/or links increases, so do the sizes of trip tables, network files, and matrices. It is important to consider the data compression and handling capabilities of the software when making a choice among alternative options.
2. ***Market Segments***: What are the market segments for which the model is able to provide information? Variables such as income, car ownership, etc. that may define market segments of interest should be available in the model and the model itself should be able to provide information for individual market segments. Again, this may not necessarily be a software selection issue; it is concerned more with model definition.
3. ***Model Forms***: The software chosen by the state should be flexible enough to accommodate all the different model forms that may be used in various steps of the modeling process. For example, in trip generation, the software should be able to accommodate both regression and cross-classification based forms. In trip distribution, the software should be able to accommodate both logit-based destination choice models and gravity models. In mode choice, the model should accommodate multinomial logit and nested logit forms. The software should be flexible to accommodate customized scripts in each of these steps both in the present and future.
4. ***Trip Purposes, Modal Alternatives, and Time of Day Periods***: The number of trip purposes, modal alternatives, and time of day blocks used in the modeling process may vary from area to area depending on the characteristics of the region. In general, the trend has been towards increasing the number of trip purposes, modal alternatives, and times of day for modeling travel. The software chosen by the state should not have any limits with respect to the number of trip purposes, modal alternatives, and time of day periods that may be used. In addition, data compression and handling capabilities

become an issue here again because of the potential proliferation of trip tables and matrices as additional purposes and times of day are used.

5. ***Auto Ownership Model***: Forecasting auto ownership is an important component of travel demand modeling as auto ownership is one of the drivers of trip generation. Currently, the state does not have an auto ownership forecasting model within FSUTMS. It would be preferable to have an auto ownership forecasting model implemented within FSUTMS. This is a relatively simple improvement that can yield significant gains. Auto ownership modeling is a consideration in software selection only to the extent that alternative options provide the flexibility to incorporate customized auto ownership models.
6. ***Model Feedback***: Model feedback is critical to ensure that, at a minimum, all steps in the modeling process are using the same speeds for modeling travel. It makes no sense to have the trip distribution, mode choice, and traffic assignment steps using different speeds (and therefore travel times) for modeling travel. Even though it has been discussed in the modeling arena for many years, feedback has not been implemented on a widespread basis. Model feedback should ensure that there is a feedback loop from assignment to the trip distribution step and the feedback loop should continue until there is convergence, i.e., no further change in travel times. Thus, trip distribution, modal choice, and traffic assignment would be based on the same speeds/travel times. It is not necessary to incorporate feedback into the trip generation step as induced travel is not really an issue. There are different methods for performing feedback including the method of successive averages and Evans algorithm. Preliminary information indicates that there are several software packages which incorporate feedback mechanisms. The panel recommends that model feedback be included as one of the criteria for model selection.
7. ***Speed Issues***: Appropriate speeds should be used at all steps of the modeling process. The incorporation of feedback in the transportation modeling process will help accomplish this. In addition, the state should examine the speed-flow curves that are currently used in the model and ensure that they are consistent with traffic characteristics in the real world. This is not necessarily a software related issue, but a tactical issue to ensure that the model adopted by the state reflects current best practice in speed-flow relationships.

8. ***Peak Spreading and Time of Day Modeling***: Time of day modeling provides a mechanism to account for variations among different times of the day with respect to travel characteristics and transportation system characteristics. Most time of day models continue to use fixed factor approaches where time of day factors are applied to trip tables to obtain time of day based trip tables. While this is a good first step, it does not allow one to account for peak spreading. Time of day choice models that include level of service variables as explanatory variables may be utilized to account for peak spreading effects (proportion of travel that occurs in peak period depends on level of service in peak period). Software chosen by the state should be able to accommodate time of day choice modeling routines that would allow the modeling of peak spreading phenomena. Software should be examined to see whether internal capabilities exist to handle peak spreading as part of the assignment process.

In summary, tactical considerations include items that help define the scope, form, and level of detail of the travel demand model. Several of these items are critical to the software selection process and the state should include them as part of an evaluation scheme.

