Annual Report 2013

TRANSPORTATION RESEARCH BOARD
JOINT TRAFFIC SIMULATION
SUBCOMMITTEE

AHB45 (1)
SimSub

Chairman's Message

SimSub Chair
Dr. George List
NC State University

It is always a pleasure to introduce you to the SimSub newsletter. This issue is reaching you contemporous with the 2014 Annual TRB Meeting. Many thanks to all the SimSub supporters who attended the Traffic Simulation Workshop and the SimSub meeting.

SimSub continues to be very active. More than 150 people attended the Traffic Simulation Workshop. There was evidence of excitement about the future of simulation and further advances. Modeling safety was a highlight. Another was the use of models in combination to balance expeditious results with detailed analysis. We are preparing a TRB Circular that will contain the papers prepared for the workshop.

A new development is a webinar series. Working in conjunction with the ITE SimCap group, we are lining up speakers for this year and next. We are very pleased that this activity is flourishing. It will likely raise the visibility of both SimSub and SimCap and further encourage the use of simulation models for traffic analyses. Our thanks to Miranda Wells for spearheading this effort.

As with prior years, we will be holding midyear meetings in conjunction with our sponsoring committees. One will be held in conjunction with the midyear meeting of the Traffic Flow Theory Committee on August 11-13, 2014 in Portland, Oregon. Another will be in conjunction with the midyear meeting of the Highway Capacity Meeting on June 11-14, 2014 in Lexington, Kentucky.

As always, we need to thank David Hale for his efforts as the new newsletter editor. He works diligently and tirelessly to assemble this document for our benefit.

In closing, we look forward to your continuing involvement and support; and to seeing you at the midyear meeting or at the next annual meeting in January 2015.

Sponsor Committees

AHB45:	Traffic Flow Theory
AHB40:	Highway Capacity and Quality of Service
AHB20:	Freeway Operations
AHB25:	Traffic Signal Systems
ADB30:	Transportation Network Modeling
AHB55:	Work Zone Traffic Control
ADC20:	Transportation and Air Quality

Contents

SimSub Web Site

Alex Stevanovic, Webmaster http://sites.google.com/site/trbcommitteeahb45

Joint Traffic Simulation Subcommittee

Draft Meeting Agenda
Transportation Research Board Annual Meeting
Monday, January 13, 2014, 7:30-9:30PM Marriott, Washington B1

A. Introductions - George List
B. Sponsoring Committee Chair Remarks - attending chairs or liaisons
C. Task Group Reports
    a. Annual Workshop Report (brief synopsis) – Rob Bertini
    b. Research Needs and Resources Task Group - Mohammad Hadi
    c. Calibration, Verification and Validation Task Group - Ray Benekohal
    d. Awards – Ed Lieberman
    e. Liaison and Outreach Task Group – David Hale
    f. Mesoscopic Task Group – Yi-Chang Chiu
    g. Safety Simulation Task Group – Bill Young
    h. Agent-Based Simulation Task Group – Monty Abbas
D. FHWA Update – James Colyar
E. New Business
    a. TRB Circular based on 2014 Workshop – Rob Bertini
    b. Joint ITE Webinars – Miranda Wells
    c. 2014 Midyear activities – George List
    d. 2015 Annual Workshop Planning – George List
F. Multitude Project Report - Vincenzo Punzo
G. Other Items (including new task groups and upcoming conferences)
H. Closing

Sponsoring Committees

AHB45: Traffic Flow Theory & Characteristics*
ADB30: Transportation Network Modeling
AHB20: Freeway Operations
AHB25: Traffic Signal Systems
AHB40: Highway Capacity and Quality of Service
AHB55: Work Zone Traffic Control
ADC20: Transportation and Air Quality

2014 TRB Sunday Workshop on Simulation (SimSub): Looking Back and Looking Ahead

Program

Welcome from George List SimSub Chair 1:30

Moderator: Constantinos Antoniou

1) Femke van Wageningen-Kessels, Traffic Flow Modeling: A Genealogy 1:30-1:45

2) Ed Lieberman,History of the Use of Simulation in Traffic Analysis 1:45-2:00

3) Tom Rioux, Evolution of the TEXAS Model and Traffic Simulation 2:00-2:15

4) Peter Vortisch, History of VISSIM Development 2:15-2:30

5) Peter Wagner, Evolution of SUMO Simulation Model 2:30-2:45

Break 2:45-3:00

Moderator: Robert Bertini

6) Alex Skabardonis, Thoughts on Traffic Simulation Models 3:00-3:15

7) Vincenzo Punzo, Future Directions for Managing Uncertainty in Stochastic Traffic Models 3:15-3:30

8) Kaan Ozbay, Big Data and the Calibration and Validation of Traffic Simulation Models 3:30-3:45

9) William Young, Looking Back and Forward at Modeling the Safety System 3:45-4:00

10) Audience Input Panel: Nate Gartner, Hani Mahmassani, George List, Jeff Lindley 4:00-4:30

2014 Upcoming Events

Institute of Transportation Engineers
FLORIDA SECTION
DISTRICT 10

2014 FSITE Winter Workshop
Traffic Analysis Tools and Specialized Applications

The Florida Section of ITE is pleased to announce the 2014 Winter Workshop on ***Traffic Analysis Tools and Specialized Applications***. The workshop will provide an overview of the latest updates for some popular analytical tools in Florida. New applications and emerging concepts will be discussed. Specific topics include:

- Guidance and framework for traffic analysis in FDOT's upcoming Traffic Analysis Handbook.
- FHWA's Traffic Analysis Toolbox and upcoming guideline revisions for applying micro-simulation software.
- Updates to 2010 HCS including the incorporation of new HCM chapters on alternative intersections, reliability and managed lanes.
- Advanced arterial analysis in Synchro/SimTraffic including alternatives intersection/interchanges, roundabouts and adaptive signal control.
- Self-calibration and sensitivity analysis in CORSIM
- Multi-resolution modeling in VISUM/VISSIM - integrating macro-, meso-, and micro-simulation models.
- Active Traffic Management modeling for freeways.

When: February 20, 2014

Where: Florida's Turnpike Enterprise Headquarters, Auditorium B
Turkey Lake Service Plaza, MP 265
Ocoee, FL 34761

Time: 10:00 AM to 4:00 PM

Target Audience:

The target audience for the workshop is transportation planners within MPOs and local, county and state organizations, transportation engineers, and traffic analysts.

PDH/AICP Credits: 6.0 hours

Registration Costs:
FDOT Employees = Free
Member = $60
Non-Member = $70
Retired Member = $40
Retired Non-Member = $50
Student = $30

Registration include lunch and refreshments

FDOT employees can purchase lunch at the door.

Don't miss this opportunity to learn about the latest practices!

2014 Upcoming Events

International Symposium of Transport Simulation, and the International Workshop on Traffic Data Collection and its Standardisation

Ajaccio, Corsica (France)
June 1-4, 2014

About the events

Following the success of the previous editions of both the International Symposia of Transport Simulation (ISTS) and the International Workshop on Traffic Data Collection and its Standardisation (IWTDCS), ISTS'14 and IWTCDS'14 aim to gather the world's transportation and traffic academics and practitioners, as well as people who are interested in contributing to or gaining a deeper understanding of the transport simulation field.

During the three-day conference plenary sessions featuring high level speakers and interactive breakout sessions will take place at the Conference Centre of Ajaccio (Corsica, France), where participants will have the opportunity to mingle with those at the forefront of data collection and standardisation, transport simulation thought, practice, and implementation as well as exchange experience and best practices. This event will focus on scientific challenges and issues raised by new theoretical development in the transport fields as well as new advances in Mobility Data collection and smart processing tools.

ISTS & IWTDCS
June 1-4, 2014 * Ajaccio, Corsica (France)

The organiser

The ISTS'14 and IWTCDS'14 is organised by the Transport and Traffic Engineering Laboratory (LICIT), a joint Research Lab. of ENTPE (the Post-graduate School of Civil Engineering & Sustainable Development) and IFSTTAR (a state-financed Research Institute in the areas of Transportation, Urban and Civil Engineering, Construction Materials and Natural Hazards). Within IFSTTAR, the LICIT is one of the 12 laboratories of the Components & Systems (COSYS) Department.

Established in 1993, the LICIT is recognized for its work in traffic modelling and engineering. The laboratory has already developed many successful applications for a real-time traffic information, network monitoring & management (including weather -sensitive traffic management), traffic simulation and dynamic assessment of the environmental impacts of transportation systems. For more information, please visit the Lab's website.

Register now and take advantage of early-bird registration discounts until March 15th, 2014.

Sponsored by: ENTPE, OPTIMUM, IFSTTAR

2014 Upcoming Events

The 5th International Conference on Ambient Systems, Networks and Technologies (ANT-2014)

The 3rd International Workshop on Agent-based Mobility, Traffic and Transportation Models, Methodologies and Applications (ABMTRANS'14)

http://www.uhasselt.be/UH/datasim/ABMTRANS.html

in conjunction with ANT-2014 conference
Hasselt, Belgium (2—5 June 2014)

The 3rd International Workshop on Agent-based Mobility, Traffic and Transportation Models, Methodologies and Applications (ABMTRANS 2014) provides an international forum on the latest technologies and research in the field of traffic and transportation modeling using an agent-based approach. ABMTRANS 2014 is organized in the context of the European FP7 project DATASIM (http://www.datasim-fp7.eu/). ABMTRANS 2014 will be held in Hasselt, Belgium (2-5 June 2014) in conjunction with The 5th International Conference on Ambient Systems, Networks and Technologies (ANT-2014).

Transportation Research Institute (IMOB)
Hasselt University
Wetenschapspark 5 bus 6
B-3590 Diepenbeek, Belgium

2014 Upcoming Events

SCOPE

This workshop provides a multidisciplinary collaborative forum for researchers and practitioners to submit papers presenting new research results and novel ideas related to the theory or the practice of agent-based traffic and transportation modeling. This workshop also invites researchers to submit their work focusing on the data mining, management and configuration for agent-based traffic and transportation modeling.

Topics of interest include (but are not limited to):

- Agent-based modeling and simulation
- Agent-human interactions
- Environment modeling and interaction protocols
- Data mining, learning and adaptation
- Marketing decision support
- Collaboration, cooperation, competition, coalitions in traffic and transportation models
- Agent-based negotiation of QoS and SLAs in traffic and transportation models
- Social and emergent behavior in MAS-T (multi-agent systems applied to traffic and transport)
- Large scale simulation of agent-based microscopic traffic models
- Calibration and validation of agent-based models for traffic and transportation
- Role of multi-agent methodologies for complex systems
- Conceptual modeling of agent-based approach
- Agent-based freight transportation modeling
- Multi-modal routing of agents in a dynamic traffic environment
  Agent-based scheduling to establish synthetic agenda for day-to-day activities

SUBMISSION AND PROCEEDINGS

All papers accepted for workshops will be included in the ANT-2014 proceedings, which will be published by Elsevier. The authors must follow Elsevier guidelines as given in ANT-2014 website (http://cs-conferences.acadiau.ca/ant-14/). The number of pages for workshop papers is limited to 6 pages. Authors should submit their contributions electronically in PDF format at: https://www.easychair.org/conferences/?conf=abmtrans2014.

The submission processes will be managed by easychair.org. If you have used this system before, you can use the same username and password. If this is your first time using EasyChair, you will need to register for an account by clicking "I have no EasyChair account" button. Upon completion of registration, you will get a notification email from the system and you are ready for submitting your paper. You can upload and re-upload the paper to the system by the submission due date.

The selective outstanding papers presented at the workshops, after further revision, will be considered for publication in journals special issues. In case of any problem with submission, please contact the workshop chair for assistance.

All workshops accepted papers will be printed in the conference proceedings published by Elsevier Science in the open-access Procedia Computer Science series (on-line). Procedia Computer Sciences is hosted on www.Elsevier.com and on Elsevier content platform ScienceDirect (http://www.sciencedirect.com), and will be freely available worldwide. All papers in Procedia will also be indexed by Scopus (http://www.scopus.com) and Engineering Village (Ei) (http://www.engineeringvillage.com). This includes EI Compendex (http://www.ei.org/compendex). All accepted papers will also be indexed in DBLP (http://dblp.uni-trier.de/).

The selective outstanding papers presented at the workshops, after further revision, will be considered for publication in journals special issues at ANT'14.

IMPORTANT DATES

- Submission due: 28 January, 2014.
- Notification of acceptance: 1 March, 2014.
- Camera-ready due: 1 April, 2014.
- Workshop: 2– 5 June, 2014.

2014 Upcoming Events

PROGRAM COMMITTEE

- Tom Bellemans, IMOB - Hasselt University (Belgium)
- Davy Janssens, IMOB - Hasselt University (Belgium)
- Bruno Kochan, IMOB - Hasselt University (Belgium)
- Reinhilde D'Hulst, VITO (Belgium)
- Fjo Deridder, VITO (Belgium)
- Tom Holvoet, Katholieke Universiteit Leuven (Belgium)
- Rutger Claes, Katholieke Universiteit Leuven (Belgium)
- Davy Preuveneers, Katholieke Universiteit Leuven (Belgium)
- Ghasan Bhatti, OKTAL - University of Toulouse (France)
- Stephane Galland, UTBM (France) Nicolas Gaud, UTBM (France)
- Fabrice Marchal, CNRS (France)
- Theo Arentze, Eindhoven University of Technology (the Netherlands)
- Harry Timmermans, Eindhoven University of Technology (the Netherlands)
- Marco Luetzenberger, DAI-Labor (Germany)
- Anders Peterson, Linkoping University (Sweden)
- Paul Davidsson, Malmo University (Sweden)
- Rashid A. Waraich, ETH Zurich (Switzerland)
- Phuc V. Nguyen, Arkansas State University (USA)
- Daniel Keren, University of Haifa (Israel)
- Irith Ben-Arroyo Hartman, University of Haifa (Israel)
- David Yang, Federal Highway Administration, U.S. Department of Transportation (USA)
- Matthew Roorda, University of Toronto (Canada)
- Kai Nagel, TU Berlin (Germany)
- Oded Cats, KTH Stockholm (Sweden)
- Johan Holmgren, Blekinge Institute of Technology (Sweden)
- Michal Jakob, Czech Technical University (Czech Republic)

REGISTRATION

Please visit: http://cs-conferences.acadiau.ca/ant-14/#registration for more information.

VENUE, ACCOMMODATION & VISA REQUIREMENTS

Please visit: http://cs-conferences.acadiau.ca/ant-14/#conferenceVenue for more information.

WORKSHOP ORGANIZERS

Dr. Ansar-Ul-Haque Yasar Transportation Research Institute Hasselt University, Belgium ansar.yasar@uhasselt.be	ir. Luk Knapen Transportation Research Institute Hasselt University, Belgium luk.knapen@uhasselt.be

If you have any further questions please contact one of the workshop organizers.

2014 Upcoming Events

ANT-2014—Modeling and Simulation in Transportation Sciences

The 5th International Conference on Ambient Systems, Networks and Technologies (ANT-2014)

(Track on Modeling and Simulation in Transportation Science)

http://cs-conferences.acadiau.ca/ant-14/
Hasselt, Belgium (2 –5 June 2014)

The 5th International Conference on Ambient Systems, Networks and Technologies (ANT-2014) is a leading international conference for researchers and industry practitioners to share their new ideas, original research results and practical development experiences from all Ambient Systems, Networks and Technologies related areas. The ANT-2014 will be held in conjunction with the International Conference on Sustainable Energy Information Technology (SEIT)).

ANT 2014 will be held in the city of Hasselt. Hasselt was founded in approximately the 7th century on the Helbeek, a small tributary of the Demer river. The name Hasselt came from *Hasaluth*, which means hazel wood. Hasselt is an old yet modern city which is home to multiple academic institutions and where visitors can enjoy a variety of activities and entertainment. ANT 2014 is co-organized & co-hosted by the Hasselt University, Belgium.

