Sponsoring Committees:
AHB45: Traffic Flow Theory
AHB40: Highway Capacity and Quality of Service
ADB30: Transportation Network Modeling
AHB25: Traffic Signal Systems
AHB20: Freeway Operations

TRB Joint Traffic Simulation Subcommittee

SimSub

AHB45(1)

January 2011: Contents

Newsletter

January 2011

Please visit our web site at:
*sites.google.com/site/**trb**committeeahb45/Welcome/*

A happy and prosperous new year to all!

2011 will be an exciting year for our Simulation Subcommittee. We have new ideas to discuss and new directions to consider. I am confident that this meeting will have activities of interest to all of you.

The Annual Workshop Task Group has put together another excellent program for the Sunday Workshop. This year's Simulation Workshop (Sunday, January 10, 1:30 – 5:00 pm) will focus on integrating air quality into traffic simulation. The speakers will describe how this is presently being done, how it might be done in the future, the strengths and weaknesses of present practice, and opportunities for improvement. This topic should draw a big crowd. You should attend if your schedule permits.

During the subcommittee meeting, we will have discussions about forming new task groups, planning a mid-year meeting, and developing new initiatives. Your inputs will help ensure we move forward in the best way possible.

See you Monday night,
George List

TRB 2011 SimSub Meeting Agenda

Monday, 7:30-9:30PM Marriott, Wilson B & C

- Introductions
- Sponsoring Committee Chair Remarks
- Annual Workshop Report (Brief synopsis and discussion of future topics)
- Research Needs and Resources Task Group Report
- Calibration, Verification and Validation Task Group Report
- Liaison and Outreach Task Group Report
- Mesoscopic Task Group Report
- FHWA Update
- 2011 Midyear activities
- New Task Group(s)
- Other Items
- Closing

Task Group Reports

Below are the reports submitted by each of the task groups.

Annual Workshop Task Group

Submitted by John Halkias, FHWA

This task group is responsible for the organization and presentation of an annual workshop on traffic simulation. This year it will be held on Sunday afternoon in the Palladian Room of the Shoreham, 1:30PM- 5:00PM.

This year's workshop will focus on the interplay between traffic simulation and environmental (air quality) impacts. Here are the presentations:

1:30 – 1:40 – Welcome and Opening Remarks – John Halkias (FHWA)

1:40 – 2:00 – "Impact of Operational Strategies on Induced Demand and Emissions" – Richard Margiotta (Cambridge Systematics, Inc). This presentation will review a current FHWA project on this topic. The presentation will focus on the meta-analyses done for induced demand and emissions impacts, a discussion of the experimental design to be used to conduct original research, and the first results of the operations/emission analyses conducted with microscopic, mesoscopic, and macroscopic traffic models.

2:00 – 2:20 – "Green Routing Strategies: Field Results and Modeling Logic" – Hesham Rakha (Virginia Tech) This presentation focuses on the impacts of route choice decisions on vehicle energy consumption and emission rates for different vehicle types using microscopic and macroscopic emission estimation tools. The results demonstrate that the faster highway route choice is not always the best from an environmental and energy consumption perspective. Specifically, significant improvements to energy and air quality can be achieved when motorists utilize a slower arterial route although they incur additional travel time. The study also demonstrates that macroscopic emission estimation tools (e.g. MOBILE6) can be misleading in that they ignore transient vehicle behavior. The findings suggest that an emission- and energy-optimized traffic assignment can significantly improve emissions over the standard User Equilibrium (UE) and System Optimum (SO) assignment formulations. The study then presents the INTEGRATION agent-based framework for modeling eco-routing strategies. Two agent-based eco-routing algorithms are developed: one based on vehicle sub-populations (ECO-Subpopulation Feedback Assignment or ECO-SFA) and another based on individual agents (ECO-Individual Feedback Assignment or ECO-IFA). Both approaches initially assign vehicles based on fuel consumption levels for travel at the facility free-flow speed. Subsequently, fuel consumption estimates are refined based on experiences of other vehicles within the same class. This stochastic, multi-class, dynamic traffic assignment framework is demonstrated to work for two Scenarios. Savings in fuel consumption levels in the range of 15 percent were observed and potential implementation challenges were identified

