Aimsun

19th-20th October 2015

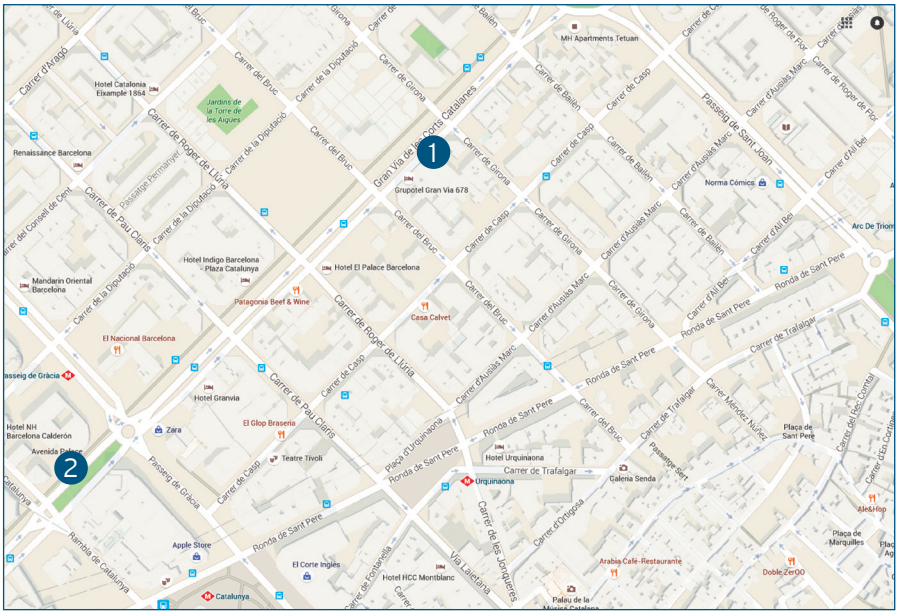
13th Aimsun Users' Meeting

Barcelona

TSS TRANSPORT SIMULATION SYSTEMS

EVENT SUMMARY

Monday 19th October	TSS Updates and Technical Sessions Hotel Avenida Palace 09:00 - 17:30 Cocktail Evening Eclipse Bar, Hotel W 21:00 – 23:00
Tuesday 20th October	Aimsun User Presentations Hotel Avenida Palace 09:00 – 16:30
Wednesday 21st October	Aimsun Training Course AMEC 09:00 – 17:00



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1 AMEC
Asociación de Empresas Industriales Internacionalizadas
Gran Via de les Corts Catalanes, 684

2 Hotel Avenida Palace
Gran Via de les Corts Catalanes, 605

3 Hotel W Barcelona
Plaça de la Rosa dels Vents, 1

TSS TRANSPORT SIMULATION SYSTEMS

MONDAY 19th OCTOBER 2015

09:00 - 09:15	Registration
09:15 - 09:30	Welcome speech / Jaime L. Ferrer, CEO
09:30 - 10:30	A TSS update / Alex Gerodimos, Executive Director, Marketing and Business Development
10:30 - 11:00	**Refreshment break**
11:00 - 11:30	Operational traffic modelling in London; the scale, scope and detail of TfL's operational models / Glynn Barton, Transport for London, UK
11:30 - 12:15	**TSS TECHNICAL SESSIONS** New demand adjustment techniques for large-scale dynamic models / Martijn Breen, Scientific Software Developer
12:15 - 13:00	Finding NEMA: What you never realised you could do with NEMA actuated control / Paolo Rinelli, Product Manager
13:00 - 14:00	**Lunch**
14:00-14:45	Integration of Aimsun DTA with the activity-based model: requirements and developments / Jordi Casas, Executive Director, Research and Development
14:45-15:15	The quasi-dynamic model in Aimsun compared to static and dynamic models / Jordi Casas, Executive Director, Research and Development
15:15-15:30	**Refreshment break**
15:30-16:00	Mixed traffic: 2D behaviour models of shared road space / Annique Lenorzer, Scientific Software Developer
16:00-16:30	Cool for SCATS: Aimsun interfaces with urban traffic control systems / Dimitris Triantafyllos, Consultant
16:30-16:45	Working with Aimsun and GTFS (General Transit Feed Specification) to improve public transport representation in large-scale dynamic models / Grant MacKinnon, Senior Consultant
16:45-17:30	**TSS TECHNICAL PARTNER** Meeting the challenges of pedestrian and traffic modelling / Enrique Huertas and Eduardo Lazzarotto, Legion, UK