Transportation Research Institute (IMOB)
Hasselt University
Wetenschapspark 5 bus 6
B-3590 Diepenbeek, Belgium

2014 Upcoming Events

SCOPE

The goal of the **ANT-2014** conference is to provide an international forum for scientists, engineers, and managers in academia, industry, and government to address recent research results and to present and discuss their ideas, theories, technologies, systems, tools, applications, work in progress and experiences on all theoretical and practical issues arising in the ambient systems paradigm, infrastructures, models, and technologies that have significant contributions to the advancement of ambient systems theory, practices and their applications.

At ANT-2014, there is a dedicated track on ***Modeling and Simulation in Transportation Sciences (MSTS)*** organized by the *Transportation Research Institute (IMOB), Hasselt University, Belgium*. This aim of this track is to bring together communities interested in the computation, knowledge discovery and technology policy aspects of transportation systems. The organizers of ANT-2014 (MSTS track) welcomes papers from researchers in the domains of transportation sciences and engineering, computer science, urban and regional planning, civil engineering, geography, geo-informatics and related disciplines to submit papers for consideration for presentation and for publication in the conference proceedings.

Topics of interest in the MSTS track include (but are not limited to):

- **Collaborative transport, including collaborative multi-modal transport**
- **Data mining and statistical learning for travel information**
- **Human factors including adaptive driving, travel behavior, persuasive technology**
- **Human-computer interfaces in intelligent transportation applications**
- **Logistics and transportation management**
- **Mathematical optimization in traffic engineering**
- **Novel applications targeted to health, mobility, liveability and sustainability**
- **Renewable energy sources in transportation**
- **Simulation of traffic, passenger flows, assisted driving or collaborative transport**
- **Social and institutional information related to travel**
- **Traffic flow and transportation model**
- **Travel information, including recommender systems and user feedback systems**
- **Uncertain information in collaborative transport and assisted traveling**

SUBMISSION AND PROCEEDINGS

All ANT-2014 accepted papers will be printed in the conference proceedings published by Elsevier Science in the open-access Procedia Computer Science series (on-line). Procedia Computer Sciences is hosted on www.Elsevier.com and on Elsevier content platform ScienceDirect (www.sciencedirect.com), and will be freely available worldwide. All papers in Procedia will also be indexed by Scopus (www.scopus.com) and Engineering Village (Ei) (www.engineeringvillage.com). This includes EI Compendex (www.ei.org/compendex). The papers will contain linked references, XML versions and citable DOI numbers. You will be able to provide a hyperlink to all delegates and direct your conference website visitors to your proceedings. All accepted papers will also be indexed in DBLP (http://dblp.uni-trier.de/).

Submitted technical papers must be no longer than 8 pages for full papers and 5 pages for short papers including all figures, tables and references.

Authors are requested to submit their papers electronically using the online conference management system in PDF format before the deadline (see Important Dates).

The submission processes will be managed by easychair.org. If you have used this system before, you can use the same username and password. If this is your first time using EasyChair, you will need to register for an account by clicking "I have no EasyChair account" button. Upon completion of registration, you will get a notification email from the system and you are ready for submitting your paper. You can upload and re-upload the paper to the system by the submission due date.

IMPORTANT DATES

- Submission due: 4 January, 2014.
- Notification of acceptance: 1 March, 2014.
- Camera-ready due: 4 April, 2014.
- Conference: 2—5 June, 2014.

2014 Upcoming Events

PROGRAM COMMITTEE (MSTS Track)

- Tom Bellemans, IMOB - Hasselt University (Belgium)
- Davy Janssens, IMOB - Hasselt University (Belgium)
- Bruno Kochan, IMOB - Hasselt University (Belgium)
- Reinhilde D'Hulst, VITO (Belgium)
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- Tom Holvoet, Katholieke Universiteit Leuven (Belgium)
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PROGRAM VICE-CHAIRS

Prof. dr. Davy Janssens Transportation Research Institute Hasselt University, Belgium davy.janssens@uhasselt.be	Prof. dr. Tom Bellemans Transportation Research Institute Hasselt University, Belgium tom.bellemans@uhasselt.be	Prof. dr. Harry Timmermans Technical University Eindhoven The Netherlands h.j.p.timmermans@tue.nl

If you have any further questions please contact one of the program vice-chairs.

You may also visit our website (*http://cs-conferences.acadiau.ca/ant-14/*) for more details.

2014 Upcoming Events

Traffic Flow Theory and Characteristics Committee (AHB45)
2014 Summer Meeting - August 11-13, 2014 - Portland, OR

Celebrating 50 Years of Traffic Flow Theory

Call For Papers
We are pleased to announce a call for papers for the Transportation Research Board (TRB) Committee on Traffic Flow Theory and Characteristics Symposium Celebrating 50 Years of Traffic Flow Theory and Midyear Meeting to be held in Portland, Oregon, USA, August 11-13, 2014. Selected top papers will have the opportunity to be considered for publication in special issues of two top transportation academic journals, and all presented papers will be published in a special issue of the *Transportation Research Circular* series.

Background: The predecessor committee focusing on traffic flow theory was organized 50 years ago, and this is an appropriate time to recognize the past accomplishments in the field, reflect on the present state of our research community and identify key future directions. Papers on all topics in the traffic flow theory and characteristics domains are welcome. This symposium builds on past successful symposia beginning with the *Greenshields Symposium* in Woods Hole, MA in 2008, the *Does Traffic Data Support Traffic Models Symposium* in Annecy, France in 2010 and the *Symposium on Advancements in Traffic Flow Theory and Highway Capacity and Quality of Service* in Fort Lauderdale, FL in 2012.

Important Dates:

March 1, 2014 Extended Abstracts Due
April 15, 2014 Authors Notified of Paper Decisions
July 25, 2014 Papers Due for Conference Proceedings

Instructions: For full consideration, download an extended abstract template, and submit a 4-page (maximum) abstract by March 1, 2014. Selected authors of the top papers will be asked to submit full papers by July 25, 2014 for further consideration for special issues by two top transportation academic journals. All accepted authors are asked to submit final papers by July 25, 2014 for inclusion in symposium proceedings and *TR Circular*.

For More Information: For additional information please contact the Symposium Chair, Prof. Robert Bertini (bertini@pdx.edu, 503-725-4249) at Portland State University.

2013 Simulation Events

Advances in Microscopic Simulation Modeling

presented at the Penn State Transportation Engineering and Safety Conference, December 11th, 2013

The Simulation and Capacity Analysis User Group (SimCap) of the Mid-Atlantic Section of the Institute of Transportation Engineers (MASITE) is pleased to present this session focusing on recent project examples and advances in microscopic simulation modeling.

Moderator: David A. Petrucci, Jr., P.E., PTOE, Traffic Discipline Leader, Borton-Lawson

- **Self-Calibration and Sensitivity Analysis in TSIS / CORSIM –** David Hale, Ph.D., Assistant in Engineering, University of Florida
- **Advanced Aimsun Applications: Online System and Evacuation –** Murat Aycin, Ph.D., Senior Traffic Engineer, Transportation Simulation Systems, Inc.
- **VISSIM Modeling of the Route 10 Superstreet Project, ChesterField County, VA –** Emily Scholl, E.I., Traffic Engineer, McCormick Taylor, Inc.

Speaker Biographies:

Murat Ayçin was born in Ankara Turkey in 1969. After graduating from Middle East Technical University with a degree in Civil Engineering, he came to Urbana-Champaign to continue his studies in Transportation. He received Ms. And PhD from the University of Illinois in 2000. In the small town called Chicago, he realized that the transportation jobs didn't require a PhD so he came to New York city where the traffic congestion never sleeps. He has been tackling with the traffic problems in NY since 2001. Murat's focus areas are traffic simulation, toll plaza operations, project management and the maintenance and protection of traffic (MPT) projects. He has twelve years' experience modeling and analyzing traffic operations of complex facilities such as the streets of Midtown Manhattan, tunnels (Holland and Midtown) and bridges (Throgs Neck and Henry Hudson). His notable projects include Broadway Model which was utilized in analyzing the impacts of closing Broadway Avenue to vehicular traffic in Times Square and Lower Manhattan Model which was utilized in World Trade Center Campus Security Plan. He dreams in Aimsun 3D.

Ms. Emily Scholl, E.I. joined the Traffic Department of McCormick Taylor in August 2007 with a Bachelor's Degree in Civil Engineering from the University of Delaware. As a member of the Traffic Group, Emily has been involved in a number of projects which have gained her experience ranging from traffic studies and traffic operations to the preparation of design plans. Her design experience includes the development of temporary and permanent signal plans, signing and pavement marking plans and traffic control plans. She has also worked on traffic studies which have involved Traffic Impact Study review, crash data analysis, data collection programs, pedestrian studies, trip distribution, traffic control warrant analysis, and detailed capacity analysis. She has extensive microsimulation experience using Vissim including a variety of different traffic networks such as freeways, roundabouts, toll plazas and signals on projects in New Jersey, Pennsylvania and Virginia. Emily is an active volunteer in the profession. She is member of the DVRPC VISSIM Study Advisory Committee; participates annually in the Futures Cities Competition and led the Engineers Club of Philadelphia Science Day activities and serves as the Outreach Chair for MASITE.

Call for Presentations:

The Thomas D. Larson Pennsylvania Transportation Institute announces the 20th annual TESC conference on December 10-12, 2014. Abstracts should be submitted by March 31st to jdauber@engr.psu.edu. Selected presenters will be notified by May 30th.

2013 Simulation Events

Advances in Microscopic Simulation Modeling

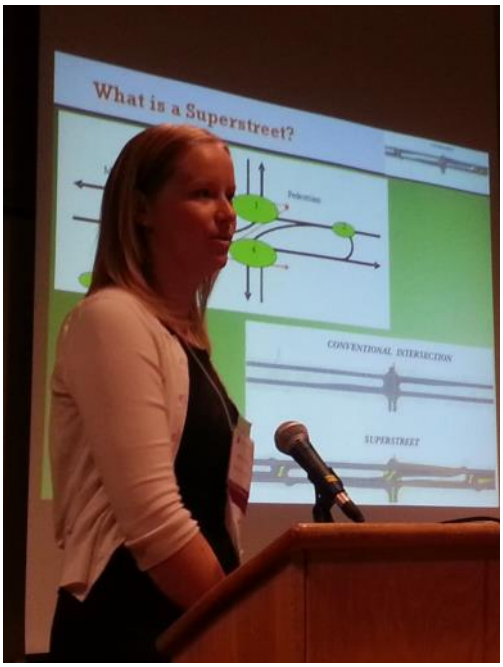
presented at the Penn State Transportation Engineering and Safety Conference, December 11th, 2013

The Simulation and Capacity Analysis User Group (SimCap) of the Mid-Atlantic Section of the Institute of Transportation Engineers (MASITE) is pleased to present this session focusing on recent project examples and advances in microscopic simulation modeling.

David Petrucci

Emily Scholl

Murat Aycin



2013 Simulation Events

MULTITUDE Final Conference (Naples, Italy) December 4th-6th

by Mark Brackstone and Vincenzo Punzo

The EU COST Action MULTITUDE (www.multitude-project.eu) concluded its 4 year run recently with a final event hosted by the University Federico II in Naples Italy. The event was attended by 70 participants from around the EU as well as a number of invited experts from the USA and Canada. The conference reported on the work undertaken in the project on uncertainty in transport simulation modelling which has included the definition of a general framework for the management of uncertainty in traffic simulation, the development and application of Global Sensitivity Analysis techniques to traffic simulation, the building of a new simulation platform to benchmark dynamic origin-destination (OD) estimation and prediction algorithms, and the development of a new methodology to reconstruct trajectory data from noisy measurements, applied to NGSIM and MoCoPo datasets.

A wide range of additional invited talks on related topics were also made by speakers from both the academic sector and suppliers (PTV, TSS and SIAS), and practitioners (government agencies TfL and the Highways Agency from the U.K., and consultancies Cambridge Systematics and Mott McDonald).

The conference also gave the chance to present highlights of the three major deliverables of the project: 1) a state-of-the-art report of both simulation research and practice, to be published by Taylor and Francis under the title 'Traffic Simulation and Data: Validation Methods and Applications'; 2) a "Case for guidelines" support and strategy document, to be published as a European Commission JRC scientific and policy report in Jan 2014, that critically reviews existing documents, addresses a number of relevant topics and proposes a road map for developments in the area and; 3) a special issue on IEEE Transactions on Intelligent Transportation Systems titled 'Emerging techniques for the management of uncertainty in computational traffic models', to appear summer 2014.

For further details on these deliverables as well as copies of many of the presentations please see the project website or contact Vincenzo Punzo (vinpunzo@unina.it). Participants were also able to sample the historic and social delights of Naples as seen in the photos below.


Thank you for
your attention!


MULTITUDE Final Conference
Methods and tools for
supporting the Use,
caLibration and valida Tion
of Traffic simUlations moDEls
cost

2013 Simulation Events

U.S. Department of Transportation
Research and Innovative Technology Administration
ITS Joint Program Office

Analyzing Alternative Vehicle-to-Infrastructure Messaging Variants: Trajectory Conversion Algorithm Version 2 Software

Date: 7 November 2013
Time: 11:30-Noon Eastern
Cost: Free

Overview
Connected vehicle research includes the assessment of alternative vehicle-to-infrastructure messaging mechanisms to support new mobility, safety and environmental applications. This webinar provides an overview of the Trajectory Conversion Algorithm (TCA) Version 2 software, recently released cost-free and under open source license. The objective of the TCA Version 2 software is to simulate the generation, capture and transmission of vehicle-based data under a range of configurable messaging strategies, including the SAE J2735 Basic Safety Message (BSM). TCA Version 2 software is now available to the connected vehicle research/development community as an offline tool or in real-time with either the VISSIM or PARAMICS traffic simulation models.