6.3 Detail-Oriented Modeling Enhancements

Detail-oriented modeling enhancements are concerned with the actual "nuts-and-bolts" of the model. Items worthy of consideration under this category include:

1. ***Network Details***: The ability of the model to incorporate significant network detail is an important consideration in software selection. Some of the items within this category include:
    a. *Network completeness*: This refers to the inclusiveness of the network. Does the network include all local streets, turn lanes, and so on? Can the software handle such completeness in network representation? Are there any limits on the number of links that can be utilized in the network?
    b. *Network control*: Intersection control, signal timing patterns, and other intersection penalties are important components of a network as capacity limitations are often associated with nodes (as opposed to links). The extent to which the software can accommodate intersection control information and the influence of intersection control on traffic flow is an important consideration in

software choice. Some software platforms such as QRS II indicate that they do accommodate intersection control in the network representation. The ability to calculate delay and perform other internal calculations is also an important consideration in software platform choice.

c. *Network Shape and GIS Functionality*: As GIS technology becomes increasingly advanced, it would be preferable to be able to retain the shape of the network components without having to use stick networks. The ability of a transportation modeling software to retain the accurate and realistic shape of the network in space is an important criterion for transportation model selection.

2. ***External Travel***: The current plan in the state to tie all urban and regional models to the new statewide model is a worthwhile effort. Estimation of external trips continues to be a difficult issue for many model applications. While this may not necessarily be a software selection issue, the state should continuously strive to enhance the external travel estimation process in FSUTMS.
3. ***Parameters – Variables – Coefficients***: The state should continuously strive to improve the model specification in FSUTMS. Model parameters, explanatory variables, and model coefficients used in FSUTMS need to be updated and enhanced over time. The ease with which alternative software options allow such periodic updates and enhancements and potential customization/flexibility (within individual areas in the state) are important criteria for selecting software.

7. TRANSPORTATION MODEL FUNCTIONALITY AND SOFTWARE SYSTEM CRITERIA

The panel spent considerable time identifying the key functional aspects that should be incorporated in Florida's transportation models as the state moves forward in identifying future directions for transportation modeling. Many of these functional aspects can be directly translated into criteria that can be used to evaluate alternative software options and make a decision regarding the tools that should be included in FSUTMS. However, it should be noted that many of the functional aspects identified here are particularly relevant in the context of current modeling practice. While many of these aspects are also likely to be applicable in the context of emerging modeling methodologies (e.g., activity based microsimulation methods), there may be additional considerations that are specifically applicable to emerging

methodologies. However, in the absence of complete information about the implementation aspects of such emerging methodologies, the panel could not develop a comprehensive list of considerations for these methodologies. As noted earlier, the panel recommends that the state keep abreast of the latest methodologies in travel demand modeling and identify additional considerations as they become known. This would also help make any transition as smooth as possible.

There are many considerations when selecting a software platform for transportation modeling. The important criteria identified by the panel include (the criteria are not listed in any particular order):

1. ***Interface with Other Software***: It would be preferable to have a transportation modeling software that has interfaces to database management and spreadsheet packages and other planning/modeling and GIS software readily available.
2. ***Data Storage and Input-Output Routines***: Data handling capabilities are extremely crucial, particularly in an era of greater disaggregation in spatial and temporal dimensions. Similarly, the software input-output procedures should readily interface with user-defined and custom developed software and scripts. Such features may help make the availability of software source code less critical in the future.
3. ***Processing Speed***: As transportation models become increasingly disaggregate and complex, the processing speed of the software is an important consideration.
4. ***Highway and Transit Path Builders***: Highway and transit path building tend to be time- and computationally intensive processes. The algorithmic efficiency with which alternative software build highway and transit paths should be examined.
5. ***GIS and Spatial Analysis Capabilities***: Transportation data and networks are increasingly becoming available and stored in GIS formats. The GIS functionality available in the transportation modeling software is an important consideration in model selection. The spatial analysis capabilities (for example, transit stop and route buffering) of the software should also be examined. The ability to represent data related to non-traditional modes such as bike and pedestrian paths is another possible consideration.
6. ***Network Editor***: Network editing is a major part of transportation modeling. The ease and speed of network editing is directly related to the ease and speed with which

alternative scenario analysis can be accomplished. The quality of the network editing capabilities should be examined carefully.