2:20 – 2:40 – "Optimizing Traffic Control for Emissions With a Valid Simulation Program" – Henk van Zuylen (Delft University of Technology) Traffic control on urban roads can be used to reduce fuel consumption, emissions and improve air quality. The most effective strategy is to reduce the deceleration and acceleration of heavy vehicles with large engines. Since this can have an impact on other traffic, a balance has to be found that provides improvements for heavy vehicles without a disproportionate increase in emissions for other vehicles.

Such a balance requires a valid method to determine driving behavior in signalized networks. The present microscopic models have to be calibrated to produce not only realistic travel times and delays, but also realistic acceleration and deceleration patterns. Research has been done to calibrate microscopic simulation models using trajectories derived from video observations

2:40 – 3:00 – "Toward an Eco-Sensitive Traffic Management" – Peter Wagner (German Aerospace Center) Within the EU-funded project *Tetris*, a microscopic simulation of the Italian city of Bologna has been conducted. Since detailed infra-structure data including a demand-table was available, the simulation gave a very detailed representation of the traffic in Bologna. Together with an emission module in the microscopic simulation program (the open source simulator SUMO was used) not only the travel-time, but also the most important pollutants (CO2, CO, NOx, HC, PMx) as well as the energy consumption were computed. Almost all of the pollutants had a high correlation coefficient (0.73,...,0.96) with the travel time. The study area was an urban area; so for pure freeway studies, the results might be different because of higher speeds. If these preliminary results prove to be true more generally, most of the commonly used operational strategies will be well prepared to account for greenhouse gas emissions and other pollutants. Of course, these results need further support, and may be even better emission modules, which will be a future task.

3:00 – 3:20 – Break

3:20 – 3:40 – "Measuring the Emissions Impact of a Traffic Control Change" – Robert Chamberlin (Resource Systems Group, Inc) This presentation focuses on the similarities and differences of different simulation tools (e.g. VISSIM, Paramics) in their estimate of emissions impacts from an operational change, such as the conversion of a traffic signal to a roundabout. This issue is rich in that variations in emissions estimates can come from several sources. At a high level, differences may stem from the use of a particular microsimulation software which incorporates different algorithms for car following and vehicle acceleration. Emissions estimates will also vary depending on which emissions tools are utilized (e.g. CMEM, MOVES, or other). Our analysis sought to minimize the "degrees of freedom" in comparing across tools. In other words, we tried to hold as many elements constant as possible in order to isolate the sources of difference in emissions estimates. An important element of this work was the definition of a traffic smoothing index, which could be developed from vehicle trajectory data output from the microsimulation software. Our work explored the correlation of emissions estimates with traffic smoothing indices.

3:40 – 4:00 – "Simulating the Impact of Variable Speed Limits on Air Quality in Barcelona" – Jordi Casas (TSS) This study explores the effects of implementing a system of variable speed limits on roads C31, C32, A2 and B23 (Barcelona, Spain) and the evaluation of the differences between this new system and the previous situation of fixed speed limits. The speed limit system is composed of a series of portals with variable sign panels that indicate the speed limit permitted at each moment of the simulation.

Continued on the next page

Annual Workshop (continued)

The calculation of the speed limit published on the panels (refreshed every five minutes) depends on an algorithm that studies and decides the speed limit based on the detection data. Each section is equipped with detectors capable of giving values for intensity, speed and occupation. These values will be used to calculate the speed limit in each section (a section being the space between each panel). The efficiency levels that will be tested between scenarios with fixed and variable speed limits will focus mainly on two subjects: circulation efficiency and the emission of pollutants.