The TCA software development project is one of several related research and development activities within of the Data Capture and Management (DCM) Program, which is in turn a part of the USDOT connected vehicle research effort considering mobile data communications in surface transportation to improve safety, mobility, and the environment. This webinar is sponsored by the Intelligent Transportation Systems Joint Program Office of the USDOT. To register for this webinar please visit www.itsa.org/bsmwebinar

Target Audience
- Researchers and evaluators interested in connected vehicle technology, and connected vehicle information providers and application developers

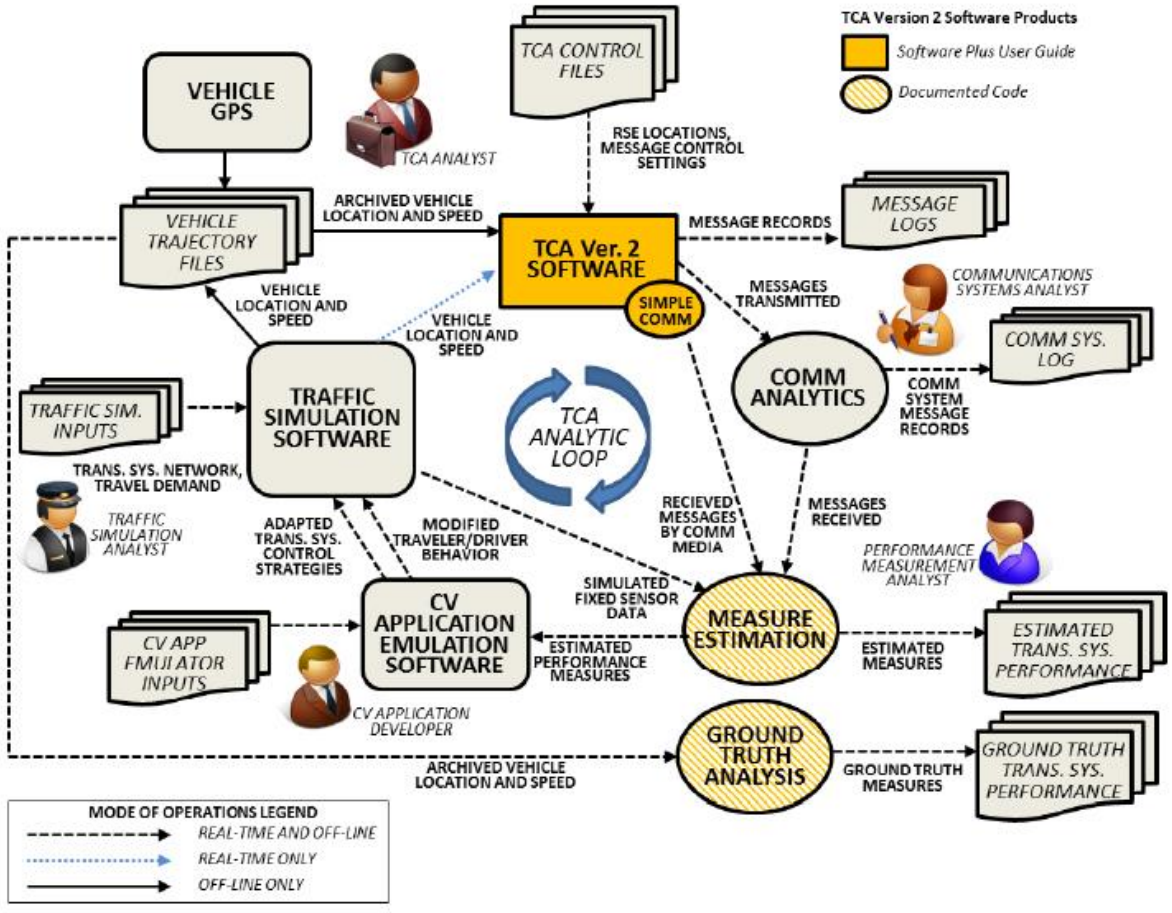
Learning Objectives
- Describe how the TCA Version 2 software can be incorporated into related research and evaluation efforts
- Acquire TCA Version 2 software and supporting documentation under open source license
- Outline key features in upcoming TCA Version 2 builds

Host: Jim McCarthy, PE PTOE, FHWA-Minnesota Division
Jim McCarthy is a traffic operations engineer with the Federal Highway Administration (FHWA) in St. Paul, Minnesota. His work includes traffic analysis, traffic operations and ITS deployment. Jim is a member of FHWA's Traffic Analysis Team, and TRB Highway Capacity and Quality of Service Committee. He holds a MS in Traffic Engineering from the University of Minnesota.

Presenter: Karl Wunderlich, Principal Investigator, Noblis
Karl Wunderlich is a Fellow for Transportation Analysis in Washington, DC. He is an expert in the use of simulation and modeling techniques to evaluate emerging technologies intended to improve traveler mobility or system productivity. He is also a thought leader in the facilitation of collaborative transportation research through open source and open data communities. Karl holds a Ph.D. in Industrial and Operations Engineering from the University of Michigan.

TCA Version 2 Software Planned Features

Build	Features
Build 1 (TCA 2.1) November 2013	• Emulate wide-area (e.g., cellular) and short-range (DSRC) communications • Model variants of the Basic Safety Message (BSM)
Build 2 (TCA 2.2) March 2014	• Update DSRC communications model • Support dual-mode V2I messaging • Model vehicle status data beyond speed, position
Build 3 (TCA 2.3) July 2014	• User-configurable variants of Japanese and EU message protocols
Build 4 (TCA 2.4) March 2015	• Support large network analyses • Model dynamic rules for regulating and tailoring message transmission



TCA Version 2 System Description *(Source: TCA Version 2 Software Concept of Operations, 2013)*

2013 Simulation Events

TRAMAN21 Workshop 2013

1st November 2013

08:15
Registration
Chairman: Dr. Claudio Roncoli, Technical University of Crete, Greece

08:45
Introduction
* Welcome to TRAMAN21 Workshop 2013
Prof. Markos Papageorgiou, Technical University of Crete, Greece
* Vehicle Automation and Control Systems: Past, Present and Future Perspectives
Dr. Christina Diakaki, Technical University of Crete, Greece

09:45
1st Session
* Macroscopic Traffic Flow Modeling and Numerical Simulation: Recent Advances
Assist. Prof. Ioannis Nikolos, Technical University of Crete, Greece

10:45
Coffee and Refreshments (including poster session)

11:15
2nd Session
* Traffic Flow Simulation of Vehicle Automation and Communication Systems
Prof. Bart van Arem, Delft University of Technology, The Netherlands

13:15
Lunch
Chairman: Assist. Prof. Argiris Delis, Technical University of Crete, Greece

14:30
3rd Session
* Traffic Flow Modeling and Control: Closing the Loop

* Intelligent Vehicles: Adaptive Cruise Control and beyond
Prof. Petros Ioannou, University of Southern California, USA

16:30
Coffee and Refreshments (including poster session)

17:00
4th Session
* Motorway Traffic Control in Presence of VACS (Vehicle Automation and Communication Systems)
Prof. Markos Papageorgiou, Technical University of Crete, Greece

18:00
Round Table Discussion

19:00
End of the Workshop

20:30
Dinner

European Research Council
Established by the European Commission

Technical University of Crete

2013 Simulation Events

Web Site: http://www.rss2013.org/

2013 Simulation Events

The Conference on Agent-Based Modeling in Transportation Planning and Operations provides an international forum on the latest technical developments and research in the field of transportation planning and operations using agent-based approach. Researchers, academicians, practitioners, and industry and government agencies are invited to this conference to discuss their research and applications pertaining to agent-based modeling in transportation planning and operations. The conference is supported by the Mid-Atlantic University Transportation Center Program and by Virginia Tech.

Conference Objectives

The conference will provide the following objectives:

- Present the current state of the art/science in agent-based modeling in transportation.
- Provide the lessons learned from the current research efforts in this field.
- Define where the future lies in this type of modeling effort and what steps and research agenda need to be taken to ensure its success

Conference Topics

Topics of interest in agent-based modeling include but are not limited to:

- Developing the daily activities of travelers
- Spatial markets simulations (housing, demographics, firm-graphics)
- Routing of travelers in a dynamic traffic simulation
- Large scale microscopic traffic simulations
- Impact of hybrid and plug-in-electric vehicles on mode choice and transportation system performance.
- Integrated Transportation Planning and Operations Applications
- Traveler willingness to pay for toll roads/HOT lanes
- Evacuation planning and emergency management
- Acceleration and braking behaviors of individual drivers
- Car following and lane changing behaviors in traffic models
- Aggressive vs. defensive drivers in the context of eco-driving
- Driver behavior in the environment of co-operative vehicle-highway systems
- Modeling heterogeneous vehicle to vehicle networks including driverless fleets
- Applications in freight transportation modeling

Qualified papers will be published in a special issue of *Transportation Journal: Part C*

Questions

Technical questions regarding abstracts should be directed to:
Dr. Antoine Hobeika
Conference Chair
Email: Hobeika@vt.edu
Phone: 540-231-7407

Submission process and registration questions should be directed to:
Holly Williams
Continuing and Professional Education
Email: hmccall@vt.edu
Phone: 540-231-2188

Important Dates

Abstract Submission Deadline:
May 31, 2013

Notification of Abstract Acceptance:
July 15, 2013

Final Revised Submission Deadline:
September 1, 2013

Hotel Reservation Deadline:
September 2, 2013

Registration Deadline:
September 20, 2013

Conference Begins:
September 30, 2013 at 5:30 p.m.

VirginiaTech
Invent the Future

www.cpe.vt.edu/abmconf

2013 Simulation Events

Abstracts

Submission Guidelines

The submitted abstracts should be between 1,000 words and 2,500 words in length. Authors should submit their contributions electronically in PDF format at: www.manager.cpe.vt.edu/conferenceDisplay.py?confId=5

Proceedings and Publications

All abstracts accepted for the conference will be included in the conference proceedings that will be compiled on a flash drive and be given to all participants at the time of registration.

Authors of selective outstanding abstracts will be asked to submit full papers to be considered for publication in the special issue of Transportation Research: Part C dedicated for this conference. In preparing their final manuscript, invited authors should follow the paper submittal guidelines for the Transportation Research: Part C.

The chief editor of this special issue of Transportation Research-C is Lei Zhang from University of Maryland. The co-editors are: Hesham Rakha from Virginia Tech, Monty Abbas from Virginia Tech, and Eric Miller from University of Toronto.

Committees

Conference Chairmen

Antoine G. Hobeika
Dept. of CEE, Virginia Tech

Hesham Rakha
Dept. of CEE/VTTI, Virginia Tech

Organizing Committee

David Roden
AECOM Inc.

Hubert Ley
Argonne National Laboratory

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University of Maryland

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University of Virginia

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University of Toronto, Co-editor

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www.cpe.vt.edu/abmconf

2013 Simulation Events

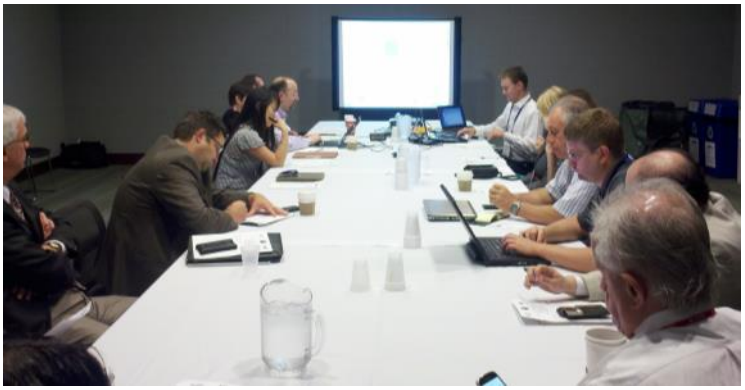
TRAFFIC ENGINEERING COUNCIL
NATIONAL SIMULATION AND CAPACITY ANALYSIS USER GROUP (SIMCAP) MEETING

MEETING AGENDA – ITE 2013 ANNUAL MEETING AND EXHIBIT (BOSTON, MA)
WEDNESDAY, AUGUST 7, 2013 (10:00 PM – 11:30 PM EDT)

SHERATON BOSTON & HYNES CONVENTION CENTER (MEETING ROOM: HYNES 108)

1. Welcome and SimCap Mission Statement (Dave Petrucci)
2. Section and Chapter Updates
    a. Virginia (Sanhita Lahiri)
    b. MET (Luigi Casinelli)
    c. Mid-Atlantic (Dave Petrucci)
    d. Washington DC (Alek Pochowski)
    e. LOCATE (John Albeck)
    f. North Central (Pat Otto)
    g. Wisconsin (Jess Billmeyer)
    h. North Carolina (Bastian Schroeder)
    i. Colorado Wyoming (Freddy He)
    j. Oregon (Miranda Wells)
    k. San Diego (Erik Ruehr)
    l. Washington (Matt Beaulieu)
    m. Toronto (Matt Davis)
    n. Dallas (Josh Smith)
    o. Houston (Raj Basavaraju)
    p. Florida (David Hale)

3. European Commission MULTITUDE Project Update (Mark Brackstone)
4. Automated Self-Calibration and HCM-Based Genetic Algorithm Optimization (David Hale)
5. Integration of Analysis, Modeling, and Simulation Tools (Ram Jagannathan and Brandon Nevers)
6. ITE E-Community Site (Dave Petrucci)
7. SimCap Activities & Projects, Settings the Agenda for 2014 (Everyone)
8. Next Meeting / Conference Call (Hyatt Regency, Miami, FL, March 9-12, 2014)



DATA SIM Summer School (15-18 July 2013)

www.datasim-fp7.eu

DATA SIM Summer School 2013

The Transportation Research Institute (IMOB) of Hasselt University organizes the first DATA SIM Summer School on 'Mobility modeling and big data sources'. This Summer School will take place at **Hasselt University, Campus Diepenbeek** (Agoralaan Building D, 3590 Diepenbeek, Belgium) from **Monday July 15th to Thursday July 18th.**

Topics

This Summer School will feature a series of lecturers by renowned researchers in the following topics:

Mobility modeling: basic principles and tools.

1. Behavior modeling, activity based models (activity selection, planning, daily schedule generation)
2. Multi-modal trips
3. Modeling cooperation, cooperative scheduling (e.g. carpooling)
4. Ontologies
5. Traffic and transportation related models, travel demand prediction models
6. Simulations in practice: what conclusions can be drawn?

Special focus: Agent based modeling and simulation for mobility, travel behavior, mobility market, electro-mobility (including smart grid, etc.).

1. Delimiting the domain of applicability: where can agent based modeling be useful?
2. Models for cooperation, mutual influence, negotiation
3. Computability issues, scalability
4. Ontologies
5. How to interpret results? What can be expected?

Big data as source for modeling.

1. Big data repositories
2. Annotation, semantic enrichment of big data
3. Data mining and process mining to extract information from big data
4. Crowd sourcing and publicly available data: pitfalss and challenges
5. Using data from different sources: how to align?

	**Integrating big data and modeling.** 1. Using big data to feed models or to validate model execution results 2. How to integrate semantically poor big data with small sets of semantically rich data as input for microsimulation or agent based modeling
	**Applications** 1. Electric vehicles (including smart grid concepts) 2. Carpooling (cooperation on trip traveling) 3. Multi-modality and car-sharing (cooperation on resource usage) 4. Markets based on big data related to traffic • Business models for EV, multi-modal trips, car-sharing, carpooling • Online support systems (ride sharing advisors) • Traffic load prediction systems 5. Effect of EV characteristics (range anxiety, charging time, limited range) on household travel behavior
	**Hot research topics in transportation behavior, traffic safety and logistics.**

Target audience

The Summer School is suited for senior-researchers, early-stage researchers, practitioners and (PhD) students from the domain of transportation sciences, data mining, agent/activity based modeling and related topics.

Participants will have the opportunity to get feedback on their work during the graduate symposium sessions. Participants interested in presenting their work should submit a 1 page (A4) abstract motivating the main research challenge they are addressing and stating the approach being taken. A selection of proposals will be chosen for presentation.

Participation Certificates

Participation Certificates will be issued to all participants of the Summer School.

Contact

For more information please contact Luk Knapen (luk.knapen@uhasselt.be) or consult the DATA SIM Summer School webpages (www.datasim-fp7.eu).

2013 Simulation Events

Oregon ITE Simulation Roundtable

by Miranda Wells
HDR Engineering, Inc.
Co-Founder and Co-Chair of the Oregon ITE Simulation Roundtable

The Oregon ITE Simulation Roundtable Subcommittee is entering its second year since being established by Miranda Wells (HDR) and Tegan Enloe (DKS). Since its creation, the group has held five brown bag lunches and one half day workshop which typically have between 30 and 60 people in attendance.

This group of presenters was great because it gave the perspective of using simulation for adaptive analysis from a consultant view point, a research viewpoint, as well as a vendor view point. For copies of the presentation material from this meeting as well as past meeting presentations please check out the Oregon ITE Simulation Roundtable website at:

http://www.orsimulation.com/

At this website you can also see scheduled upcoming meetings. If you are interested in joining the workshops please RSVP by email:

oritesimulationroundtable@gmail.com

One brown bag lunch meeting was a joint meeting with the Oregon ITE ITS Subcommittee. The topic was "Analyzing Adaptive Signal Systems in Micro-Simulation." This meeting looked at ways to model adaptive systems in micro-simulation, the level of effort involved, and how effective the results are in replicating field conditions.