7. ***Report Generation***: The reports generated by the model should be clear, useful, and easy to understand. The quality of the reports generated by the model should be another criterion for consideration.
8. ***Wrapper***: The transportation modeling software package should come with a high-quality wrapper and graphical user interface. The panel suggests that the model task force examine the software wrapper (e.g., how are different components of the model tied together, how are different files formatted and named) and graphical user interface prior to making any decision.
9. ***Customization Scripts***: In Florida, many areas run customized scripts that specifically meet their planning needs. Software should be evaluated with respect to their ability to accommodate customized scripts easily and in a flexible environment.
10. ***Matrix and Link Calculators***: Quite often, one needs to perform matrix manipulations, matrix calculations (transpose, multiplication, addition, etc.), and link calculations as part of the modeling process. Software should be evaluated with respect to the extent to which users can perform such calculations within the modeling process.
11. ***Component Applications***: Different transportation modeling software incorporate different component applications. The software can be evaluated with respect to the different component applications that they offer in the context of those applications that may be of greatest interest to the state.
12. ***Operating System***: What are the operating systems on which the software will run efficiently? The state should identify the operating systems on which the software should be able to function. Alternative software packages should be evaluated with respect to their ability to run on alternative operating system platforms.
13. ***Display***: Modeling systems should provide data, maps, displays, and other information that best facilitate/feed project evaluation and selection processes in the state, particularly for decision makers. This is an important consideration and should be included as a potential criterion in the decision making process.
14. ***Tie into other Florida Models***: There are several other models and tools being developed in the state including GIS-TM, ULAM, TLOS, and so on. The ability of the software to be tied into these and other pertinent Florida planning models of interest to

the model task force should be a criterion for selecting transportation modeling software for the state.

As mentioned earlier, these criteria are directly applicable to models that are currently in practice. Emerging methods including tour based and activity based models may have additional criteria for consideration. For example, tour based and activity based models may have much greater memory requirements. Similarly, there may be additional network and data collection considerations that play an important role with respect to the adoption or transition to emerging methodologies and tools.

This section has focused on the user functionality and software functionality for identifying transportation modeling software package(s) that best meet the needs of the state. The next section examines management and administrative issues related to software selection.

8. SYSTEMS MANAGEMENT AND ADMINISTRATIVE CRITERIA

One of the most critical components of the success of transportation modeling in Florida has been the extremely strong and effective business system that the state has put into place to help guide the development and application of travel demand forecasting models in the state. The panel felt that the state should not lose or compromise on the transportation modeling business system as it moves forward in identifying future modeling directions. The panel considered it important that the state give due consideration to various administrative and management issues that may affect the transportation modeling business system and environment in the state.

Administrative and management issues considered by the panel include (these are not listed in any particular order):

1. ***Cost/Price***: One of the biggest issues associated with selecting a software package is going to be related to the purchase price of acquiring the software and the cost associated with implementing it. This category will include such items as:
    a. Purchase price
    b. Implementation cost
    c. Training and support cost

d. Transition (labor) cost
e. Continuing license agreement and technical support cost
f. Upgrade cost
g. Cost to consulting community

In this context, it should be noted that the panel felt that implementation costs associated with transitioning to a new platform may truly be the big-ticket item in terms of overall adoption costs (more so than purchase price per se).

2. ***Company Business Model***: The company business model is an important consideration. How the company conducts business, relates to customers, and serves customer needs are critical ingredients to successful transportation modeling.
3. ***Company Stability and Longevity***: The stability and longevity of the company are important considerations. As the adoption of transportation modeling platforms is an extremely labor and resource intensive effort, it is important to ensure that the vendor is a stable entity that is likely to remain for a long time into the future.
4. ***Ability to Produce Needed Products Smoothly on Time***: Regardless of the capabilities of the model, planning agencies and consultants have to produce products on time in a smooth and efficient manner. Such production mode capabilities of the modeling software should be considered in decision making.
5. ***Visual Appeal of Output***: Decision makers and policy makers would like to see outputs that have visual appeal and are easy to understand and digest, particularly when dealing with the public. The visual output generation capabilities of the software should be considered.
6. ***Ability to Reproduce Results***: In general, the model should be able to replicate results when subjected to the same conditions.
7. ***Flexibility to Accommodate Future Changes***: Transportation modeling is a continuously evolving process where enhancements to the model form and specification are made on a routine basis. The software should be flexible enough to accommodate future changes that the model task force may wish to implement in FSUTMS.
8. ***Ease of Use***: The transportation modeling software package should be examined for ease of use. Depending on the vision of the model task force with respect to the entities, individuals, agencies, and firms that should be able to run the model, software packages can be evaluated.