To evaluate the efficiency of traffic circulation the following factors must be taken into consideration:

- Journey time (time and speed of circulation)
- Congestion level (time/number of stops and length/ distribution of queues)

And to evaluate the efficiency of pollutant emissions:

- "Fixed" model (without variable speed system, only vertical signaling)
- "Variable" model (system with variable speed limits)

The first model should reproduce the behavior that exists or existed (depending on the road) when the variable speed system was NOT in use and the second model permitted the observance of drivers following the new system of variable speeds. The comparison between scenarios is fundamental for the evaluation of the system.

4:00 – 4:20 – "Traffic Signal Control Strategies for Emissions Reduction: The Case of IntelliDrive" – Alexander Skabardonis (University of California Berkeley) IntelliDrive will provide the means for real-time data availability and exchange between vehicles and infrastructure that can lead to improved for traffic control strategies. For example, knowing the signal status would provide advisories to vehicles on adjusting their speeds to minimize fuel and emissions; also signal settings can be adjusted to provide smooth driving based on real-time information on vehicle trajectories. This is an FHWA Exploratory Advanced Research Project.

4:20 – 4:40 – "Current Practice in Optimization of Signal Timings (minimizing PI) and Impact on Emissions" – Aleksander Stevanovic (Florida Atlantic University) The goal is to show that our current practices in optimization of signal timings (minimizing PI) do not lead to lowest emissions (as it is believed in our community). Consequently, if we couple emission models with signal timing optimization models we could select signal timings which would further reduce emissions (our preliminary results show about 5-10 %).

4:40 – 5:00 – Panel Discussion

Midyear Meeting Report

Submitted by Alex Stevanovic

The mid-year SimSub meeting took place in Annecy, France during the TRB Traffic Flow Theory Committee (TFTC) Summer Meeting from July 7-9, 2010. The TFTC Summer meeting was a great success with 65 participants from 13 countries who presented 37 regular and 5 invited papers. The main theme of the TFTC meeting was "Does Traffic Data Support Traffic Models?" which perfectly aligned with purpose and the goals of SimSub Subcommittee.

A round table and several informal gatherings provided great opportunities to share our practices in traffic and network simulation with our European colleagues.

The SimSub mid-year meeting addressed the following topics:

- New SimSub website
- The upcoming TRB 2011 workshop
- Email list for SimSub members and friends
- Inputs for future SimSub newsletter

The meeting was moderated by Alex Stevanovic; and key contributions came from Rob Bertini and Ken Courage who, as pioneers of TFTC and SimSub activities, discussed the need for SimSub to establish strong liaisons with other TRB committees and to have more volunteers who will help with the SimSub newsletters.

A new SimSub Website was presented to the audience (see the first page of this newsletter) and the attendees were asked to visit the website and provide comments and inputs for its improvement. It was commented that more inputs are needed from SimSub Task Groups about their activities both during the TRB and later during the year.

The SimSub workshop at the 2011 TRB Annual Conference was the next topic on the agenda. The topic of the TRB workshop was announced (Simulation Modeling and Analysis of the Effect of Operational Improvements on Greenhouse Gas Emissions: Integrating the EPA MOVES Model and other Power-Based Emission Models with Simulation Models) and the attendees were invited to recommend potential speakers and to advertise the workshop among their peers who were not able to attend.

Next on the agenda was a discussion about various ways to distribute emails, forum discussions, and other correspondences to SimSub members and friends. Two major approaches were to establish a Google Group or to use a previous way of communicating messages through a listserv. Alex Stevanovic informed the participants that a new Google Group called Friends of SimSub has been established and he invited participants to join this Google Group in order to receive future emails about SimSub activities. Most of the attendants showed interest to join this group and provided their contact information. All of the interested attendees were subsequently invited to join the Google Group 'Friends of SimSub'.

At the end the audience was asked for any comments and ideas of general interests. Christine Buisson, our host, suggested that we initiate (with sponsoring TRB committees) a call for papers on some simulation-related subjects for TRB 2012. The idea was noted and we agreed to talk about this idea at the upcoming TRB meeting. The attendees were informed to send any questions or comments about SimSub website or Google Group to trbcommitteeahb45@gmail.com. Then the meeting was adjourned.