There were three presenters who discussed three different adaptive systems:

Miranda Wells, HDR (ScatSim)
Aleks Stevanovic, FAU (InSync)
Marshall Cheek, Trafficware (SynchroGreen)

2013 Simulation Events

Benchmarking of OD Estimation Algorithms

by Dr. Constantinos Antoniou

The EU COST Action TU0903 - MULTITUDE (Methods and tools for supporting the Use, caLibration and validaTIon of Traffic simUlations moDEls, www.multitude-project.eu), has now entered its last year and is set to culminate with a range of outreach activities and documents, in addition to finalising technical work on a number of issues.

One of these activities is performing a benchmarking exercise of origin-destination (OD) estimation and prediction algorithms, in a way that is fair to the various approaches and provides a level playing field for unbiased evaluation. The objective is not to conclude that one approach is better than another, but instead to illustrate the advantages and disadvantages of the various approaches, highlighting the conditions under which each might become more relevant. Several experienced OD estimation researchers are involved in this task, including several TFT and SimSub members, bringing expertise from diverse fields of OD estimation. The list of participants includes (in alphabetical order): Costas Antoniou (NTUA), Jaume Barcelo (UPC), Jordi Casas (TSS), Ernesto Cipriani (UniRoma3), Biagio Ciuffo (EU JRC), Tamara Djukic (TU Delft), Gunnar Flötteröd (KTH), Vittorio Marzano (UniNa), and Tomer Toledo (Technion).

A common evaluation and benchmarking framework has been developed, so that a number of algorithms can be implemented and tested under the same conditions. The framework is implemented in Matlab and python and uses the AIMSUN traffic simulator for the function evaluation/assignment. The mesoscopic simulator level of AIMSUN has been considered suitable for this task (considering computational requirements) and therefore this is the one that is being used in this task. However, the framework is flexible. Besides providing a common platform, the developed framework requires each participant to simply implement their algorithm (in Matlab), while taking advantage of the remaining infrastructure for the tedious tasks of interfacing with the simulator, performing (and averaging the output of) the replications and computing the goodness-of-fit statistics.

An experimental design has been performed along multiple dimensions, including:

- OD estimation and prediction algorithms;
- Networks;
- Data sources;
- Demand levels; and
- Levels of sensor coverage, depending on location of sensors, type of surveillance information, as well as quality of surveillance information.

The considered algorithms include (i) Kalman filter variants (in which case the problem is formulated as a state-space model), such as the Extended Kalman Filter (EKF), the Limiting EKF and quasi-dynamic Kalman Filter and (ii) direct optimization algorithms (in which case the problem is formulated as a standard optimization problem), such as SPSA, GLS, and LSQR.

Three networks are being used in this effort: (i) a test network, used primarily for debugging and verification purposes, (ii) a network from Vittoria, Basque country, Spain (57 centroids, 600km road network, 2800 intersections, 389 detectors) and (iii) a network from Barcelona, Catalonia, Spain (130 centroids, 1570 nodes, 2800 links).

Different types of data are considered by different groups. Besides the conventional loop detectors, counts from Bluetooth detectors and travel time information between detectors (e.g. Bluetooth sensors) are also considered.

Preliminary results of this task have been presented in a hands-on workshop in a recent MULTITUDE meeting in Delft, The Netherlands, on February 2013. Based on the results of this workshop, further refinements to the common platform and individual codes have been made and revised results will be presented at the MULTITUDE Management Committee meeting in Chania, Greece, in the end of May 2013. We expect that the results will be able to be published soon, hopefully in TRB2014!

multitude

Methods and tools for supporting the Use caLibration and validaTIon of Traffic simUlation moDEls

COST

2013 Simulation Events

Managed Lanes Webinar and Computer Lab Workshop

Presented by
Dr. Dimitra Michalaka

Course Content:

- Pricing Strategies
- Lane Choice Models
- Toll Structures
- Simulation of Managed Lanes using CORSIM

The Managed Lane Operations and Simulation using CORSIM Webinar and Computer Lab Workshop was held on April 29 & 30, 2013 at the University of Florida, Gainesville, and was presented by Dr. Dimitra Michalaka.

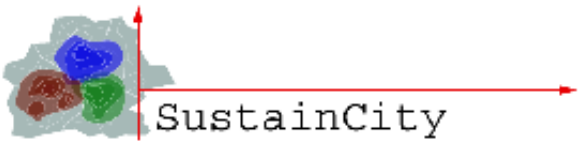
This two-part event consisted of a 1.5 hour webinar on April 29th; followed by 4-hour, hands-on computer lab workshops on April 30th.

In a typical setting, lanes on a given freeway are designated either as regular or managed toll lanes. The former has no toll while the latter can only be accessed by paying a toll. If high-occupancy vehicles (HOVs) do not need to pay, the facility is widely known as a high-occupancy/toll (HOT) facility. Some of the HOT lane facilities currently implemented in the U.S. are single-segment (e.g., SR-91 in California and 95 Express in Florida), while others are multi-segment (e.g., I-15 in Utah, I-10 in Texas, and I-394 in Minnesota). A single-segment HOT facility has essentially one entrance, one exit, and one tolling point. In contrast, a multi-segment HOT facility has multiple ingress and egress points that are located distantly from each other, and multiple tolling points. This webinar focuses on the operations of single and multi-segment managed lanes. It covers several components of managed lane operations such as pricing strategies, lane choice models, and toll structures. It also demonstrates how to use CORSIM to simulate managed lanes with one or multiple segments.

UF | Transportation Institute
UNIVERSITY of FLORIDA

T2 CTT
Florida Transportation Technology Transfer Center

2013 Simulation Events



Zurich, 08 March 2013
Revision: 9

SustainCity Conference on
Integrated Land-Use and Transport Simulation

Public open lectures
Wednesday 17 April 2013

Location	ETH Zurich (Zentrum) Building CAB, Room CAB G 11 Universitätstrasse 6, 8006 Zürich
Time	Wednesday 17 April 2013, 17:00-19:00
Registration	Please register until 7 April 2013 under www.sustaincity.eu.

Time	Content (Speaker)
17:00	**Welcome + introductions** K.W. Axhausen, ETHZ, Administrative Coordinator A. de Palma, ENSC, Scientific Coordinator
17:15	**Integrated Land-Use and Transport Simulation in Politics** Dr. Maria Lezzi
18:00	**Interdependences between Land-Use and Transport** Prof. Dr. Paul Waddell
18:45	**EU policy relevance of SustainCity project** D. Rossetti, European Commission
19:00	**Apéro**

Organization: **Prof. K.W. Axhausen**, ETHZ (axhausen@ivt.baug.ethz.ch)
Prof. A. de Palma, ENSC (andre.depalma@ens-cachan.fr)
Dr. B.R. Bodenmann, ETHZ (bodenmann@ivt.baug.ethz.ch)
Information: **www.sustaincity.eu**

2013 Simulation Events

TRAFFIC ENGINEERING COUNCIL
NATIONAL SIMULATION AND CAPACITY ANALYSIS USER GROUP (SIMCAP) MEETING

MEETING AGENDA – ITE 2013 TECHNICAL CONFERENCE AND EXHIBIT
SAN DIEGO, CA
MONDAY, MARCH 4, 2013
2:45 PM – 4:15 PM (PACIFIC)
5:45 PM – 7:15 PM (EASTERN)

SHERATON SAN DIEGO HOTEL AND MARINA
MEETING ROOM: EXECUTIVE CENTER 4

1. Welcome and Introductions (Dave Petrucci)
2. Remarks and ITE Traffic Engineering Council Update (Troy Peoples)
3. ITE Update (Zaki Mustafa)
4. Regional Updates
    a. San Diego Section Transportation and Mobility Task Force (Erik Ruehr)
    b. Mid-Atlantic Section (Orla Pease)
    c. Washington D.C. Section (Alek Pochowski)
    d. Houston Section (Raj Basavaraju)
    e. North Carolina Section (Bastian Schroeder)
    f. MET Section (Gordon Meth)
    g. Florida District (Dave Hale)
    h. Washington State Simulation Roundtable (Matt Beaulieu)
    i. Oregon Traffic Simulation Roundtable (Miranda Wells and Tegan Enloe)
5. ITE E-Community Site (Dave Petrucci)
6. Next Meeting / Conference Call (Boston, MA August 4-7, 2013)
7. Open Discussion
8. Adjourn

2013 Simulation Events

Roundabout Operations Software Showcase

Sponsored by the ITE Roundabout Committee
Monday, March 4, 11:00 a.m.-12:30 p.m.
Room: Harbor Island Ballroom III

ITE 2013 Technical Conference and Exhibit
San Diego, CA, March 4th, 2013

Learning Objective:

Showcase and discuss software packages that can assist planners and designers in roundabout operations and design.

Presider:

Hillary N. Isebrands, Safety Engineer, U.S. DOT-FHWA, Lakewood, CO, USA

Speakers:

Modeling Roundabouts with PTV Vissim and Vistro
Karen Giese, Vice President Product Management, PTV America, Portland, OR, USA

SIDRA INTERSECTION Roundabout Demo
Howard McCulloch, Roundabout Design Specialist, NE Roundabouts, Averill Park, NY, USA

TORUS Roundabout Demo
Steven Chan, Senior Product Engineer, Transoft Solutions Inc., Richmond, BC, Canada

Synchro and SimTraffic Roundabout Demo
Michael T. Trueblood, Senior Traffic Engineer, Trafficware, Sugar Land, TX, USA

RODEL Roundabout Demo
Mark T. Johnson, Principal Transportation Engineer, MTJ Engineering LLC, Madison, WI, USA

Karen Giese presents roundabout simulation in VISSIM

Left-to-right:
Steven Chan (demonstrating TORUS)
Hillary Isebrands
Karen Giese
Howard McCulloch
Michael Trueblood
Mark Johnson

Traffic Analysis Tools Volume III Update: Interview Summary

Submitted by Taylor Sandelius, Karl Wunderlich, and Meenakshy Vasudevan of Noblis, Inc.

Noblis contacted 14 experts to complete the prioritization exercise and provide validation and feedback on the proposed topics to be addressed in the updated version of TAT Volume III. Of the 14 experts that Noblis contacted, nine (Table 1) completed the prioritization exercise and participated in a short follow-up interview. Two of those interviewed are non-US and the other seven are from a variety of domestic stakeholder groups: model users, academics, vendors, and researchers. Interviews were conducted in the period June 11-21, 2013.

Expert	Affiliation	Expert Type	Noblis Interviewer
Thomas Bauer	Traffic Tech Solutions	Private Sector/Vendor	Vasudevan
Alex Gerodimos	TSS (AIMSUN)	Private Sector/Vendor	Sandelius
Michael Mahut	INRO	Private Sector/Vendor	Vasudevan
Shawn Birst	RS&H	Private Sector/Tool User	Sandelius
Kaan Ozbay	Rutgers	Academic/Tool User	Wunderlich
David Hale	Univ. of Florida/McTrans	Academic/Tool User	Sandelius
Vincenzo Punzo	University of Naples (Italy)	International (MULTITUDE)	Sandelius
Mark Blackstone	IOMI (UK)	International (MULTITUDE)	Wunderlich
Alex Skabardonis	PATH	Academic/Tool Developer	Vasudevan

Table 1. Expert Panel Members Participating in Prioritization Exercise and Interviews

Description of the Prioritization Exercise. Noblis created a prioritization exercise where participants were asked to rank the priority of roughly 30 candidate topics for inclusion in an updated TAT Volume III. Topics were derived from interaction with the FHWA project key content review team regarding key topics to be addressed or possible new sections for TAT Volume III. The list of topics and their descriptions can be found in Appendix B. Exercise participants were asked to identify up to 17 higher priority topics using a graduated criticality voting system. Each individual was limited in the number of priority ratings that could be registered: up to two critical priority indicators, up to four high priority indicators, up to five medium-high priority indicators, and up to six medium priority indicators. Participants were only allowed to enter one rating for each individual topic, i.e., ratings could not be com-

Expert	Affiliation
John Halkias	FHWA Expert Panel
James McCarthy	FHWA Expert Panel
James Sturrock	FHWA Expert Panel
James Colyar	FHWA Expert Panel
Kris Milster	FHWA Expert Panel
Phillip Bobitz	FHWA Expert Panel
Paul Heishman	FHWA Expert Panel
Chung Tran	FHWA Expert Panel
Taylor Lochrane	FHWA Expert Panel
Meenakshy Vasudevan	Noblis
Karl Wunderlich	Noblis
Taylor Sandelius	Noblis

Table 2. FHWA and Noblis Team Members Participating in Prioritization Exercise and Interviews

bined to create even higher priority ratings. The federal team, Noblis project staff, and the expert panel participants completed the prioritization exercise. The results are captured in the bubble graphs in Figure 1, Figure 2, and Figure 3.

Description of Prioritization Bubble Graphs. Results of the prioritization exercise were measured on the bubble graphs in Figures 1 through 3. Each topic was calculated an average score based on the priority indicators. The four levels of priority which were critical, high, medium-high, and medium, were assigned a point value in a series based on factors of two. A priority indicator of medium was worth one point, medium-high was worth two, high was worth four, and critical was worth eight. The average priority indicator score for each topic is noted on the x-axis of the bubble graphs. Topics with a high average score were those frequently rated with a critical or high priority.

The y-axis illustrates the total number of respondents including the topic in their assessment. Up to 17 topics could be selected by any individual and at least 13 topics had to be left without a rating by an individual participant. This metric illustrates breadth of support among all respondents for a particular topic. So it was possible that a topic could have a high number of votes but a low average score because it was frequently voted as a medium priority – that is broad, but somewhat lukewarm priority.

The bubbles in the graphics were sized according to a Noblis-estimated level of effort to pursue that topic within the update. Each bubble was also colored by its general topic area: emerging analysis, experimental design, corridor studies, unified problem solving, data,

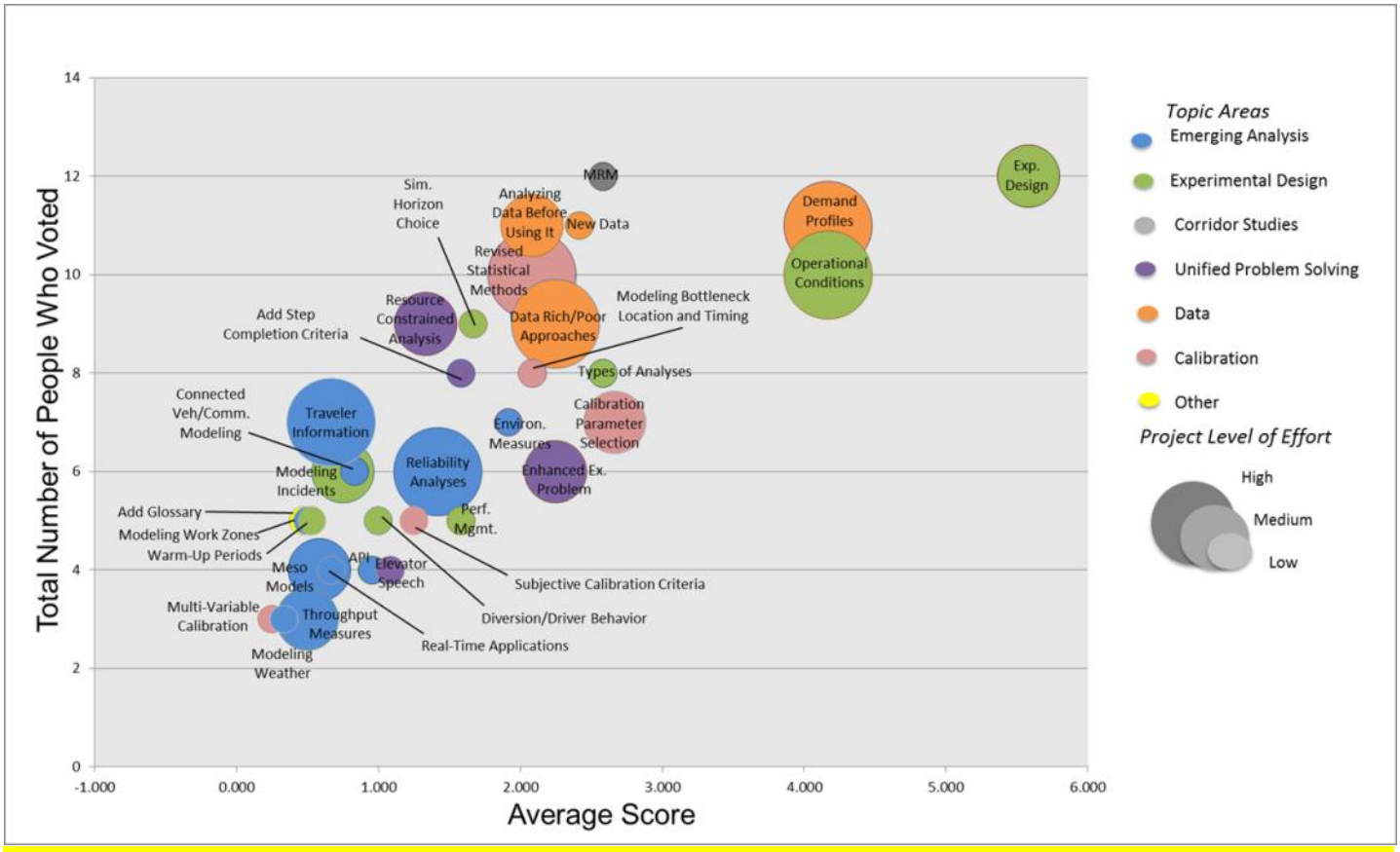


Figure 1. Bubble graphic of federal and Noblis prioritization results

calibration, or other. Each individual was permitted to give only up to two topics a critical rating.