9. ***Source Code Availability***: The availability of source code is not likely to be a major criterion in the current and future context of transportation modeling. In general, vendors do not provide source code; on the other hand, the open architecture nature of the software allows users to develop and incorporate customized programs within the software. While the availability of source code was a major issue at the previous decision point, the panel feels that this may not be such a critical factor any more.
10. ***Vendor Support***: The model task force should get clear information regarding the extent to which various vendors will provide technical and software support. The cost, time frame for response, and level of support should be evaluated carefully before making a decision regarding transportation modeling software.
11. ***Software Stability and Backward Compatibility***: The stability of the software is an important consideration. When the software upgrades to a new version, it should be possible to utilize scripts and programs written for an earlier version within the new version. Users should not have to rewrite scripts and routines from scratch every time a new version is released.
12. ***Maturity of Software***: Different transportation modeling software are at different stages of maturity and development. The current state of maturity and future potential for enhancement of the transportation modeling software packages need to be evaluated to ensure that the state is purchasing a good product that is most likely to see continued support and development in the future.
13. ***Language Longevity***: Software are written in different programming languages and utilize different types of protocols. If there are any issues related to the longevity of the software as a result of the programming language and protocols followed, they should be considered in the evaluation process.
14. ***Data Portability***: All areas in the state currently have data and networks in uniform formats that are consistent with FSUTMS. It may be difficult to translate and convert all databases and networks to new software platforms. The ease with which data and networks can be translated and converted over to the new platform is a major consideration when deciding on a new software platform.

Some of the administrative criteria noted above are negotiable and are not necessarily cast in stone at the time of evaluation. It is suggested the model task force undertake an evaluation of

alternative software modeling platforms based on those criteria that are not open to negotiation. If negotiations on a certain software product fail to produce desired results, the model task force can then proceed to the next most favored option and so on.

9. A METHODOLOGY FOR THE EVALUATION OF ALTERNATIVE SOFTWARE OPTIONS

Within the context of the two day meeting, the panel could not decisively identify the comprehensive list of options available to the state for consideration. The model task force will need to conduct some background research to identify the available options. However, the blue ribbon panel spent some time trying to develop a sample list of options. The list is as follows:

1. ***Null Option***: The null option is one where there is no defined plan for model development and enhancement in the state. Instead, the state retains the current FSUTMS toolbox and simply makes minor improvements or changes based on user requests. Such remedial action is undertaken on an ad-hoc basis.
2. ***Current FSUTMS with Small Scale Enhancement Plan***: In this option, the state continues to use the current FSUTMS toolbox with a small scale model enhancement plan. Enhancements would constitute short-term minor improvements to the current modeling tools available in FSUTMS.
3. ***Current FSUTMS with Larger Scale Enhancement Plan***: In this option, the state continues to use the current FSUTMS toolbox with a major commitment demonstrated by the implementation of significant enhancements over a longer time horizon. In this plan, the model task force defines a reasonably ambitious model enhancement agenda and helps guide the plan through a periodic evaluation process.
4. ***Citilabs***: Citilabs has a suite of products available for use including TRANPLAN, TRIPS, Viper, and TP+ for example. Citilabs is now developing a unified package called Cube. In this option, the FSUTMS toolbox would be considerably changed to include the new Citilabs product(s).
5. ***Caliper Corporation***: TransCAD is the major product of Caliper Corporation from a full-fledged transportation modeling standpoint. Caliper Corporation also has GIS packages that can be interfaced with other transportation modeling software (other than TransCAD). In this option, the FSUTMS toolbox would be considerably changed to include new Caliper Corporation products.