17:30	**Close of day**
21:00	Meet at Eclipse Bar of Hotel W for cocktail and canapé evening

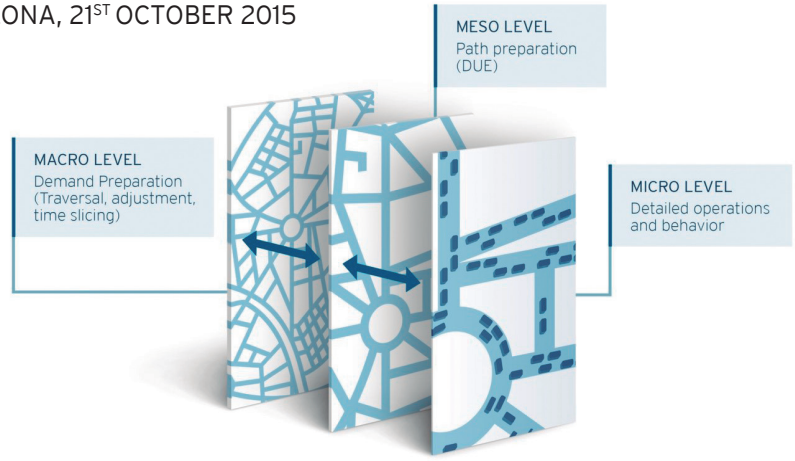
TUESDAY 20th OCTOBER AIMSUN USER PRESENTATIONS

09:00-09:30	Using Aimsun to model a motorway corridor: the A1/A1 (M) experience / Angela Lopez, CH2M, UK
09:30-10:00	The Halifax Aimsun Model / John James, Fore Consulting, UK
10:00-10:30	Ringing in the changes: Belo Horizonte ring road study / Rodrigo Sírio Coelho, Fratar Engenharia Consultiva Ltda, Brazil
10:30-10:45	**Refreshment break**
10:45-11:15	Integrated public transport network for the City of Cape Town / Gerald Klemenz, Royal HaskoningDHV, The Netherlands
11:15-11:45	Reaper Man – Bringing the data harvest home to Aimsun / Ken Fox, Fox Traffic Simulation, UK
11:45-12:15	Why vehicle emission models need traffic microsimulations / James Tate, Institute for Transport Studies, University of Leeds, UK
12:15-12:45	Dynamic large-scale model for the Harbour of Rotterdam / Benjamin Tempert & Muriel Verkaik, Royal HaskoningDHV, The Netherlands
12:45-14:00	**Lunch**
14:00-14:30	Optimisation of variable speed limits for motorway traffic using artificial intelligence techniques / Panos Georgakis, University of Wolverhampton, UK
14:30-15:00	The Paris mesoscopic model / Matthieu Jacquart and Thomas Juin, SYSTRA, France
15:00-15:15	**Refreshment break**
15:15-16:15	Open discussion of user requirements / Chair: Jordi Casas, Executive Director, Research and Development
16:15-16:30	**Closing remarks**

AIMSUN TRAINING COURSE

Working with demand and paths in Aimsun 8.1

BARCELONA, 21ST OCTOBER 2015



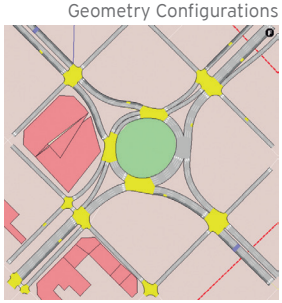
amec

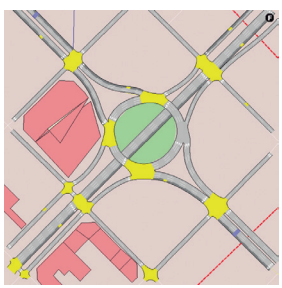
Asociación de Empresas Industriales Internacionalizadas