Observations of Exercise Results. Overall, the results from the federal and Noblis team (Figure 1) and the expert panel (Figure 2) were generally consistent. However the scales of the two graphs vary. Average scores were generally lower for expert panel rated topics, most likely due to the diverse expertise and background of the participants.

The topic experimental design/sample size confidence was the highest voted upon and scored topic by the federal and Noblis team. However it was not popular with the expert panel. Another topic that stood out was multi-variable calibration. This topic had a relatively higher average for the expert panelists.

A bubble graphic that combined the results of the federal team, Noblis, and the expert panel is presented in Figure 3. Topics that were consistently prioritized higher with broad support are in the top right corner of the figure. In contrast, topics without broad support and scoring low are found in the bottom left corner of the figure. For example, Figure 3 shows that emerging analysis topics had both limited breadth and low intensity of support. In comparison, data-related topic areas had both broad and intense support. Highest-rated topics included: demand profiles/patterns, operational conditions, calibration parameter selection, multi-resolution modeling (MRM)/corridor modeling, experimental design/sample size confidence, analyzing

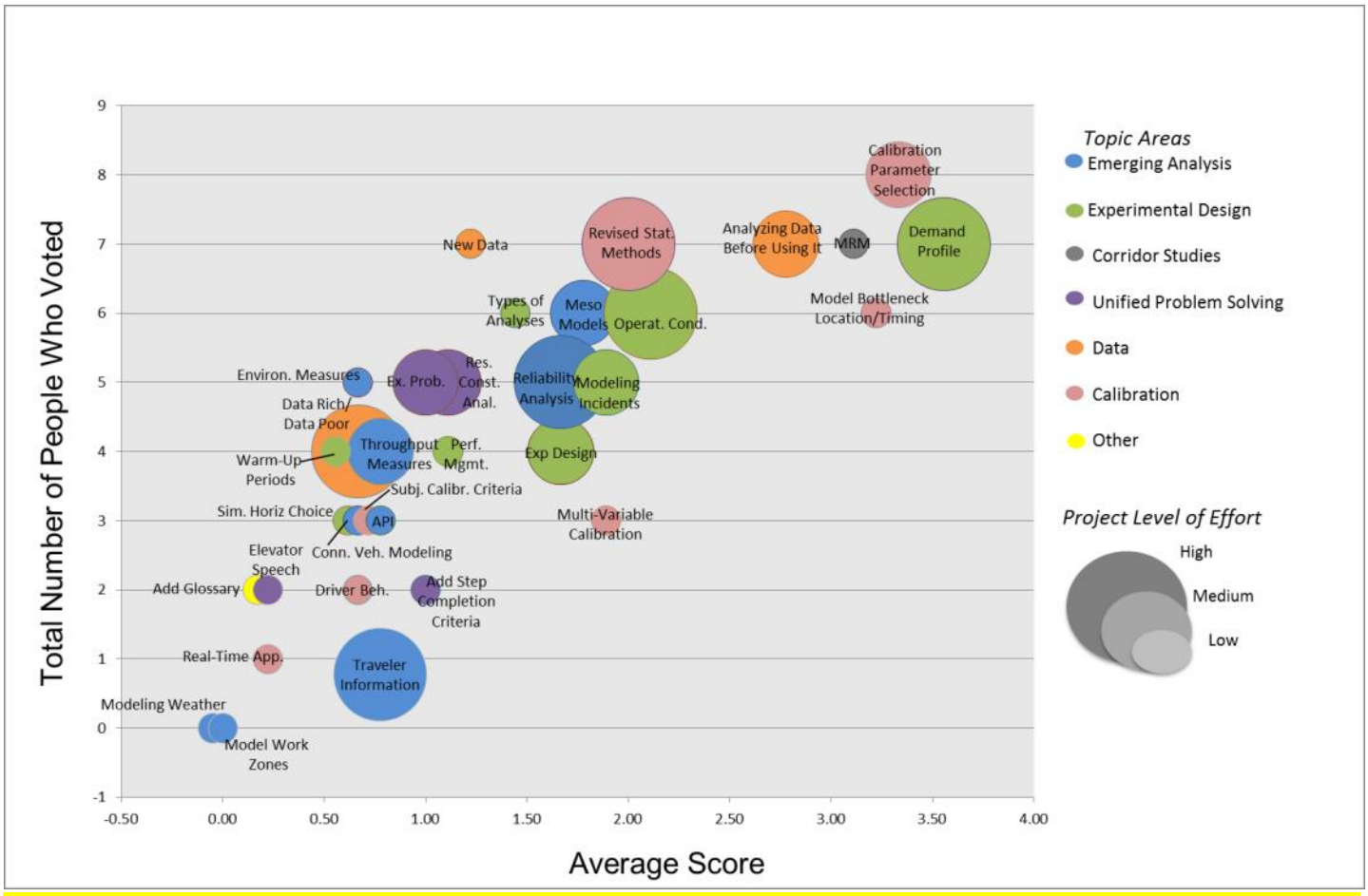


Figure 2. Bubble graphic for expert panel prioritization results

data before using it, new data, revised statistical methods, types of analyses, and modeling bottlenecks.

Overall Observations on Expert Panel Interviews. The expert panelists seemed appreciative to have their feedback included in this exercise. Most commented that it was a difficult exercise due to the large number of valuable topics and few allocated votes. Most panelists ranked topics that are fundamental concepts but lacked sufficient guidance as high. Topics that are less mature were consistently ranked low. These preferences are evidenced from the graph results.

Experts were asked to comment on specific topics they considered to be high priority. MRM was a consistently discussed topic. New data was the most popular consideration of a topic gaining relevance in the next ten years.

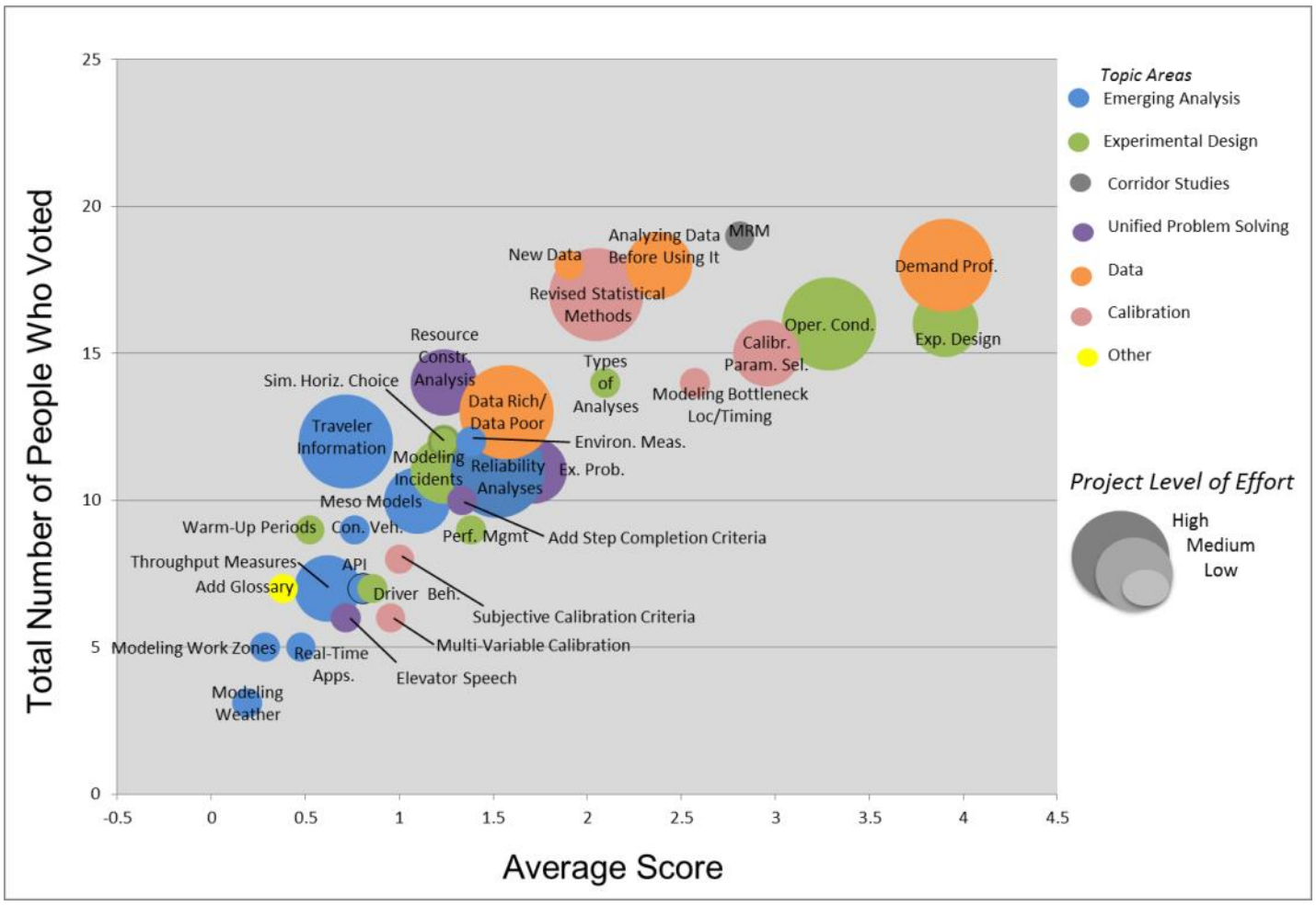


Figure 3. Bubble graphic for federal, Noblis, and expert panel prioritization results combined

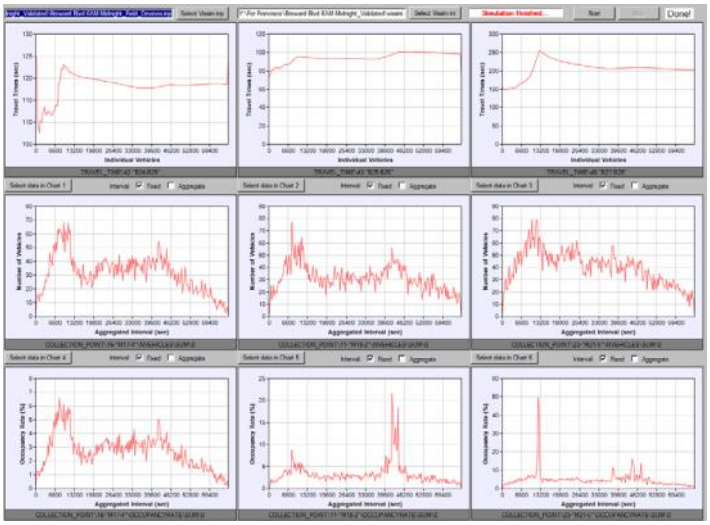
Simulation-Based Tools for Performance Measures of Signalized Arterials

by Aleksandar Stevanovic, PhD, PE
Florida Atlantic University

Since MAP 21 was enacted in mid-2012, performance measures and performance-measures-based decision making have been emphasized in the US transportation industry like never before (*1*). To accommodate new MAP 21 requirements (e.g. performance targets and plans) our consulting and academic industries should continue to seek better ways to process, visualize, and deliver abundant data from the field and/or applicable simulation tools. This article presents a small contribution from FAU's Center for Adaptive Traffic Operations and Management (CATOM) on the development of new performance measure tools based on well-known traffic engineering concepts and data/outputs from simulation models. The tools discussed here are based on PTV software VISSIM but similar concepts can be developed with data from other simulation platforms.

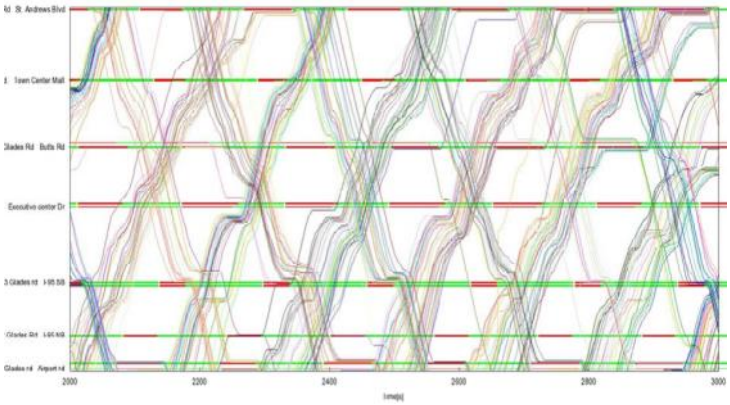
Tool for Real-time Traffic Metrics

This tool is developed to monitor, in real time (while simulation is running), behavior of traffic metrics from link-based (e.g. travel time sections) and point-based sensors (e.g. data collection points). The tool can be used to mimic similar Traffic Management Center tools where data feeds from alike field detectors (e.g. Bluetooth readers or microwave radars) are used to monitor field traffic conditions. Thus, the program can be utilized as a part of the Decision Support Systems in TMC operations, or similar. The program can display performance measures of individual vehicles or aggregated data based on predefined time interval. Currently up to 9 measures can be displayed at the same time.



Time-distance Diagrams

This very well-known diagram has been extremely helpful for understanding of the queues, shockwaves, and other traffic flow conditions but also for safety and environmental purposes. For example, vehicular trajectories serve as inputs into surrogate safety estimation tools (2) and fuel consumption and emission estimation tools (3). However, time-distance diagrams which provide plots of individual vehicle trajectories are still not default outputs for many of the simulation tools. More importantly, exact signal operations (timings as executed in the virtual reality, not as planned to be executed) are seldom represented accurately even in those tools that offer time-distance diagrams as their outputs.