Liaison and Outreach Task Group

Submitted by Ken Courage

The scope of the task group was redefined to include the following responsibilities:

1. Maintenance of a document on SimSub organization and activities
2. Publication of a periodic newsletter with the following content:
   - Reports from all active task groups
   - Reports on the activities and interests of sponsor committees
   - Reports on the simulation-related activities of other professional organizations
   - Summaries of information on simulation-related conferences, projects and developments
   - Summaries of the simulation related content of the annual TRB meeting.
   - Summaries of recent research progress and results
   - Summaries of industry news and developments
   - Brief technical articles and papers submitted by members
3. Pursuing additional TRB Committee sponsorship

The Organization and Activities document was expanded and updated. The document is included in this issue of the newsletter.

The responsibility for newsletter publication was also transferred to this task group. The intent is to publish a quarterly newsletter to enhance the level of subcommittee activity throughout the year. Formation of editorial group is in progress.

TRB Committee ADB30, Transportation Network Modeling was added to the list of SimSub sponsor committees. We are also discussion sponsorship possibilities with TRB Committee AHB55.

Research Needs and Resources Task Group

Submitted by Mohammed Hadi

The SimSub Research Needs and Resources task group has accomplished a review of emission modeling as it relates to traffic simulation. Emission modeling and fuel consumption as related to traffic characteristics has been identified as a high priority research area by the TRB traffic flow theory committee.

The review conducted by SimSub Research Needs and Resources Task Group included contacting the developers of the widely used microscopic simulation tools to obtain information regarding the models used in these tools to estimate emission and fuel consumption. This effort also included reviewing the state of art in emission modeling with a focus on the recently developed EPA MOVE model. The effort also produced recommendations for future research on the subject. A presentation will be made at the SimSub meeting of the 2011 TRB annual meeting to discuss the results from the review and the needs for future research on the subject.

Calibratrion, Verification, and Validation Task Group

Submitted by Ray Benekohal

Nine members of the task group had a short meeting on Monday evening January 10, 2010 at TRB immediately after the Simulation Subcommittee meeting. It was decided to undertake the following activities this year.

1. Compile a list of references about CVV
2. Create web site for CVV
3. Offering a webinar on CVV and it possibility
4. Write a white paper on “best practice” and “users need”
5. Develop a research problem statement on CVV

Progress has been made on Activities 1 and 2 and the group will continue working on all five. We have found a person interested in offering the seminar. The obtaining the approval to proceed with offering the Webinar has been an unfinished activity.

Volunteers are being sought for writing the white paper. This remains as a future activity and we are still interested in finding volunteers for this task. We are still exploring writing and seeking funding for the research problem statement.

Mesoscopic Simulation Task Group

Submitted by Yi-Chang Chiu

The mission of the Mesoscopic Simulation Task Group is to facilitate the understanding of mesoscopic traffic simulation methods and to promote future research and applications of mesoscopic traffic simulation models. The main activities include synthesizing past and present research outcomes and identifying future research topics, as well as communicating with TRB traffic simulation communities to better align mesoscopic traffic simulation approaches with pertinent applications.

The main activities in 2010 have been 1) development of an outline for a synthesis on mesoscopic simulation, 2) development of research needs statements, and 3) ideas for presentations at the mid-year meeting. The current primary authors for the synthesis are Yi-Chang Chiu and Wilco Burghout. The target completion date is February 2011. The outline is:

