



# User Group 2009

2009 North American User Group Meeting, 9th October, San Francisco, CA

## Venue

Hilton San Francisco Airport, 600 Airport Blvd., Burlingame, California, 94010

## Agenda

- 09.45 – 10.00 Registration
- 10.00 – 10.15 Introduction
- 10.15 – 11.00 *Large Scale Microsimulation Modeling of Proposed Truckways within The Regional Toronto Freeway System*  
University of Toronto
- 11.00 – 11.15 Coffee
- 11.15 – 12.00 *Corridor System Management Plan (CSMP) - A Case Study on Interstate 580*  
Dowling Associates
- 12.00 – 13.00 *Update from Paramics*
- 13.00 – 14.00 Lunch
- 14.00 – 14.45 *Considerations when applying Paramics to strategic traffic models*  
Braidwood Associates
- 14.45 – 15.30 *The development of a HOV driver behavior model under Paramics*  
CLR Analytics
- 15.30 – 15.45 Coffee
- 15.45 – 16.55 *Pushing the Boundaries: Achieving Reality in Complex Paramics Networks*  
Halcrow
- 16.55 – 17.10 Closing remarks

## Presentations and Presenters

We've listed below the confirmed presentations for this User Group Meeting, this was correct at the time of publication.

### ***Large Scale Microsimulation Modeling of Proposed Truckways within The Regional Toronto Freeway System***

Hossam Abdelgawad, University of Toronto  
Toronto, Canada

This project assesses the impact of exclusive truck facilities on urban freeway performance. A large scale regional microscopic traffic simulation model is developed for AM and PM peak hours and is used to model two alternative truckway configurations in the Greater Toronto Area (GTA), including a truck only highway and a truck lane conversion on Highway 401. Demand inputs to the microsimulation model are generated by a regional transportation demand model which provides OD matrices for light, medium and heavy trucks and passenger cars. Plug-ins are developed to represent a truck only lane in the simulation. The simulation model is successfully calibrated to reflect observed road counts, and to produce realistic congestion patterns. The effect of infrastructure changes on travel distances, travel times, exclusive truck lane usage, and travel speeds are assessed. Microscopic simulation allows queuing formation/dissipation and bottlenecks to be represented, and allows for separate analysis of truck and car performance. Addition of a 4-lane truck only highway results in greater travel time improvements for trucks, and sometimes results in shifting of traffic bottlenecks on Highway 401 to downstream locations. Conversion of a freeway lane on Highway 401 results in increased congestion for passenger cars, but improved travel speeds for trucks. Both scenarios show truck facility usage ranges from 100 to 800 trucks per hour per direction.

## **Corridor System Management Plan (CSMP) - A Case Study on Interstate 580**

Allen Huang, Dowling Associates  
Oakland, CA

The California Department of Transportation sponsored a series of Corridor System management Plans (CSMPs) on the most congested freeway systems in the state. The basic objective of a CSMP is to develop priority sequence of funding improvement projects, by maximizing productivity of existing transportation resources, and for all modes of transportation. This paper will present a case study of the Interstate 580 CSMP in the San Francisco Bay Area (a 33-mile long freeway between interchanges of I-205/I-580 and I-238/I-880). Technical evaluations are conducted using a combination of microsimulation model (integration of Paramics and Synchro/SimTraffic) and demand forecasting model (implemented using CUBE).

The study begins with an extensive effort of data acquisition, including aerial photography, traffic counts and occupancy survey, as well as travel time studies. Next, both the travel demand forecasting and microsimulation models are carefully calibrated and validated for the multiple-hour AM and PM peak periods. Mitigation strategies are then packaged together as appropriate by category and objective and tested to identify project prioritization. Strategies covered a wide range of project types, including: high occupancy toll lanes, operation hours and occupancy requirements for restricted lanes, interchange modifications, ramp metering, truck movements, arterial improvements and signal optimization, as well as transit improvements.

This paper will share some of the techniques, challenges and lessons learned from the study, including a seamless technique developed using Origin Destination Matrix Estimation (ODME) to obtain trip tables for the microsimulation analysis ensuring consistency between various models, collaboration with stakeholders for development of mitigation strategies, as well improvements recommendation and guidance.

### **Update from Quadstone Paramics**

Ewan Speirs, Quadstone Paramics

New product news including details of some key features in the soon to be released Paramics 6.7 and UAF 1.2. In addition, development roadmap information for the next major version (v7.0) and details of the newly formed Product Steering Group which allows visionary users of the Paramics tools to shape future development plans at the earliest stages of the development process.

### **Considerations when applying Paramics to strategic traffic models**

Matt Juckes, Braidwood Associates  
Avenel, NJ

With over 20 years of combined experience Braidwood Associates has been well placed to work on some very complex projects using Paramics. This Presentation will try to share some of that experience with reference to the I-405 District 12 model as an example.