Gran Via de les Corts Catalanes, 684
08010 Barcelona

- Morning session: 9:00-13:00 (including a 15-minute break)
- Afternoon session: 14:00-17:30 (including a 15-minute break)

Geometry Configurations





TUTOR: Paolo Rinelli, TSS Product Manager

Paolo will guide you through the methodology and techniques for calibrating the base traffic demand (using static OD adjustment, departure time adjustment and dynamic OD adjustment) and for calculating the base equilibrium paths (using dynamic user equilibrium with incremental load).

Paolo will then show you how to code the future scenario (using geometry configurations) and see how the changes affect the path assignment (using APA fixer and continuing the DUE).

METHODOLOGICAL INTRODUCTION

1. Multi-resolution modelling project workflow
2. Routing (cost) consistency
3. Demand preparation
4. Techniques for improving the convergence of a dynamic user equilibrium (DUE) assignment
5. Scenario management
6. Modelling the transition to a new equilibrium after network modifications

HANDS-ON EXERCISES

1. Traversal calculation
2. Demand adjustment and slicing (static adjustment, departure adjustment, dynamic adjustment)
3. Dynamic user equilibrium (DUE) assignment options
4. Geometry configurations
5. APA fixer

TSS TRANSPORT SIMULATION SYSTEMS

ABSTRACTS: AIMSUN USERS AND TSS TECHNICAL PARTNER

LEGION
SCIENCE IN MOTION

Meeting the challenges of pedestrian and traffic modelling

Enrique Huertas and
Eduardo Lazzarotto,
Legion

In densely populated cities like London, New York and Hong Kong, the pedestrian is an overwhelming part of the transportation network. This presentation describes several challenging case studies, particularly in hotspots such as intermodal hubs, stadiums and airports, with particular regard to improvements, both current and upcoming, in pedestrian and vehicle interaction in the latest version of Legion Spaceworks and Aimsun 8.1.

The Halifax Aimsun Model

John James, Fore Consulting

Fore Consulting has used the most recent features in Aimsun 8.1 to help design and test proposals to improve the town centre highway network in Halifax, a town in North England. The model includes AM and PM peak mesoscopic simulations, which are used to generate DUE paths. These paths are then used by 85% of the traffic in microscopic simulations, with the rest dynamically assigned. The model achieves fast convergence at a mesoscopic level, and accurate replication of counts and journey times.

Legion for Aimsun has been used at a critical junction outside the train station to determine the level of benefits that scheme proposals would provide for pedestrians. Do Minimum scenarios have been constructed, which have additional traffic from new developments in the area. Geometry configurations have been well exploited to test different designs and combinations quickly. The geometry configuration workflow has enabled faster scheme development, as the user can instantly switch between examining one design in isolation, and coordinating it with other changes. This has helped determine the optimum combination of individual proposals in the overall scheme and also the phasing of the scheme.

Outputs from this model have been used in TUBA and COBALT—two economic and accident appraisal tools developed by the UK Department for Transport—in order to determine the benefit-cost ratio of the scheme.

Integrated Public Transport Network for the City of Cape Town

Gerald Klemenz, Royal HaskoningDHV

The City of Cape Town is faced with a number of difficulties resulting from the Apartheid-era land use pattern and its transport network: poor accessibility to essential services for a large share of the population, an inefficient and poorly laid out public transport network that does not address the needs of the patrons, and a land use pattern promoting the privately owned car as the only means of transport.

To address these shortcomings, the city has begun to construct an Integrated Public Transport Network to replace the existing decades-old bus and minibus taxi network. At the heart of the proposals is the MyCiti BRT system, a segregated new high frequency bus network providing access between the suburbs and the CBD.

Aimsun software was used to model and evaluate the proposals for one of the key corridors in the southern suburbs of the city where macroscopic demand modelling was supplemented by dynamic simulation (mesoscopic and hybrid).