1. Introduction
   - 1.1. What is the term “mesoscopic?”
   - 1.2. What is mesoscopic vehicular traffic simulation?
   - 1.3. Why mesoscopic vehicular traffic simulation?
2. Past Research in Mesoscopic Simulation
3. Mesoscopic Simulation versus Microscopic Simulation
   - 3.1. Supplementary not repetitive or competitive
   - 3.2. Select appropriate model types for problem at hands
4. Research Issues Concerning Mesoscopic Simulation Model Developments
   - 4.1. Traffic flow standpoint
   - 4.2. Macroscopic representation – speed, density, flow, shockwaves, travel time, queue formation and dissipation
   - 4.3. Vehicle loading standpoint
   - 4.4. Path generation and updates
   - 4.5. Reaction to network, traffic, information situations
   - 4.6. Hybrid Simulation
5. Summary and Conclusions

SimSub Organization and Activities

Motivation:

The decision to create a joint subcommittee was motivated by the recognition that simulation is a problem solving tool and not an institution. A few TRB committees found it hard to ignore their overlapping interest in simulation and decided that the joint subcommittee structure was the best way to address these interests. They all agreed that forming a separate simulation committee was not a good idea.

SimSub addresses the simulation community as a whole. For example, one of our task groups organizes a Sunday afternoon simulation workshop annually at TRB. Workshops generally address a topic of broad interest to developers and users of simulation tools. We also publish a periodic newsletter with information of interest to the simulation community.

Sponsorship:

SimSub presently has five sponsoring TRB Committees.

- AHB45: Traffic Flow Theory
- AHB40: Highway Capacity and Quality of Service
- AHB20: Freeway Operations
- AHB25: Traffic Signal Systems
- ADB30: Transportation Network Modeling

Discussions are progressing with other TRB Committees that have an interest in highway traffic simulation.

Place in TRB Structure:

SimSub fits into the TRB structure as subcommittee AHB45-1 of the Traffic Flow Theory Committee. It supports, instead of competes with, the sponsoring committee activities. It does not sponsor paper sessions because that would compete with the sponsoring committees. It does offer an annual award for the best TRB paper on simulation but the nominations for that award are collected from the sponsoring committees. Conversely, the research problem statements and other materials that SimSub generates are forwarded to the sponsor committees for their consideration.

Some of the sponsoring committees have formed simulation subcommittees to address their own missions. For example, the AHB40 Simulation Subcommittee's job is to guide the development of material related to simulation to be incorporated in the Highway Capacity Manual.

Membership:

Subcommittee membership has no numerical limitations but all subcommittee members must be active members of an appointed task group. Those who are interested in the work of the subcommittee but are not task group members will be designated as friends of SimSub.

Expansion of SimSub Sponsorship:

Recognizing that the interest in traffic simulation extends beyond the boundaries of our existing committee sponsors, we have established a formal but simple procedure for expanding committee sponsorship.

There are two requirements for any committee that seeks to become a sponsor:

1. A resolution from the full committee expressing the desire for sponsorship
2. Acceptance by the chairs of all of the existing sponsoring committees

Role of Sponsor Committees

The chair of each sponsor committee appoints one member as a SimSub liaison. The role of the liaison member is as follows:

- Report to SimSub on the current interests and activities of their committee, including suggestions for new SimSub task groups and activities that would have cross cutting components with other sponsor committees.
- Report to their committees on the current activities of SimSub, including task group progress, reports, research problem statements and proposals for new task groups.

Each sponsor committee may nominate papers to be considered for awards by the subcommittee. Normally, these papers will have been submitted to the committee for presentation and/or publication at the annual TRB meeting. Both lectern and poster session papers are eligible. The award categories are identified in the Awards Task Group description. Committees may also make nominations for the Lifetime/Pioneer Achievement Award.

Task Groups

The activities of the subcommittee take place within task groups that are appointed by the Subcommittee Chair, who will designate a Task Group Chair and at least two other members. Additional task group membership is determined by the Task Group Chairs. The task group membership should be reviewed annually and adjusted to ensure that all members are contributing productively to the task group mission. Progress reports from all task groups will be included in a periodic newsletter.