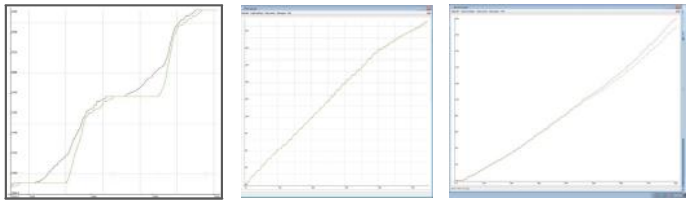


Based on VISSIM outputs of traffic signals and vehicular trajectories, the tool takes care of those problems and provides an accurate account of vehicular positions with respect to signal timings and spatial position of the stop lines These diagrams are especially useful when evaluating impact of Connected Vehicle Technology on signalized arterials. A recent study reported how this tool can be used to visualize trajectories of vehicles whose speeds are

adjusted to enable stopples passing through signalized intersections (concept known as GLOSA—Green Light Optimized Speed Advisory) (*4*).

Real-time Fundamental Queue-Delay Diagrams

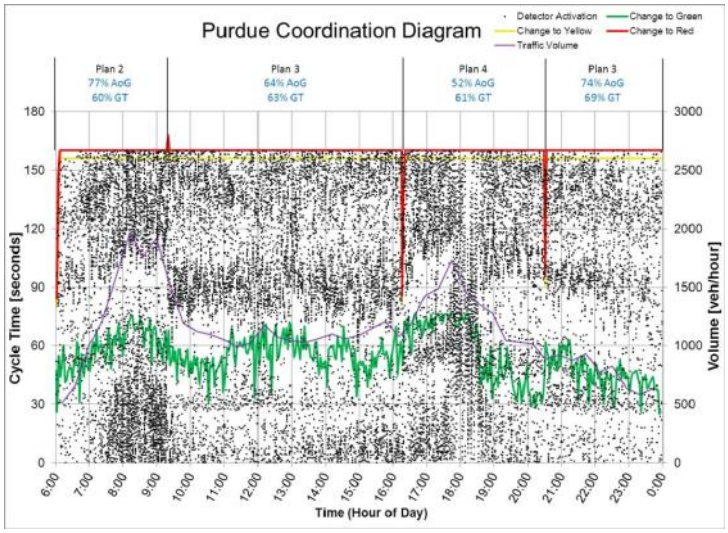
These diagrams have been known since queuing theory has been introduced into the field of traffic signals (*5*). However, historically they were used more frequently in analytical procedures than in simulation models. Here we used VISSIM's capabilities of C2X module (originally intended for modeling of Connected Vehicles) to capture position of individual vehicles approaching a signal. Based on two marking points on the link(s) of the given intersection approach we developed the Arrival and Departure curves. The first marking point is arbitrarily chosen at the link's entrance where vehicle is considered Arrived (should be placed as far upstream as needed to capture the longest queues). The second marking point is usually placed at the signal's stop line. Based on the given curves one can observe (in real time, as simulation runs) queue length, vehicular delay, and total delay at each cycle (the program can also output those measures). It should be noted here that the diagram accounts for a horizontal queue dimension (it does not stack up vehicles vertically as most analytical tools do) helping to understand how queues grow.



Examination of these graphs over a longer time period (e.g. many cycles within a peak period) helps to visualize which signals work in stable and oversaturated conditions. Finally, it should be noted that a similar program exists to derive the number of vehicles on the entire segment between two intersections at each second. Considering that the program can also read intended routes/directions of the vehicles, such a number constitutes real-time link-based traffic demand for the downstream signal and can be used for other purposes.

Purdue Coordination Diagrams

Purdue Coordination Diagram (PCD) is becoming a popular visualization tool for understanding performance of traffic signals, especially when related to the arrival of vehicular platoons (*6*). The PCD has been adopted by several DOTs to track performance of their signalized operations. Also, some of the traffic signal controller vendors (*7*) have already included the PCD as a standard output of their signal hardware and software. Simulation community has been little bit slow in keeping up with PCD development; to our best knowledge there have not been attempts to utilize vast amount of simulation outputs to replicate PCDs. Here we present such an attempt where vehicular actuations from an intersection approach in VISSIM model were logged, combined with signal timing outputs, and plotted according to the PCD format.



1. *http://www.fhwa.dot.gov/map21/*
2. *http://www.fhwa.dot.gov/publications/research/safety/08049/*
3. *http://www.cert.ucr.edu/cmem/*
4. *Stevanovic et al. (2014). "Comparative Evaluation of Benefits from Traffic Signal Retiming and GLOSA". TRB Paper # 14-1746.*
5. *Webster, F.V. (1958). Traffic Signal Settings. Road Research Technical Paper No. 39. Lon- don: Great Britain Road Research Laboratory.*
6. *Day et al. (2011). "Evaluation of Arterial Signal Coordination". TRR Vol. 2192, pp. 37-49.*
7. http://www.econolite.com/assets/pdf/systems-centracs-MOE-data-sheet.pdf

2013 Research Results

San Diego ICM Demonstrator Project

by Matthew Juckes
Senior Project Manager
TSS-Transport Simulation Systems

The San Diego Interstate 15 Integrated Corridor Management (ICM) Demonstrator project deploys an innovative system designed to coordinate and optimize all available infrastructure, routes and modes. As part of the USDOT's larger initiative for reducing congestion in metropolitan areas, SANDAG is leading the Interstate 15 demonstrator with Delcan Corporation as systems integrator and TSS-Transport Simulation Systems as its subcontractor. The project went live in March 2013 and in April won the ITS America award for Best New Innovative Practice.

Focusing on a 20-mile stretch of Interstate 15 between San Diego and Escondido, the project's pioneering Decision Support System (DSS) integrates two tools never used together before in the US: Delcan's Intelligent NETworks ATMS, for field device monitoring and control, center-to-center data fusion, event management and response plan generation; and TSS's Aimsun Online for real-time traffic prediction and simulation-based evaluation of incident response or congestion management strategies.

Rather than reacting to traffic conditions, the DSS allows managers to anticipate problems before they arise and take preventative action using ICM strategies such as responsive traffic light synchronization, coordinated ramp metering or active traffic rerouting. This ability to make traffic management decisions based on both current and predicted traffic conditions has so far been missing from ATMS so-

lutions.

Aimsun Online takes an accurate reproduction of the current traffic status as the starting point for the forecasting process. By comparing the records from the previous 30 minutes with the historical patterns in the database, Aimsun Online allows system managers to load the appropriate trip tables (Origin-Destination matrices) and simulate the network under its current capacity status. This sophisticated, simulation-based monitoring procedure is supported by time-series analysis and not only produces accurate travel time forecasts but also offers advanced incident detection capabilities.

Simulation has the potential to significantly improve the accuracy and relevance of travel-time forecasts. Because it takes capacity changes and network effects into account, it is the only technique that can allow operators to compare the effectiveness of complex alternative traffic management strategies quickly and objectively, leading to: more effective and efficient incident management; reduced incident impact and quicker recovery period; earlier dissemination of incident information to the public; reduced manpower resources; shorter journey times and, as a corollary, increased economic savings.

THE URBAN TRANSPORTATION MONITOR

Micro-Simulation Software Characteristics Survey

by Daniel B. Rathbone, Ph.D., P.E.
Editor/Publisher
Lawley Publications

In 2013, *The Urban Transportation Monitor* sent survey questionnaires to organizations that develop and/or market micro-simulation software. Altogether nine vendors were identified that market this type of software in the U.S., replies were received from six of those vendors. The results of the survey are published here.

Note: The survey information shown in the table was supplied by the vendor of each of the software packages listed. *The Urban Transportation Monitor* cannot vouch for the accuracy of this information.

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Editor's Note: The next page of the SimSub newsletter contains only the final page of the 10-page survey. To view the full 10-page survey results, please refer to the September 2013 (VOL. 27 NO. 7) issue of *The Urban Transportation Monitor*.

Micro-Simulation Software Characteristics (continued)

Name of Software	TSIS-CORSIM	VISSIM	CUBE DYNAMISM	SIMTRAFFIC	TRANSMODELER	SIDRA TRIP
Main Strengths of Software	Comprehensive and realistic modeling, low cost, widely used, quick and easy to use, can be calibrated extensively for local conditions, integrated with many popular software packages, extensive output processing capabilities, fundamentally sound modeling.	Flexible network structure to model nearly any physical configuration and geometric designs; fully integrated and simultaneous interactions between all modes; temporal characteristics; scalable for single intersection or regional simulation; powerful graphic capabilities, extensive MOEs with user-defined aggregation and filters, integration with travel demand models, mesoscopic models, and GIS software; integration with PTV Vistro and optimization; real signal control; iterative dynamic traffic assignment; industry-leading technical support.	Integration with ESRI ArcGIS and Cube Voyager, event-based simulation, scenario-based workflow, interactive 3D animation (Cube DynaViews), parking modeling.	Affordable traffic simulation tool that allows users to calibrate and perform multiple simulations within a relatively short time frame. Simulations of real-word traffic operations along arterials that consist of various combinations of stop, yield, roundabout, or signal controlled intersections. Users can quickly compare results produced from similar SimTraffic models.	TransModeler is trip-based traffic mi- cro-simulation on a GIS platform. Trip-based means that vehicles route themselves on their dynamic, stochastic shortest path. The user does not need to manually enter waypoints. The traffic micro-simulation engine is optimized for speed and realism. The driver behavior engine is designed to appropriately handle congested conditions, particularly on congested weaving sections and oversaturated arterials. Vehicles never stall or disappear on failing to change lanes a certain distance from a turn or exit. The vehicle performance model respects the feasible range of acceleration and deceleration of a vehicle. Integrated GIS environment vastly simplifies data preparation, sharing, and integration. GIS platform enables software to automatically calculate conflict zones and manage movement priority. TransModeler is optimized to harness cutting-edge hardware, enabling wide-area micro-simulation.	SIDRA TRIP employs an instantaneous speed and acceleration model to determine various trip characteristics for assessing traffic and travel level of service, performance (delay, speed, travel time), and a power-based vehicle model to estimate fuel consumption, emissions, noise operating cost and user cost. SIDRA TRIP is ideally suited to before and after studies to assess travel conditions with ease. It can also be used for assessing intelligent transport system applications, driver training programs, and vehicle characteristics. SIDRA TRIP allows analysis of trips of any length as well as selected sections of a trip in a flexible way. It can use trip data collected by an instrumented vehicle, for example, using a GPS data logger, or use drive-cycle data based on speed-change information specified by the user. SIDRA TRIP has high educational value towards improved understanding vehicle movements and related traffic performance, emissions, fuel consumption, operating and user costs and noise at a microscopic level. Animation and dynamic graphs help towards this purpose. Output data generated by SIDRA TRIP can be used to calibrate network microsimulation models, e.g. heavy vehicle acceleration- deceleration profiles, or macroscopic models, e.g. excess fuel consumptions and emission factors. Network microsimulation models could generate speed-time data which can be imported into SIDRA TRIP for checking against real-life data and calibration.
Main Improvements To Be Added to Software Within the Next 12 Months	Upcoming features of CORSIM may include new vehicle trajectory analysis tools, automated "self-calibration", next-generation emissions models, and improvements to the software architecture.	Vissim 6 has new user interface with added capabilities to make network building and analysis more efficient; internal MOE aggregation, storage, and visualization; live Bing™ Maps connection; improved simulation speed through distributed computing; expanded COM functionality; improved bicycle modeling.	N/A	Improved roundabout simulating capabilities IIntegration with TripGen 2013. Virtual signal control capabilities	Integration with EPA's MOVES (Motor Vehicle Emission Simulator) and CMEM (Comprehensive Modal Emission Model); Traffic impact analysis tools, including ITE trip generation and distribution; More advanced vehicle trajectory analysis; Tighter integration with HCM 2010.	SIDRA TRIP Version 2 is planned. This will introduce major enhancements to the software capabilities including linking with the SIDRA INTERSECTION software: http://www.sidrasolutions.com/Software/INTERSECTION/Overview.

Quasi-OTEE versus kriging-based approaches for the sensitivity analysis of computationally expensive traffic simulation models

Submitted by Biagio Ciuffo[1], Qiao Ge[2], Monica Menendez[2] (1. European Commission Joint Research Centre. 21027 Ispra, IT; 2. ETH Zurich, Institute for Transport Planning and Systems. 8093 Zurich, CH)

Introduction

Traffic simulations have become indispensable tools for academicians and practitioners worldwide. A significant amount of research has gone into improving the quality of the simulators. Nonetheless, model calibration continues to be a key factor in ensuring the accuracy of the outputs. One area of model calibration in which meaningful contributions are still needed is the sensitivity analysis (SA) of the input parameters. The SA explores the relationship between the simulation output and the input parameters. Although calibration is typically carried out for only a limited number of parameters, there is usually no formal procedure for selecting them. The wrong selection may lead to multiple issues, including model imprecisions, and unrealistic values for the calibrated parameters. A proper SA, therefore, can be very valuable for the calibration process and ultimately the final simulation results.

Research goal

This paper aims at comparing two recently developed SA methods, in order to better understand their advantages and disadvantages especially when applied to traffic simulators. The first model, called quasi-OTEE, was introduced in (*1*). It is a general screening approach based on the Elementary Effects (EE) method (*2*) but with much higher efficiency. It screens the influential parameters through computing the corresponding EE and qualitatively comparing the Sensitivity Indexes. The case study provided in (*1*) demonstrated that this tool can properly identify the most influential parameters from a computationally expensive model, for which other quantitative SA techniques are not feasible. The second method adopts Sobol indices (*3*) calculated on a kriging approximation of the simulation model. Effectiveness of this method has been proven in (*4*) where the authors show that Sobol indices calculated on the kriging emulator (based on 128 and 512 model evaluations) achieve approximately the same value than those calculated, following the procedure described in (*3*), on almost 40.000 model evaluations.

Preliminary results

A benchmarking exercise was carried out on five "toy" networks (the same as in (*4*)), using the mesoscopic version of the AIMSUN model. Seven model parameters were considered in the analysis, and, in both methods, 512 model evaluations were used. The SA was then carried out on four different model outputs calculated locally and globally. Preliminary results show that both methods were able to identify, to a good degree, the non-influential parameters. Furthermore, the kriging-based method was also able to provide a reliable estimation of first order and total order sensitivity indices, thus allowing a more powerful insight into the input-output relation of the model. The reliability of a kriging meta-model, however, suffers for the high dimensionality of the model itself. The experience carried out therefore suggests the following rule-of-thumb for the SA of computationally expensive traffic simulation models: the quasi-OTEE method can be used first to exclude non-influential parameters. Then, a kriging-based SA can be applied on the reduced set of parameters to refine the analysis and to identify with higher precision the effects produced by each

input on the outputs. In this way, just a few hundreds simulations can produce results as accurate and reliable as any other more computationally expensive sensitivity analysis tool.

Acknowledgements

Research contained within this paper benefited from participation in EU COST Action TU0903 – Methods and tools for supporting the Use caLibration and validaTIon of Traffic simUlation moDEls.

References

1. Ge, Q., and M. Menendez. An improved approach for the sensitivity analysis of computationally expensive microscopic traffic models: a case study of the Zurich network in VISSIM. *Proceedings of the 92th TRB Annual Meeting*, Washington DC, 2013.
2. Morris, M. D. Factorial sampling plans for preliminary computational experiments. *Technometrics*, Vol. 33, No. 2, 1991, pp. 161 - 174.
3. Saltelli, A.; Ratto, M.; Anres, T.; Campolongo, F.; Cariboni, J.; Gatelli, D.; Saisana, M.; Tarantola. S.; *Global Sensitivity Analysis – The Primer*; John Wiley and Sons Ltd: Cheichester, England, 2008.
4. Ciuffo, B., Casas, J., Montanino, M., Perarnau, J., Punzo, V. From Theory to Practice: Gaussian Process Meta-Models for Sensitivity Analysis of Traffic Simulation Models: Case Study of Aimsun Mesoscopic Model. *Proceedings of the 92th TRB Annual Meeting*, Washington DC, 2013.