This presentation aims to provide a brief description of the project, outline the model development and calibration and discuss the output retrieved from the model. It will be demonstrated that the MyCiti BRT system will decrease overall journey times during peak hours and reduce congestion as a result of a change in the modal share.

Transport for London

Operational traffic modelling in London; the scale, scope and detail of TfL's operational models

Glynn Barton, Transport for London

Transport for London's Road Space Management (RSM) Directorate and Outcomes Delivery (OD) department within the Directorate has the broad responsibilities outlined in the Mayor's Transport Strategy, including traffic management for over 1,000km of London's busiest roads and the operation of 6,300 traffic signals. The network is managed on a daily basis to minimise the impact of both planned interventions and unplanned events on traffic movements in the capital.

To ensure the efficient operation of London's traffic system RSM conducts over 1,000 traffic signal timing reviews annually using operational traffic modelling tools on both the junction level and network-wide to ensure the network is continually optimised to cope with variations in demand and changes to the network.

In addition to the above, within its operational modelling hierarchy, RSM - OD use corridor-based micro-simulation models to deliver the Mayor's desire to improve journey time reliability on the 23 MTS corridors and to test future changes to the road network. Changes to the wider network are investigated with area-wide tactical assignment models, which are used to test both operational strategies and the impact of significant developments or changes to London's roads.

Reaper Man – Bringing the data harvest home to Aimsun

Ken Fox, Fox Traffic Simulation

In the early days typical Aimsun models were quite small, typically a few junctions or a corridor and at most a small town centre or city suburb. Nowadays the trend is shifting towards building big models of whole towns, cities or even regions. Continuing improvements in computer performance with quicker multi-threading processors, more memory and fast access solid state storage mean that run times are not usually a problem. So one of the most time-consuming tasks when working on big Aimsun models is getting all the data that defines the network and the data that is used for model validation into the models. However there are lots of standard data sets that are freely available to help with these tasks. As well as already being able to import some of these data sets with built-in importers, Aimsun also has scripting facilities to let the user code their own importers to harvest these data sets and automatically add the data to their models.

This presentation covers my experiences in importing data sets into my UK Aimsun models. It includes mapping data from Open Street Map, model data from SATURN, motorway traffic flow and travel time data from Highways England (MIDAS) and Public Transport stop data from the National Public Transport Access Nodes (NaPTAN) and public transport schedules from the Traveline National Dataset (TNDS).

Why vehicle emission models need traffic microsimulations

James Tate, Institute for Transport Studies, University of Leeds

Air quality is a pressing concern for many European Cities, with concentrations of traffic-related pollution (NO2, particles) exceeding national, EU and World Health Organisation (WHO) standards. Effective routes to cleaner air need to be identified using robust and reliable assessment tools (models).

The presentation will demonstrate why the relatively coarse 'average-speed' vehicle emission modelling packages—such as COPERT and HBEFA, which are used in most European air quality studies—are not reliably predicting 'Real Driving Emissions' when roads are busy or congested, and why they cannot assess the impact of traffic management measures. The reason why uncertainties in predictions increase as the average-speed and length of road sections (links) falls will be explained through analyses of measured second-by-second vehicle emission data in central London.

The alternative approach is microscopic traffic simulations coupled with instantaneous emission models (IEM), which can now reliably predict tail-pipe emissions of the whole European fleet mix of light- and heavy-duty, Euro standards 0 to VI, petrol and diesel fuelled vehicles. This will be demonstrated by presenting UK case studies that have linked AIMSUN traffic simulations with instantaneous emission models, with the models setup and calibrated to reflect demand levels, on-road driving behaviour/ vehicle dynamics and the local fleet mix. Views on expected developments in the vehicle emission and urban air quality field will also be given.

A dynamic large-scale model for the Harbor of Rotterdam

Benjamin Tempert & Muriel Verkaik,
Royal HaskoningDHV

For the harbor of Rotterdam, a dynamic traffic model is built in Aimsun, to give insight in the accessibility of the harbor. It is used to calculate the effects of the masterplans of the future development of the harbor and to gain insight where to invest in the infrastructure to keep the harbor accessible.