The I-405 Corridor model spans 25.4 miles of I-405 in Orange county and has been modeled for a 4 hour am and a 4 hour pm peak period. As with the case of many high level models these days the corridor includes a number of challenge issues including: HOV lanes; Dynamic Ramp Meters, and high volumes including sections with over 11,000 vehicles/hour in each direction.

When starting a large scale Paramics model it is always important to consider the following issues.

- Project Scope,
- O/D source and Development
- Simulation Speed
- Software Enhancements - Actuated Signals, Freeway MOE, Ramp Metering, HOV Lanes, HOT Lanes, Route Choice.
- Output Statistics

We will show through this presentation the stages of a project and discuss in an open forum format the pluses and minus with each step. When is it correct to use APIs. And what are the limitations that should be considered when taking on a project of this size.

## ***The development of a HOV driver behavior model under Paramics***

Lianyu Chu, CLR Analytics  
Irvine, CA

High-Occupancy Vehicle (HOV) lanes, commonly known as carpool lanes, have been accepted as a cost-effective and environmental-friendly alternative in many metropolitan areas. It is thus very important to find ways to evaluate HOV strategies during the decision making process, and prior to any implementation. An alternative approach is microscopic traffic simulation. However, current micro-simulation models have limited capabilities to model HOV driver behaviors, particularly with respect to buffer-separated facilities. This study proposed a probabilistic HOV driver behavioral model based on discrete choice modeling derived from random utility principles, which includes a preferred access choice model for examining travel time savings and a traffic model for calculating the acceptable gap to get in/out the HOV lane. A HOV access plugin was also developed using a micro-simulation tool, Paramics, based on the proposed model. Its theoretical capability is extended to real-world application via providing additional "implementation" parameters, such as ingress and egress points selection control, and update frequency of traffic information. A real-world freeway network, SR-57 in Orange County, California, was selected to analyze the reasonableness of the model through sensitivity analysis, and was further investigated for model validation purposes. The results have shown the reasonableness of the proposed model under various traffic conditions. The proposed model also demonstrated its feasibility and applicability via setting various calibration parameters and control parameters.

## ***Pushing the Boundaries: Achieving Reality in Complex Paramics Networks***

Chris Wilson, Simon Kinnear, Halcrow  
Australia

After almost 10 years experience in the application of Paramics, the presenters will outline their experiences in the development of some of the more unusual and complex models built during those years. In doing so, the presenters will highlight some of the techniques developed to model complex traffic conditions including data preparation, network build, matrix estimation, and the judicious use of plugins. Case examples to be discussed follow.

### **Downtown Sydney Model**

Halcrow have developed a Paramics model that covers the downtown district of Sydney, Australia and includes an area of approximately 2sq miles between the Sydney Harbour Bridge, The Opera House and Central Station to the south. This district contributes about 7% to the economy of Australia and the effect of congestion here causes the greatest impact to the Australian economy which is why the state government utilises Paramics to quantify impacts of network or land use changes in the downtown district.

The State Roads Authority (RTA) has developed its own successful signal control system that is required to be reflected in the models accurately. This is why the 130 signalized intersections are connected to the adaptive signal control logic using SCATSIM making it the largest application of this technology in the world.

As well as accurately reflecting the adaptive signal timings, pedestrian crossing delays to vehicles and bus stopping activity on over 150 bus routes. There is also an accurate representation of the 35,000 vehicle trips that either pass through the area or access the 120 downtown parking stations.

The primary difficulties in modelling adaptive signal control technology to grid networks is the alternative routing that can exist on a network and this is largely determined by the granularity of the matrix together with the disaggregation of the zoning system adopted.

### **Downtown Sydney UAF Model**

Using the downtown Sydney model as the basis for coding 4 discrete areas of pedestrian activity in the

Urban Analytics Framework (UAF) it was possible to examine the effects of pedestrian flow as part of Metro rail planning exercise. These pedestrian volumes were determined from surveys undertaken during the busiest weekday periods with a combined volume of almost 150,000 pedestrians being considered.

### **Sydney Harbour Bridge Lane Control Model**

A third element to the development of Paramics models for Sydney was the need to accurately reflect the influence that the Sydney Harbour Bridge crossing has on the feed of traffic into the downtown area.

Approximately 250,000 vehicles per day cross the harbour and because of limited lane capacity, involves the use of reversal lanes to manage rush hour traffic demand.

Due to continuing growth in traffic demand, a Paramics model was required to optimize the lane management. This in turn would have a significant influence on the movement of traffic into and out of the downtown which needed to be quantified.

Reversal lanes are not easy to model in Paramics and hence the modelling process involved the development of plugins to successfully replicate the process.