Task groups are generally formed with the objective of producing a product. Current task groups include:

- *Annual Workshop*: Tasked with the development and presentation of the Simulation Workshop on the Sunday afternoon of each TRB Meeting. Workshops generally address a topic of broad interest to the simulation Community. The annual workshop draws a large attendance and has been the most visible product of the subcommittee.
- *Research Needs and Resources*: The goal of this task group is to provide support to research in the area of surface transportation system simulation and to facilitate the use of the results from this research to advance the state-of-the-art and state-of-the-practice in transportation system simulation modeling. Since the formation of SimSub, the Task Group has produced a number of products including the identification and ranking of traffic simulation research challenges and producing a white paper that addresses the need for a data repository to support traffic simulation research and development.

Continued on the next page

Continued from the previous page

- Awards: This task group has developed two awards that may be presented annually:
  1. The Lifetime/Pioneer Achievement Award, to be presented to an individual who has made a continuing contribution to the traffic simulation field over his/her full career
  2. The best paper award for simulation, chosen from the papers submitted to the sponsor committees. Separate awards are presented for model development and application.
- Calibration, Validation and Verification: The objective of this task group is to enhance the understanding of the role of and effects of calibration, verification and validation in simulation.
- Mesoscopic Simulation: The mission of the Mesoscopic Simulation Task Group is to facilitate the understanding of mesoscopic traffic simulation methods and to promote future research and applications of mesoscopic traffic simulation models. The main activities include synthesizing past and present research outcomes and identifying future research topics, as well as communicating with TRB traffic simulation communities to better align mesoscopic traffic simulation approaches with pertinent applications.

- Liaison and Outreach: The scope of this task group includes the following activities:'
  1. Maintenance of this document on SimSub organization and activities
  2. Publication of a periodic newsletter with the following content:
     - Reports from all active task groups
     - Reports on the activities and interests of sponsor committees
     - Reports on the simulation-related activities of other professional organizations
     - Summaries of information on simulation-related conferences, projects and developments
     - Summaries of the simulation related content of the annual TRB meeting.
     - Summaries of recent research progress and results
     - Summaries of industry news and developments
     - Brief technical articles and papers submitted by members
  3. Pursuing additional TRB Committee sponsorship

The task group membership includes all of the liaison members from sponsor committees and professional groups as well as the newsletter editor and assistants.

Subcommittee members are encouraged to focus their efforts on a single task group.

Formation of New Task Groups

New task groups are our most important means of expanding the SimSub activities and interests and attracting new members and TRB committee sponsorship. Anyone can propose a new task group and the person proposing the task group generally becomes the chair of that group.

Proposals for new task groups should be submitted to the subcommittee chair. Each proposal should contain a discussion of the following items:

1. Why is this topic important?
2. What are the unmet needs and how will they be addressed?
3. What is the specific product to be developed by the proposed group?
4. Who are the proposed members? A task group must have at least three members to ensure a broad perspective. In keeping with TRB goals, each task group should have one young member who will serve as the co-chair.

Individuals wishing to explore the formation of a task group may request time on the agenda of a subcommittee meeting. They may also submit a prospectus for publication in the newsletter to assess the interest among subcommittee members and friends. The SimSub chair may appoint a task group at any time, subject to ratification at a subcommittee meeting.

Simulation in the HCM 2010

Submitted by Lily Elefteriadou, Ken Courage, and Mark Vandehey

Production of the fifth edition of the Highway Capacity Manual (HCM) is complete and publication is scheduled to occur in February 2011. HCM2010 incorporates more than $5 million of funded research that has occurred since publication of HCM2000 through the National Cooperative Highway Research Program (NCHRP).

One of the projects that contributed to its development is NCHRP Project 03-85, "Guidance for the Use of Alternative Traffic Analysis Tools in Highway Capacity Analyses", led by Prof. Ken Courage. NCHRP 03-85 provided materials for addressing the use of alternative tools in conjunction with HCM techniques. Twenty of the 35 chapters of the HCM 2010 include materials related to the use of alternative tools and produced by this project.