6. ***INRO Consultants***: EMME/2 is the major transportation modeling software package marketed by INRO. It is used quite extensively in the Pacific Northwest, Chicago, Europe, and Canada. Once again, this option would entail making significant changes to the FSUTMS toolbox.
7. ***AJH and Associates***: QRS II is the transportation modeling software package marketed by AJH and Associates.
8. ***PriceWaterhouse Coopers***: PriceWaterhouse Coopers is the vendor that is developing a commercial version of TRANSIMS. The blue ribbon panel does not feel that this is an option that can be chosen in the short-term, although it is possible in the longer term.
9. ***Others***: There are other transportation modeling software such as TMODEL, VISSIM, and so on that the model task force may wish to consider. Some preliminary background research will help identify these options and their potential viability as candidate alternatives for consideration in the state.
10. ***Specific Software Applications***: Within the context of evaluating transportation modeling software, the task force may also wish to examine specific planning software tools for their continued or potential inclusion in the FSUTMS toolbox. These may include ULAM, IDAS, TLOS, RTFAST, IMPLAN economic input-output model, site analysis software, and other specific purpose planning software.

The blue ribbon panel also felt that the options noted above are not necessarily mutually exclusive. The model task force may wish to consider the possibility of combining alternative options to comprise the new FSUTMS toolbox. In fact, the combining of options (particularly by including the first or second options within option packages) may help make the transition to any new tools very smooth.

The blue ribbon panel suggests that evaluative matrices be constructed for assessing alternative options with respect to their performance on various criteria. The blue ribbon panel developed sample evaluation matrices to illustrate the format in which software evaluations may take place. Within the scope of the two day meeting and without elaborate information about the software options, the blue ribbon panel felt that it could not fill in the information for the matrices.

Matrices provide a means of rating the various options with respect to various criteria of interest. Within each matrix, the options may be rated on a scale of 1-3 or any other rating mechanism that the model task force would like to adopt. Essentially, the rating mechanism is a means by which the strengths and weaknesses of each option can be effectively summarized and compared against other options.

Table 1

Matrix of Ratings with Respect to Ability to Analyze Transportation Policy Actions

Policy Action	Option 1	Option 2	Option 3	...	...	Option N
1	..					
2		Likelihood of need Extent of Use Overall importance to program Can software handle the study?				
3						
..						
M						

Table 2

Matrix of Ratings with Respect to Software Functionality and Administrative Criteria

Functionality/ Administrative Criterion	Option 1	Option 2	Option 3	...	...	Option N
1	..					
2		Dollar values for cost/price criteria Assessment of how option performs				
3						
..						
P						

10. AN ACTION PLAN FOR THE STATE

In closing the meeting, the blue ribbon panel spent some time discussing an action plan that the model task force might consider as it embarks on the critical task of identifying the future of transportation modeling in the state. Based on the discussion, the panel developed the following broad action plan and time schedule for consideration by the model task force:

Step 1: Blue Ribbon Panel Meeting

The first step occurred with the organization of the blue ribbon panel meeting on April 2-3, 2002. The blue ribbon panel helped initiate the process through the following tasks:

- Development of a preliminary list of criteria against which alternative model options can be rated and compared
- Development of a preliminary "modeling needs" list that addresses contemporary and future planning issues and transportation policy considerations
- Development of a preliminary action plan for moving towards a decision about the future of transportation modeling in Florida

Step 2: Vendor Presentations and Demos

The second step is about to occur on the afternoon of April 17, 2002 when several major software vendors are scheduled to make presentations and demonstrate their products. The vendors scheduled to present are Citilabs, INRO, Caliper Corporation, and PriceWaterhouse Coopers. These presentations and demos will offer the model task force initial insights into the capabilities, functionality, and methods that have been incorporated into the different products. The blue ribbon panel suggested that the criteria identified in Sections 7 and 8 of this report be provided to the vendors prior to the April 17 presentations so that they may customize their presentations to address the criteria of potential interest to the model task force. In this way, the model task force can maximize the benefit obtained from the presentations.