The traffic model for the harbor of Rotterdam is a dynamic mesoscopic model on a large regional scale. Special effort is taken to model the freight transport from and to the harbor. Cargo throughput data is used to model the freight production in the harbor. Blue-Tooth detections are used to model the distribution pattern of the freight traffic. A mesoscopic dynamic modeling technique is used to give detailed information of the bottlenecks and traffic congestion. Additional analyses are made on MoEs (Measures of Effectiveness) for different network and traffic management variants to investigate the accessibility of the harbor.

Optimisation of variable speed limits for motorway traffic using artificial intelligence techniques

Dr Panos Georgakis, Faculty of Science and Engineering, University of Wolverhampton

The study presents the development of an algorithm that employs machine learning techniques, such as Fuzzy Logic (FLS) and Genetic Algorithms (GA) in order to minimise the travel time over a 10KM stretch of the M6 motorway in the UK.

The traffic parameters for each section of the motorway are generated by the Aimsun microscopic simulator and are passed onto the fuzzy system in predefined time intervals. These traffic parameters form the input to the FLS and are used to generate the desired speed limit for each section. The speed limit of each section (output of the FLS) is then fed back to Aimsun and is applied to the current traffic. This is repeated continuously for the course of the simulation. Improvements on the network can be achieved if the fuzzy rules can lead to section speed limits that optimise a particular parameter from the simulation.

For the optimisation of the fuzzy rule set, a GA has been developed. The GA uses a specific traffic parameter for adjusting the rules in order to achieve better results. This traffic parameter is defined as Total Travel Time / Total Distance Travel.

The Paris mesoscopic model

Matthieu Jacquart and Thomas Juin,
SYSTRA, France

In 2014, SYSTRA and the Mairie de Paris signed a master agreement for traffic modelling and simulation and in June 2015 launched their first mesoscopic model. The study includes four arrondissements: 3rd, 4th, 11th and 12th, with a particular focus on the Place de la Bastille. Both for SYSTRA and the Mairie de Paris, this is a large-scale experiment of shifting from a macroscopic model toward a network designed for dynamic simulations, which will pave the way for the mesoscopic modelling and calibration of Paris.

This presentation explains the methodology of mesoscopic modelling of place of Bastille: model editing, demand adjustment, calibration and projection. We will go through the successive steps, from static traffic assignment based on the Paris macroscopic model to mesoscopic DUE assignment in the subnetwork studied, showing the difficulties we encountered along the way. We will also present special features of the Parisian network and their impact on dynamic modelling and lastly, we will show the progress of the study and our initial findings along with lessons for the future modelling of the whole city.

Ringing in the changes: Belo Horizonte ring road study

Rodrigo Sírio Coelho,
Fratar Engenharia Consultiva Ltda, Brazil

This presentation will provide a complete overview of the Belo Horizonte ring road study, which comprises over 20 km of roadway study, all carried out in Aimsun 8.1. The study started with the macroscopic metropolitan area traffic assignment, then using features such as subnetwork traversal generation, traffic forecasting, scripting for grade data import, micro-simulation and Highway Capacity Manual outputs.

Using Aimsun to model a motorway corridor - The A1/A1 (M) experience

Angela Lopez, CH2M

CH2M has recently developed a mesoscopic model of the A1/A1 (M) corridor in Tyne and Wear and Durham (North East of England) on behalf of Highways England. We would like to share our experience with other Aimsun users, focusing on the main opportunities, benefits and challenges that this model has generated.

The first part of the presentation will include an overview of the study area and model development, touching on the model objectives, methodological approach and validation. The second part will focus on showing some examples of how the A1/A1 (M) mesoscopic model has been used to inform decision making; one of the studies used the whole model to assess congestion build up at a busy junction, while the second study explored the use of subareas to test a number of transport intervention measures. The third part of the presentation will focus on how we are planning to improve the model and expand its functionality.

We hope to be able create discussion around the use of subareas; the use of dynamic traversal matrices in congested networks; output customisation; best practice network coding, and the use of detectors to code MOVA activated signals.

NOTES

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