The HCM 2010 Chapter 7 provides general guidance for the use of alternative tools, and each methodological chapter contains specific guidance on the application of such tools for the subject facility. For each methodological chapter, those materials discuss:

- Strengths of the HCM Procedure
- Limitations of the HCM Procedures that Might Be Addressed by Alternative Tools
- Additional Features and Performance Measures Available from Alternative Tools
- Development of HCM-Compatible Performance Measures Using Alternative Tools
- Conceptual Differences between the HCM and Simulation Modeling that Preclude Direct Comparison of Results
- Adjustment of Simulation Parameters to the HCM Results
- Step by Step Recommendations for Applying Alternative Tools

In addition, sample calculations illustrating alternative tool applications are provided for several types of facilities.

Finally, a set of rules for computing uniform measures from trajectory analysis is included in HCM Chapter 24, Concepts: Supplemental. These rules were developed in a manner that will make them practical for implementation in simulation tools.

A new website (www.HCM2010.org) will provide the opportunity for additional discussion and comments regarding the HCM 2010 methods. The Highway Capacity and Quality of Service (HCQS) Committee of the Transportation Research Board (TRB) invites the users of the manual interested in improving the profession's understanding of capacity and quality of service analysis to participate in the committee deliberations at the committee website: www.AHB40.org.

News from Caliper Corporation

Submitted by Dan Morgan

In early 2010, Caliper Corporation completed the development, calibration, and validation of a city-wide microscopic traffic simulation model of Eureka, CA for the California Department of Transportation (Caltrans) using Caliper's traffic simulation software TransModeler. That model is now being extended and applied by Caltrans staff to evaluate the traffic impacts of various access management strategies along Broadway, Eureka's most heavily traveled corridor. The model represents the first of its kind - a GIS traffic model of an entire city. The model is geographically accurate to the lane level, with highly detailed roadway and intersection geometry and includes the City, County, and State's combined inventory of traffic signal timings, including time-of-day coordination plans, for more than 50 signalized intersections. Starting in July, Caliper began a new project to test a similar approach to traffic modeling on an altogether different scale. A model of Central Phoenix, which spans 500 square miles of the city and parts of surrounding Glendale, Peoria, Scottsdale, Tempe, and Chandler and includes more than 1,700 signalized intersections, is being developed for the Maricopa Association of Governments. The model development is nearly complete, and calibration efforts are under way. The model calibration and validation process will involve various parallel transportation research and software development elements, including microscopic, mesoscopic, and hybrid traffic simulation, simulation-based dynamic traffic assignment, route choice modeling, and more efficient threaded and 64-bit computational methods. The first phase of the project is scheduled to be completed by the end of 2011.

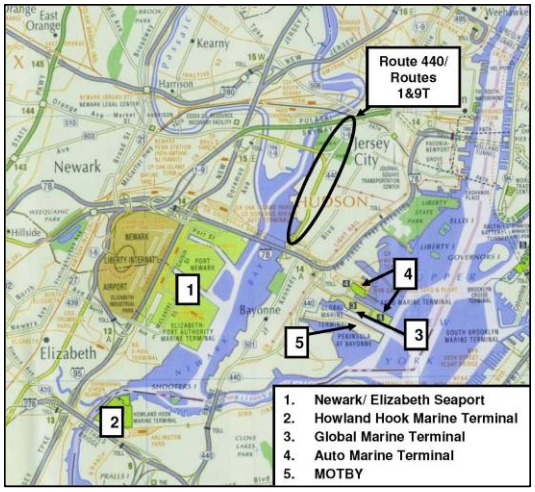
Other wide area microscopic, mesoscopic, and hybrid traffic simulation models of places such as Buffalo, NY, San Diego, CA, and Northern Virginia have recently been developed or are presently being developed by TransModeler users around the country using TransModeler 2.6, which was released in 2010. Early 2011 will see the release of TransModeler 3.0, which will include a variety of performance improvements for simulation-based dynamic traffic assignments and 3D animation and new features such as center two way left turn lanes, reversible and contra-flow lanes, and passing on two-lane rural highways. TransModeler 3.0 also has a variety of new traffic signal timing management features that make it far simpler to input and maintain signal timings for large numbers of intersections and multiple times of day