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MISSISSIPPI STATE UNIVERSITY

CIVIL & ENVIRONMENTAL ENGINEERING

Traffic Simulation in Research Projects

by Dr. Li Zhang, Zhitong Huang, and Yi Wen
Mississippi State University

Traffic simulation has been extensively used for simulating traffic systems in transportation research projects at the Department of Civil and Environmental Engineering, Mississippi State University. In the project "Coordination of Connected Vehicle and Transit Signal Priority on Transit Evacuations", we developed the complete Gulf Coast traffic network in TSIS-CORSIM. Traffic signals, freeways, highways, traffic signs, and traffic flow were simulated. The simulation was implemented in an emergency evacuation scenario to help us evaluate the proposed Transit Signal Priority (TSP) system. In addition, a Run Time Extension (RTE) was developed for the simulation to help us on the evaluation. For example, RTE enabled us to implement Transit Signal Priority (TSP) operations at specific signalized intersections. Moreover, Connected Vehicle, which is a technology under development for wireless communication among vehicles and infrastructures, was simulated and integrated with TSP to improve transit evacuation efficiency. We could also simulate different scenarios for different levels of evacuations. The proposed TSP strategies were demonstrated effective by the simulation.

In the project "I-55 Integrated Diversion Traffic Management Benefit Study", simulation was used to create a scenario in which the freeway was very congested and freeway traffic was diverted to arterials to bypass the congested segment. RTE was also developed for the simulation. We implemented our models and algorithms in the simulation to optimize the diverted traffic volume and traffic signals on the arterials. We performed before/after simulations to evaluate the diversion system performance. It provided us valuable results which were helpful on the analysis of diversion traffic pattern, diversion route selection, DMS implementation, and traffic signals on the arterial roads when there is serious congestion on the freeway.

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Directed Brute Force Calibration (patent pending)

by Dr. David Hale
University of Florida

Use of traffic simulation has increased significantly, and has allowed important transportation decisions to be made with better confidence. During this time, traffic engineers have typically been encouraged to embrace the process of calibration, in which steps are taken to reconcile simulated and field-observed traffic performance.

Federal Highway Administration (FHWA) guidelines for applying microsimulation modeling software (1) state "the importance of calibration cannot be overemphasized"; and then refer to a study (2) by Bloomberg et al., which makes the following statement: "Recent tests of six different software programs found that calibration differences of 13 percent in the predicted freeway speeds for existing conditions increased to differences of 69 percent in the forecasted freeway speeds for future conditions."

According to international surveys (3), top experts, and conventional wisdom, existing (non-automated) methods of calibration have been difficult and/or inadequate. Consulting engineers and DOT personnel have expressed strong interest in making calibration faster, cheaper, easier, and requiring less engineering expertise. Some users of simulation have been unwilling to perform any amount of calibration; frequently citing labor-intensive data collection procedures, or a lack of coherent procedures and guidelines. Some simulation users have tried to apply procedures and guidelines that exist in the literature (1, 4, 5, 6); but have found that these guidelines are difficult to apply, or that these guidelines are a poor fit for their specific type of simulation analysis. Finally, some simulation users believe that they have somewhat mastered the process of calibration; but that the amount of engineering expertise required to achieve this mastery could be measured in decades, or that successful execution of calibration for a project could require weeks of hard work.

There has been a significant amount of research in the area of automated calibration techniques, for traffic simulation. However, many of these research projects and papers have not provided the level of flexibility and practicality that are typically required by real-world engineers. In the research papers by Lee and Ozbay (7) and Lee et al. (8), the authors present substantial literature reviews for both manual and automated calibration techniques. Their literature reviews contain references to dozens of related papers. The authors then emphasize that, despite the extensive efforts, existing calibration procedures continue to require excessive time and expertise.

With this in mind, the self-calibration features within TSIS-CORSIM were designed with an eye on maximizing practicality, flexibility, and ease-of-use. The implemented methodology allows engineers to quickly and easily select a set of input and output parameters for calibration. This methodology also allows engineers to prioritize specific input and output parameters, and specify their tolerable computer run time, prior to initiating the self-calibration process. The "directed brute force" search process is believed to be a key element in making this methodology flexible and practical, for real-world use.

FHWA is in the process of updating Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software (1), which was previously published in 2004. To support this effort, engineers from Noblis, Inc. are helping FHWA to produce a literature review (9) of existing calibration guidelines. This literature list demonstrates a widespread interest in simulation guidelines. It is hoped that the directed brute force calibration process described in this article may someday be recognized by many of these guideline documents.

Largely due to CPU speed limitations, automated calibration is unlikely to fully replace engineering judgment, engineering expertise, or manual (non-automated) calibration. The automated tools also cannot defend against fundamental (volume, timing, laneage) input data errors, simulation software bugs/limitations, or inconsistent performance measure definitions. Despite this, these software tools can hopefully "bridge the gap", in terms of significantly reducing the amount of time and expertise required for complex engineering projects.

[1] Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modeling Software, June 2004, Publication No. FHWA-HRT-04-040

[2] Bloomberg, L., M. Swenson, and B. Haldors, *Comparison of Simulation Models and the Highway Capacity Manual*, Preprint, Annual Meeting, TRB, Washington, DC, 2003.

[3] Brackstone, Mark, et al. (2012), Use, Calibration, and Validation of Traffic Simulation Models in Practice: Results of Web-Based Survey. Paper #12-2606. Transportation Research Board. Washington, D.C.

[4] Vortisch, P. *National Guidelines for Microsimulation*. Presented at 3rd MULTITUDE Meeting, Haifa, Israel, 6-7 December 2010. http://multitude-project.eu/meetings.html. Accessed 26 July 2011

[5] *Guidelines for the Use of Microsimulation Software*. Highways Agency. July 2007. http://www.highways.gov/knowledge_compendium/assets/documents/Portfolio/Guidelines - 901.pdf. Accessed 26 July, 2011

[6] Traffic Analysis Toolbox Volume IV: Guidelines for Applying CORSIM Microsimulation Modeling Software, January 2007, Publication No. FHWA-HOP-07-079

[7] Lee and Ozbay, New Calibration Methodology for Microscopic Traffic Simulation Using Enhanced Simultaneous Perturbation Stochastic Optimization Approach, *Transportation Research Record: Journal of the Transportation Research Board, No. 2124,* Transportation Research Board of the National Academies, Washington, D.C., 2009, pp. 233–240

[8] J. Lee, B. Park, J. Won, and I. Yun, "A Simplified Procedure for Calibrating Microscopic Traffic Simulation Models", Proceedings of the 92nd TRB Annual Meeting Compendium DVD, Washington D.C., 2013

[9] Sandelius, T. and Wunderlich K. *Literature Review for Update of TAT Volume III: List of Source Documents (v0.6)*, prepared for FHWA by Noblis, March 2013

Online traffic simulation software for heterogeneous road networks – current state and future trends

Submitted by Andreas Pell, Andreas Meingast, and Oliver Schauer (University of Applied Sciences Upper Austria – Logistikum, Steyr AUT)

Introduction

This article presents the results of an evaluation process of traffic simulation systems, which were presented at this year's European Conference on Intelligent Transportation Systems in Dublin. The evaluation was part of the on-going project "Intelligent Transport Systems Austria West" commissioned by the Office of the Provincial Government of Upper Austria and sponsored by the Austrian Climate and Energy Fund, which aims to implement and introduce a simulation software tool for providing real-time traffic estimation and short-term traffic predictions for the roads of Upper Austria. This road network includes urban streets in cities and towns as well as rural roads. In addition heterogeneous traffic has to be taken into account.

Road-side detectors are expensive and can only measure traffic volume at single points. To describe the current traffic situation of a heterogeneous road network an online sensor-integrated software tool has to be implemented to simulate and estimate the current traffic conditions in sections without real-time sensor information by abstraction of real world conditions by developing computer models [1].

A literature review revealed that in the last few years 24 reports were published but no comprehensive comparison of traffic-simulation tools like the "SMARTEST" project coordinated by the University of Leeds and funded by the European Commission [1][2][3][4]. Technical documents have been evaluated and an online survey with developers and product managers has been conducted. In addition predictions of future trends in traffic simulation software (TSS) have been collected on basis of expert interviews.

Comparison study

As part of this study, a survey was conducted to ascertain the current state of TSS. The questionnaire was based on SMARTEST [4]. As new fields of application have developed over the last few years, a lot of additional functionalities of other publications were added. The aim was to provide an overview of as many products as possible. The outcome of the study is an overview of 17 products. The information was gathered either by the questionnaire or from literature. Comparing the up-to-date results with earlier studies it seems that some simulation systems have been developed faster than others. It also reveals a further development of some products to adapt them to new fields of application. Due to the fact that traditional simulation programs have not been developed for being used in this area this step seems to be necessary [5].

Expert interviews

In addition to the comparison, future trends were collected by expert interviews. Analyzing the interviews show, that using TSS for ATMS & real-time simulation causes special requirements on TSS. The use of real-time traffic simulation is relatively new and from a market perspective still underestimated. Today, there are very limited real-world applications of real-time systems. Most of these applications are academic research case studies. There are many vendors, but only a few of them deliver suitable products that fit for those real-time applications. To operate real-time TSS good behavioral models, driver response and prediction algorithms are needed. The trend of using TSS for ATMS has created increased interest in mesoscopic solutions, their ability to scale wide areas without too much loss of fidelity in representing traffic dynamics. Yet, vendors of TSS do

not offer all of these functionalities in one single product. By providing interfaces in TSS vendors ensure, that missing functionalities can be implemented. However, for customizing TSS, a lot of research, coding and calibration must be done. Therefore, it needs more than a tool from a user's perspective. Real-time traffic simulation needs a bundle of software tools, knowledge and sometimes know-how. Another challenge will be to process great volumes of data provided by vehicles, mobile phones or road side sensors. They all have to be integrated in TSS to provide real-time traffic estimation, prediction and predictive route guidance. Predictions are required in order to anticipate congestion and drivers' response to any guidance that is disseminated to them. Some real-time systems without sophisticated prediction models exist in practice. Real-time predictive methodologies are still in the research/ academic domain.

TSS in rural areas have to deal with different challenges. Comparing rural areas with urban and inter-urban areas it arises, that rural areas have to deal with motorized and non-motorized traffic. Due to the fact that pedestrians, bicycles, cars, trucks, busses, etc. interact on these roads, parameters require a calibration. Freight traffic also needs to be properly calibrated to be able to take into account the effects of trucks on traffic congestion. To model heterogeneous traffic it is possible to change parameters in microscopic simulation systems and develop mesoscopic models. TSS need to adapt their methods of assignment on the different road categories rural, interurban and urban. In some cases legacy asset management and network information systems have to be replaced with more comprehensive database solutions. Additionally, poor data quality, a small amount of real-time data and communication costs in remote rural areas are common challenges – not only for operators, but also for vendors.

Conclusions

A state-of-the art review report has been drawn up. The results of the evaluation show, those existing simulation systems can estimate current traffic situation and predict traffic conditions.

Most of the simulation tools are designed for "urban", "interurban" or "combined" road networks and can deal with real-time data. No system delivers all functionalities; no system seems to have a focus on a single field of application. Some of these systems use hybrid models (micro+meso, micro+macro, micro+meso+macro); some of them have limitations in links, etc. A detailed network model is necessary. A GIS data based network model would improve data consistency and efficiency, which is often not recognized by software vendors.

There is a lack of online traffic simulation software applications specially designed for heterogeneous road transportation networks in peripheral regions. Regarding the rising performance of traffic simulation systems, future research could be done to further develop this functionality in simulation systems to can use them better for providing real-time traffic information and short-term traffic predictions in mixed wide areas (rural, urban, inter-urban) by the use of vehicle probe data without focusing only on highways, highly-ranked arterial roads and conurbations. Customization provides more room to develop future applications but also overstrains some users.

1. Ratrout, N. T., S. M. Rahman (2009). *A Comparative Analysis of Currently Used Microscopic and Macroscopic Traffic Simulation Software*, The Arabian Journal for Science and Engineering, vol.34, Number 1B, April 2009, pp. 121-133.
2. Kotushevski, G., K. A. Hawick (2009). *A Review of Traffic Simulation Software*, Computational Science Technical Note CSTN-095, Massey University, Albany, North Shore 102-904, Auckland, New Zealand.
3. Jones, S. L. et al (2004). *Traffic Simulation Software Comparison Study*, University Transportation Center for Alabama Report.
4. Barceló, J., et al (1999). *SMARTEST - Simulation Modelling Applied to Road Transport European Scheme Tests – Simulation Report*, University of Leeds, Faculty of Environment.
5. Boxill, S., L. Yu (2000). An Evaluation of Traffic Simulation Models for Supporting ITS Development, Cleburne: Texas Southern University.

2013 SimSub Activities

SimSub Meeting at the Mid-Year Highway Capacity Committee Meeting

The Highway Capacity and Quality of Service Committee (HCQS) held its mid-year meeting between July 31st and August 3rd, 2013, at the Polytechnic Institute of New York City. On August 1st, a SimSub meeting was held in conjunction with the HCQS Traffic Simulation Applications Subcommittee meeting. The meeting was moderated by George List (NC State University) and Loren Bloomberg (CH2M Hill).

Lily Elefteriadou conducts the HCQS full committee meeting on August 3rd

During this meeting, members discussed future research and activities to consider. Popular research ideas included integration of HCM methods with macroscopic simulation, and developing procedures for comparing HCM outputs to simulation outputs. Activity ideas included documenting the relationship between three analysis paradigms (capacity analysis, simulation, "Big Data"), and maintenance of simulation-based guideline manuals.

About halfway through the meeting, David Hale (University of Florida) repeated some of the other simulation-based topics mentioned during Wednesday's HCQS Research Workshop. These topics included HCM guidance on calibrating simulation (especially geometric factors), defining performance measures for simulation, prescribing when simulation should supplement field data, using new data to facilitate simulation algorithm development, guidance on field data measurement for simulation, and using simulation for reliability analysis. Karen Giese (PTV Group) mentioned the effectiveness of macroscopic simulation for reliability analysis.

Towards the end of the meeting, Jim McCarthy (FHWA) reported on the progress of Traffic Analysis Tools Volume III, which is undergoing a major revision. Finally, members discussed the Sunday Workshop at TRB 2014, at which expert speakers are expected to discuss the past, present, and future of simulation.

2013 SimSub Activities

Animations of Traffic Flow Phenomena

by Dr. Aleks Stevanovic

I've created a page on our website that lists some of the websites that contain simulations/animations of traffic flow phenomena. The list is not inclusive and it contains links which were either given to us or were known from personal experiences. If you know any other similar links which you think deserve to be included please let us know (trbcommitteeahb45@gmail.com). Animations of traffic conditions (e.g. shock waves, ramp metering, signalized operations) are great visual tools to popularize the traffic engineering discipline and great resources for our students in traffic engineering/ traffic flow theory courses. If you have any ideas how to improve this page please send your comments to the email address given above.

Carlos Daganzo's Animations of Traffic Phenomena
http://www.ce.berkeley.edu/~daganzo/index.htm

Ben Coifman's (OSU) Shock Wave Animations
http://www2.ece.ohio-state.edu/~coifman/shock/

This page illustrates wave propagation on freeways. In the extreme, such waves take on the form of stop and go traffic. All of the data shown here come from real traffic, having been reduced by hand from video.

Jorge Laval's (GA Tech) Online Simulations
http://trafficlab.ce.gatech.edu/

Here you will find information and resources on vehicular traffic simulation models. Most of the models included in this website are based on the kinematic wave model (also known as the LWR model), which is the simplest model able to capture basic traffic dynamics features such as the propagation of congestion in the form of "waves".