Step 3: Model Task Force Discussions

The third step would involve the model task force deliberating and fine-tuning the list of various criteria identified in this blue ribbon panel report at its meeting of April 18, 2002. The model task force may utilize the opportunity afforded by the April 18 meeting to assess the list of planning issues and needs and array of transportation policy actions to see if there are any other needs that need to be added. For example, are there any specific issues related to the transportation disadvantaged or tourists that need to be added to the needs/issues list? Are there any specific transportation policy actions that need to be added to the policy action list? Likewise are there any issues and policy actions that are currently on the list that can be deleted (not important to the state) or merit modification?

Similarly, the model task force can discuss the lists of criteria identified in Sections 7 and 8 of this report. Are the criteria important to the state? Are there any additional criteria that need to be added to the list and/or are there any existing criteria that may be eliminated or modified to better meet the needs of the state? The model task force should try to refine the lists of criteria and prepare more formal matrix templates that can be used for evaluating alternative software options. The model task force should also consider refining the list of options (model alternatives) at this meeting.

Step 4: Conduct Research Study on Options

Following the April 17-18 meetings, the model task force should embark on a rigorous data collection effort where detailed data are collected for each option. This effort may include several tasks:

- ***Data from Vendors***: Detailed information regarding various software products including their capabilities, methods, data formats, interfaces, and functionality may be obtained directly from vendors. Vendors may be asked to provide additional and longer presentations that constitute full-fledged demonstrations of the software. Vendors may also be asked to provide free examination copies of their packages to different agencies in the state for a trial examination period.
- ***Literature***: There is some literature available regarding the potential capabilities about various transportation models (e.g., Urban Transportation Monitor articles on travel demand modeling software). A 1996 ITE publication also provides guidance on how to select a travel demand model. The model task force should review the literature to gather additional information useful to the decision making process. There is considerable literature on alternative land use modeling strategies, economic input-output modeling strategies, and ITS and transit models that may also be reviewed as part of this task.
- ***Data from Users***: There are two types of model users. One category of users includes model developers while the second category includes those who only apply models (and do not develop them further or write customized scripts). Both types of users should be contacted for information regarding their experience and use of the various modeling software. The model task force may wish to undertake targeted site visits to have face-to-face meetings with users of various software packages and learn

from their experiences. These contacts with users can also be used to frame additional questions that can be given to vendors for their response.

- ***Benchmarking***: All of the different model software options should be put through a benchmarking test. All of them should be subjected to the same application, problem, and/or network and data. Benchmark tests and comparisons can be performed to evaluate alternative modeling software options with respect to various criteria that the model task force considers important.

During the data collection process, additional resources may also be brought to bear. The blue ribbon panel members have expressed a willingness to help the state as needed in the future in the evaluation process. The data collected in this stage should be used to fill evaluative matrices such as those shown in the previous section. These matrices will serve as decision support matrices for identifying most preferred options or combinations thereof for incorporation into FSUTMS.

Step 5: Assess Differences and Identify Preferred Options

When the evaluation matrices are filled up, it is likely that there will be several criteria on which all of the available options score equal ratings. At the two extremes, there may be some criteria or methods that all software are able to equally accommodate and then there may be other criteria or capabilities that all software simply do not address at this time. This affords the model task force an opportunity to reduce the dimensionality of the problem/matrices. The model task force should filter the evaluation matrices so that only those criteria upon which the software perform differently (and therefore can be distinguished from one another) are retained in the evaluation matrices. Decision making should be done using the criteria that are left in the evaluation matrices. Differences among software options can then be isolated effectively and the most preferred options can be identified.

Step 6: Address Administrative Issues that are Negotiable

As mentioned earlier, there are several administrative criteria that may be negotiable. For the most preferred options or combinations thereof, the state should initiate negotiations on these administrative criteria. These may include training programs, data conversion assistance, cost and price packages, technical and on-site support, upgrade policies, licensing agreements, and

availability of source code. These negotiations should yield additional data that can be used to fill the remaining cells in the evaluation matrices, namely, those that deal with negotiable administrative criteria.

Step 7: Decision Meetings and Action Schedule

Following the completion of all data collection efforts and negotiation, the model task force should consider holding a final series of decision meetings that can help ensure that there is a broad base of support for the chosen option(s). The model task force can also use these meetings to develop an action schedule, timeline, and evolutionary path that may be needed to facilitate any software transitions that might be necessitated by the chosen options.