News from Jacobs Engineering

Submitted by Scott Parker

Introduction

Significant growth and redevelopment are anticipated throughout Jersey City, New Jersey over the next 40 years, driven in part by the expansion of nearby marine terminals that are expected to generate increasing volumes of large trucks. A significant portion of this growth is expected to occur along the Western Waterfront of Jersey City, which is targeted for renewal by local agencies. Primary access to and through the Western Waterfront is provided by NJ 440 / Routes 1&9T; however, in its current configuration, this facility will not safely and efficiently accommodate future traffic demands (of all modes, including bicycles and pedestrians). Furthermore, mobility constraints and unattractive physical traits of the highway will hurt the appeal of new livable communities envisioned along the corridor.

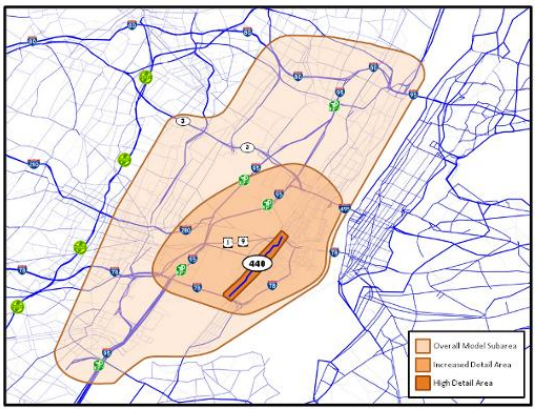


Study

In spring 2009 the City of Jersey City awarded this 40-year horizon planning study to Jacobs Engineering. The scope included model development at both the macro- and micro levels. It was of primary importance that the models be realistically calibrated, so that model projections could withstand scrutiny and potential challenge by stakeholders or by members of the public. The first model – a regional travel demand (macro) model – was produced to evaluate the regional implications of boulevard-concept alternatives; this model would be used to create projections for the 2020, 2035 and 2050 analysis years. The North Jersey Regional Transportation Model – Enhanced (NJRTM-E), developed by the North Jersey Transportation Planning Authority, was selected as the base from which to build a project-specific module.

The NJRTM-E is a standard four-step model that runs on Citilabs software products, *CUBE* (as an interface) and *Voyager*. Because of the importance of model output credibility, calibration relied not only on actual volumes and ground-based turning movement counts, but also on empirically-derived sets of origin-destination (O-D) tables. These were generated as follows: during one morning and one evening peak demand period, five circling aircraft were staggered simultaneously along the six mile corridor, and overlapping photo sets were acquired of the highway at two-second intervals. Later, sample vehicle sets were traced from each significant point of origin along the corridor to ultimate destinations. O-D tables were compiled from the resulting database. These tables were then run through the NJRTM-E in an iterative calibration process, ultimately assuring that the output data from the model for the base year (2009) matched the real world. This model was then run for each of the future-condition analysis years (2020, 2035 and 2050); resulting output flows and O-D tables were in turn provided as input to the second model, a micro-simulation model built on the *Paramics* platform.

The diagram below shows the NJ 440 network model sub-area of the NJRTM-E; its also shows the high-detail inner corridor for the aerial O-D survey and Paramics micro-simulation model (dark brown).



The *Paramics* micro-simulation model was needed to develop and analyze detailed design concepts for the NJ 440 / Routes 1&9T corridor. Links, nodes, attributes and basic flow parameters were assembled using standard tools and methods. Then, for 2020, 2035 and 2050, various design concepts were tested (again, the projected flows and O-D tables from the NJRTM-E were used for these runs).

If there are any questions about this ongoing study or the deployment of model findings, please direct them to Scott Parker, Jacobs Engineering, at scott.parker@jacobs.com. The aerial O-D survey was performed by Skycomp; contact Greg Jordan at jordan@skycomp.com.