Martin Treiber's Traffic Animations

1. MovSim
Homepage of the Multi-model open-source vehicular traffic simulator (MovSim): www.movsim.org

Besides working with/contributing to the open-source simulator, you can play two online games:

Ramp-Metering Game: Control interactively a signalized freeway access and try to beat the high-score, i.e., the minimum simulation time to manage all the prescribed traffic demand. If your control abilities are low, you will create massive jams, or even a gridlock, on the secondary road.

Routing Game: Reroute interactively some of the prescribed freeway traffic demand over a deviation to avoid/ delay traffic breakdown. However, you can do too much of a good thing and create massive jams on the deviation. Again, the goal is to beat the high-score, i.e., the minimum time to manage all the traffic demand. The routing game will be available as an Android App, soon.

By the nature of the traffic management simulated in the games, action and effect are significantly delayed. This makes it tricky (and interesting) to obtain good scores. Both games have been tested on our annual science fair for pupils and the general public ("Lange Nacht der Wissenschaften") and can be made available for similar events.

2. Traffic-Simulation (DE)
www.traffic-simulation.de

In this interactive Java applet, you can create your own traffic jam in different situations, provoked by bottlenecks, traffic demand peaks, external perturbations, or by changing the driver's behavior. All the above elements can be controlled interactively.

3. Traffic-States
www.traffic-states.com

This is a searchable graphical data base for spatial-temporal traffic jam patterns.

SimSub Web Site

Alex Stevanovic, Webmaster **http://sites.google.com/site/trbcommitteeahb45**

2013 Product Updates

TransModeler
Traffic Simulation Software

Caliper

TransModeler is Caliper's trip-based traffic microsimulation on a GIS platform. During July of 2013, Caliper started shipping TransModeler 3.0 Release 2, or R2.

R2 has a variety of improvements. Of particular note is the addition of a disaggregate emissions model in the Comprehensive Modal Emissions Model (CMEM). This post-processor enables the calculation of emissions and fuel consumption. CMEM enables users to calculate these various sustainability, environmental and public safety metrics.

TransModeler 3.0r2 further leverages the product's GIS platform. One such new feature is the ability to add dynamic Web Map Layers from services like Google and OpenStreetMap. This feature pulls the relevant map tile from the Internet as the user moves through the map.

Other highlights include:

- Expanded API functionality, including an example that enables simulating scenarios in batch
- Ability to launch and run two sessions of the software simultaneously
- Expanded support for intersections with more unusual geometries (e.g., greater than six intersecting links)
- Driver behavior improvements for roundabouts
- A new toolbox for connecting simulation databases to centroids in a planning line layer
- Improved toll revenue reporting for HOT lanes and toll plazas
- New features for creating copies of projects for build scenarios
- Improvements in AVL-based transit signal priority
- Improved support of reversible lanes

TransCAD
Transportation Planning Software
Caliper
TransModeler
Traffic Simulation Software

2013 Product Updates

TSIS-CORSIM version 6.3 was released in August 2012, and has been mailed to all registered offices with a current support subscription. TSIS 6.3 contains several improvements including the Streets Editor, Freeways Editor, HOT lanes, advanced toll plazas, interactive lane alignment in TSIS Next, adaptive cruise control, and bug fixes.

Streets Editor and Freeways Editor. Based on the Urban Streets and Freeway Facilities modules from HCS, these new editors use basic volume and timing data from the user to automatically construct complex simulation networks within seconds.

High Occupancy Toll (HOT) Lanes. The new version of CORSIM supports different HOT lane pricing algorithms, monetary value of time for each vehicle type, HOT pricing output data, and specification of vehicle types permitted to use HOT lanes in each time period. In addition, the user can specify a percentage of transponders for each vehicle type, and numerous calibration parameters to customize vehicle behaviors near HOT lanes.

Advanced Toll Plazas. CORSIM now supports different types of toll payment in each lane, vehicle type restrictions in each lane, and the percentage of vehicles using each payment type. In addition, the toll plazas now allow all settings to vary between time periods, and numerous calibration parameters to customize vehicle behaviors near toll plazas. TRAFVU 6.3 has been modified to indicate advanced toll plazas, and provides color coding to indicate payment types for each vehicle.

Interactive Lane Alignment in TSIS Next. TSIS Next users can now drag-and-drop entire roadway sections to achieve better upstream/downstream lane alignment. Endpoints are used to control intersection and node alignments, and the midpoints are still available to affect curvature. Alternatively, a pop-up dialog is available to manually enter the X/Y feature point values.

Adaptive Cruise Control (ACC). CORSIM now allows the user to specify the percentage of advanced technology vehicles in the traffic stream, plus car-following time headways for each ACC driver type.

New Input Screens in TSIS Next. TSIS Next has been updated for version 6.3; with added support for ACC, HOT lanes, and advanced toll plazas.

Minor Improvements and Bug Fixes. Increased the number of lanes allowed at interface nodes**;** fixed the control delay calculation on NETSIM entry links; fixed a problem with freeways that split into two branches and then rejoin downstream; improved some of the input error checking logic; updated the CSV output format to handle 9-lane approaches; corrected a bug in spillback checking that occurred when the right receiving link and the right-diagonal receiving link were the same link; fixed the calculation of travel times and average speeds on interface links.

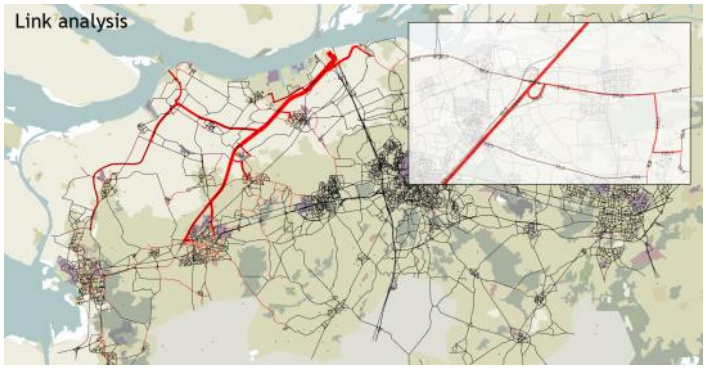
Upcoming Developments. Upcoming features of CORSIM may include new vehicle trajectory analysis tools, automated "self-calibration", next-generation emissions models, and improvements to the software architecture.

2013 Product Updates

TSS-Transport Simulation Systems views its latest software release, Aimsun 8 Expert, as a development in the emerging sector of integrated transport modeling rather than an addition to the established travel demand modeling software sector.

According to TSS commercial director Alex Gerodimos, the company is aware that the travel demand modeling market is well served by existing software; but Aimsun 8's originality lies in its integrated approach, meaning its set of features can support simulation projects from beginning to end.

"It might seem odd that we would want to enter a saturated market, but our aim is not to add just another package to a long list. Aimsun Expert adds support for the four-step transportation planning process to a software application already capable of dynamic traffic assignment coupled with mesoscopic, mircoscopic and hybrid simulation - all in the same environment. Our primary audience is users who see integration as a key requirement; perhaps those who have been using simulation all along and have been longing for access to travel demand modeling features in the course of a project," he said.



Gerodimos said that consultants carrying out simulation studies were often artificially constrained in their ability to make adjustments to their demand because of the need to establish arduous links with other software packages, often used by different groups. "We now provide the option of doing this type of analysis inside the software they are already using," he said.

Aimsun 8's approach is the opposite of an exclusive approach, he says. "Ours is not a walled garden, where clients have to use our software every step of the way. While we believe that Aimsun 8 Expert is currently the most complete package on offer, we also expect that users might want to use a subset of what we offer alongside another's package. We will continue to support interfaces with other software applications, including those of our competitors."

Aimsun hybrid simulator:
a pocket of microscopic detail in a mesoscopic model

Gerodimos says the new software benefits engineers in the field. First, he says cost efficiencies encourage them to build larger models and maintain them, rather than build smaller ones they cannot keep. "The work then becomes cumulative and you don't have to start from scratch," he said. Second, the engineers do not face the temptation to make blanket assumptions to avoid transferring data between packages.

"They can just change the inputs, then run the model again and continue looping between the two until they are satisfied that the interplay between supply and demand has been captured adequately." Gerodimos cautions that there is no magic button that will replace thoughtful analysis in this process.

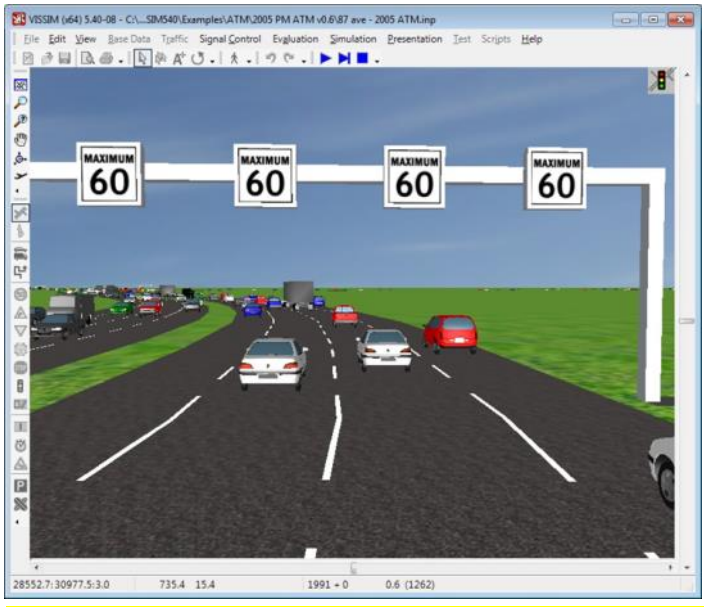
"However, we are removing a technological burden that should not be there in the first place, and that is no small thing."

ATM Lab

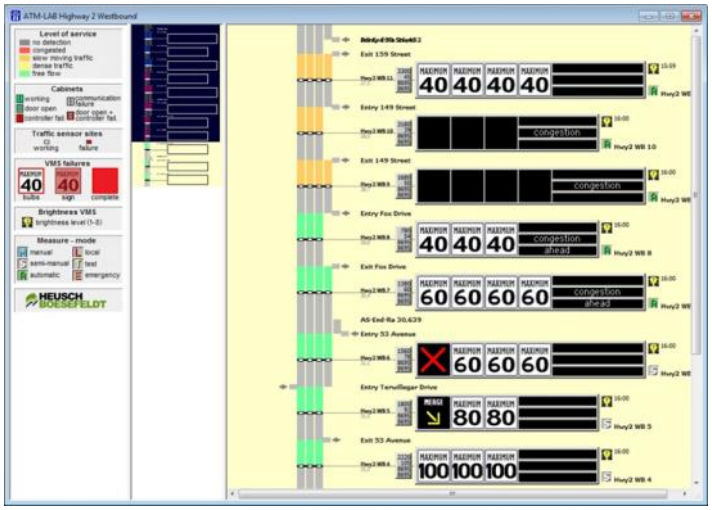
The concept of testing new traffic management and control strategies and algorithms in a traffic modeling environment is often referred to as a laboratory or testbed. Following this testbed concept, Traffic Technology Solutions in conjunction with its partner and shareholder Heusch/Boesefeldt has developed the ATM Lab by integrating the ATM control and management software GeoDyn – Control with the microscopic traffic simulation tool Vissim. The ATM Lab allows the user to test various traffic and incident scenarios in microsimulation, observe their impact on the whole network through Vissim, and determine the most promising ATM activation strategies. The ATM Lab far exceeds the capabilities of traditional traffic simulation modelling, providing a virtual reality for operators to interact with their traffic management systems more realistically with quicker response feedback.

GeoDyn – Control. GeoDyn – Control is the flagship product of our partner and shareholder Heusch/Boesefeldt. Incorporating operational experience of approximately 70 operational systems in Europe and more than 30 years of traffic control experience, it is a mature and reliable off-the-shelf management and control software for Active Traffic Management (ATM) freeway control supporting the following ATM strategies:

- Speed harmonization
- Congestion warning
- Fog warning
- Wetness warning
- Ice warning
- Temporary passing ban for trucks
- Vehicle headway warning
- Wrong way driver warning
- Cross wind warning
- Hard shoulder running
- Ramp metering



Vissim's powerful 3D graphics provide the ATM Lab user with realistic feedback of his/her management decisions.



The ATM Lab's actual traffic management center user interface provides for an authentic user experience of actively managing traffic by deploying various ATM strategies.

2013 Product Updates

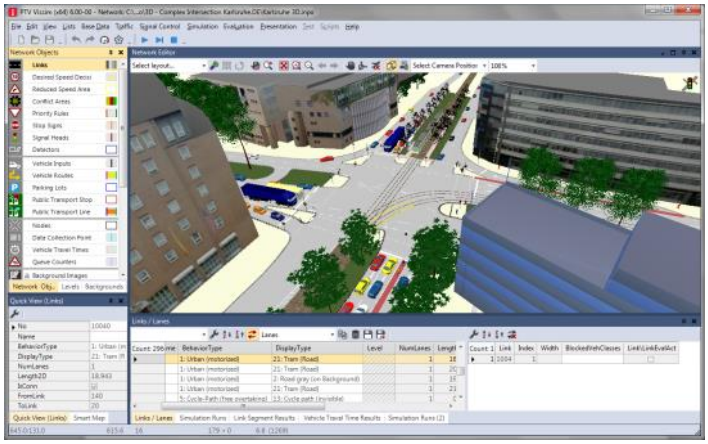
PTV Vissim

PTV Vissim 6 has just been launched and is the result of extensive user feedback and intense software development. PTV Vissim 6 brings to our users a brand new, modern interface along with expanded functionality.

Vissim is still the ideal tool for state-of-the art transportation planning and operations analysis and now has new features to further streamline in your workflow.

Flexible Window Interface

When Vissim users open Vissim 6, they'll see an interface with a flexible window concept. This allows users to open and edit multiple networks, access data listings, and arrange windows within the main interface window or extract and arrange them across multiple monitors. Vissim users can truly customize the workspace to suit their personal preferences and project needs.

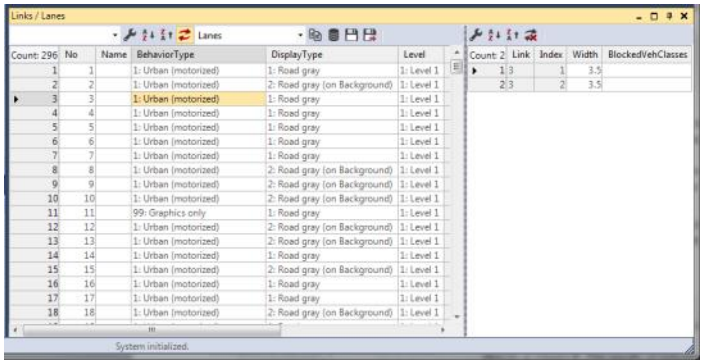


More Efficient Network Coding

Vissim 6 brings new efficiency to the network coding process. The Vissim object bar has been expanded to easily access graphical parameters, context menus have been added for key coding functionality, and management tools allow users to manage background images and network levels.

Data Access

All network objects and data attributes are directly accessible in the Vissim 6 interface through the new Lists. Here, users can sort, copy/paste, and multi-edit, significantly improving efficiency in data entry and network building. Complex data structures are also supported through access to related objects and indirect data editing.



In addition, COM access has been extended to include all data objects and new COM functions for advanced modeling applications.

Output and Reporting

Vissim 6 provides users with new functionality to analyze output directly in the interface. Output can be summarized across multiple runs and results of individual runs and time intervals are provided along with average values and other statistics. This output is managed & displayed through lists while labels for network objects can be displayed with color schemes for the thematic display of network outputs.

PTV Group is excited to bring Vissim 6 to our users and believe it is a significant step into the future of simulation software.