The blue ribbon panel recognizes that, if the state were to decide to change some of the software options in the FSUTMS toolbox, a gradual evolutionary path wherein simultaneous model systems are available for a certain time period would have to be developed and planned. It would not be possible to do a full scale conversion in a short time frame. Users should play a key role in shaping the development of any transition plan that might be developed by the model task force. The time frame and schedule associated with Steps 4 through 7 are more uncertain due to the need to coordinate with vendors and research project selection schedules. Nevertheless, it is likely that the model task force will be able to make significant progress towards identifying the future of transportation modeling in Florida by its Fall meeting. Transportation modeling software selection is a major decision that has tremendous implications for transportation modeling and planning in the state. As such, the panel felt that the state should undertake a careful and deliberate process as it moves forward in identifying transportation modeling software to be adopted in the state.

APPENDIX

Future Direction for Florida's Transportation Models

Florida Statewide Model Task Force
BLUE RIBBON PANEL

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April 2-3, 2002

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Model Task Force Subcommittee Chairs

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- Mike Neidhart, Trip Distribution Subcommittee
- Imran Ghani, Trip Generation Subcommittee
- Gary Kramer, Land Use Subcommittee
- Glen Ahlert, GIS Subcommittee
- Kevin Feldt, Nominee for Transit Subcommittee

Blue Ribbon Panel Members

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- Kenneth Kaltenbach, The Corradino Group
- Eric Miller, University of Toronto
- Tom Rossi, Cambridge Systematics
- Jim Ryan, Federal Transit Administration

Coordination

- Bob McCullough, Administrator, FDOT Central Office Traffic Modeling Section
- Huiwei Shen, Model Task Force Coordinator, FDOT Central Office Traffic Modeling Section
- Ram Pendyala, Panel Moderator, University of South Florida Civil Engineering Department

AGENDA

Tuesday, April 2, 2002

8:00 AM	Introductions	Panel Moderator: Ram Pendyala Panel Members/Attendees
8:15 AM	Welcome Remarks	MTF Tri-Chairs: Danny Lamb Dennis Hooker Shi-Chiang Li
8:45 AM	Florida Standard Model Overview Setting Direction for Blue Ribbon Panel Expectations and Desired Deliverables	MTF Tri-Chairs (Panel Members/MTF Participation)
9:45 AM	Break	
10:15 AM	Question and Answer Session	Panel Members/MTF Participation
11:15 AM	Fine-Tune Meeting Strategy and Approach	Panel Members Participation (MTF Non-Participation)
12:00 Noon	Lunch	
1:30 PM	New Concepts in Transportation Modeling *Conceptual Changes and Paradigm Shifts* • Trip chaining • Induced travel • Integrated land use/transportation models • Microsimulation approaches • Activity-based methods • Agent-based models • Other	Panel Members Participation (MTF Non-Participation)
3:00 PM	Break	
3:30 PM	New Concepts/Paradigms in Transportation Modeling (continue discussion) • Review of tools/platforms in context of conceptual changes and paradigm shifts	Panel Members Participation (MTF Non-Participation)
5:00 PM	Adjourn	

Wednesday, April 3, 2002

8:30 AM	Recap of Day-1 Discussions	Panel Members/MTF Participation
9:00 AM	New Concepts in Transportation Modeling	Panel Members/MTF Participation

Practice Changes

- Time-of-day modeling
- Trip attraction models
- Multimodal and intermodal modeling
    - Bus
    - Rail
    - Non-motorized modes
    - HOV
    - Paratransit
- Urban truck modeling (goods and services)
- Land use sensitivity/modeling
- Air quality modeling
- Network and spatial microsimulation
- Auto ownership modeling
- Feedback in transportation modeling
- Destination Choice/Trip Distribution Enhancements
- Other

10:00 AM Break

10:30 AM New Concepts in Transportation Modeling — Panel Members Participation
Practice Changes (continue discussion) — (MTF Non-Participation)

- Levels of accuracy in transportation models
    - Long range transportation plans
        - Highway elements
        - Transit elements
    - DRI and site impact analysis
    - Daily vs. peak period/hour models
    - Network microsimulation analysis
- Achieving desired level of accuracy
    - Model validation standards

12:00 Noon Lunch

1:30 PM New Concepts in Transportation Modeling — Panel Members Participation
Technology and Software Platforms — (MTF Non-Participation)

- Review of tools/platforms in context of practice changes
- Discussion on software platforms – Strengths, capabilities, and data requirements
    - FSUTMS
    - Citilabs Products
    - EMME/2
    - TransCAD
    - QRS II
    - TRANSIMS
    - Other
- Maintaining common modeling platform while enhancing flexibility

- GIS tools for transportation modeling
- Graphical user interfaces
- Output visualization
- Input and output database formats/structures
- Other technology and software issues

3:00 PM	Break	
3:30 PM	Development of Recommendations Format/Outline of White Paper/ Blue Ribbon Panel Report	Panel Members Participation (MTF Non-Participation)
4:30 PM	Wrap-up/Feedback to MTF	Panel Members/MTF Participation
5:00 PM	Adjourn	

Future Direction for Florida's Transportation Models

Florida Statewide Model Task Force

BLUE RIBBON PANEL

Metroplan Orlando • 315 East Robinson Street, Suite 355 • Orlando, Florida 32801
Phone: (407) 481-5672 • Fax: (407) 481-5680
April 2-3, 2002

MISSION STATEMENT

PURPOSE

The Blue Ribbon Panel is being assembled to provide independent and objective counsel to the Florida Statewide Model Task Force on the future directions for transportation modeling in the State of Florida

OBJECTIVES

The objectives of the Blue Ribbon Panel are as follows:

- To advise the Model Task Force on emerging and new directions/approaches to transportation modeling
- To assess the current modeling process/procedures/methods used in Florida with respect to their strengths and limitations in meeting future transportation modeling needs and incorporating emerging and new directions/approaches
- To inform the Model Task Force about other available and emerging modeling tools and platforms with respect to their capabilities and suitability to meet Florida's future transportation modeling needs

TASK ASSIGNMENTS

The Blue Ribbon Panel will provide direction on how best to:

- Address modeling needs and issues identified by the Model Task Force
- Keep Florida advancing with new modeling approaches

- Integrate new technologies and methodologies into Florida's transportation modeling process
- Determine accuracy/confidence levels for different model applications

Specific work assignments include:

- Identifying modeling capabilities (e.g., policy analysis capabilities) that should be incorporated into Florida's transportation modeling process
- Reviewing the current Florida modeling system with respect to its strengths and limitations in addressing the identified modeling capabilities
- Providing information about available software and platforms with respect to their:
    - Ability to address the identified modeling capabilities
    - Compatibility with new modeling approaches
    - Integration and interface with existing models
    - Limitations
    - Practical issues
        - Data needs
        - Computing equipment, training, and cost
        - User-friendliness
        - Nationwide/worldwide modeling community support
- Providing advice/plan on:
    - How to conduct an evaluation of alternative modeling software and platforms
    - Executing a smooth transition to new software/platforms, if desired
    - Resource (time, cost, personnel) commitments for a transition to new software/platforms, if desired

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LIST OF ATTENDEES

1. Frank Baron, Miami Dade MPO
2. Jeanette Berk, Advanced Planning Inc.
3. Terry Corkery, FDOT Systems Planning Office
4. Patrick Costinett, Parsons Brinckerhoff
5. Kevin Feldt, Jacksonville Transportation Authority
6. Imran Ghani, FDOT District 2
7. David Hartgen, University of North Carolina at Charlotte
8. Dennis Hooker, Metroplan Orlando
9. Dane Ismart, The Louis Berger Group
10. Ken Kaltenbach, The Corradino Group
11. Gary Kramer, Pensacola-Fort Walton Beach-Panama City MPO
12. Danny Lamb, FDOT District 7
13. Shi-Chiang Li, FDOT District 4
14. Bob McCullough, FDOT Systems Planning Office
15. Eric Miller, University of Toronto
16. Vidya Mysore, FDOT Systems Planning Office
17. Mike Neidhart, Volusia County MPO
18. Ram Pendyala, University of South Florida
19. Tom Rossi, Cambridge Systematics
20. Jim Ryan, Federal Transit Administration
21. Huiwei Shen, FDOT Systems Planning Office
22. Suraya Teeple, FDOT District 2