aimsun.next

Aimsun Next User's Manual

A quick guide to the new features available in Aimsun Next 8.3

Introduction

This document summarises some of the key developments in version 8.3 of the Aimsun Next environment and their application to your modelling work.

We have made every effort to ensure that all the information contained within this manual is as accurate as possible.

As always, your feedback to support@aimsun.com is a valuable factor in our continued improvement and addition of new features to Aimsun Next, so please send us your comments.

Aimsun Next 8.3 Highlights

Performance improvements

Aimsun Next 8.3 has been developed with a focus on improving the performance of all model runs.

- Use of multiple threads in mesoscopic simulation.
- Reduced the size of the apa file so it is written and reloaded faster.
- Reduced DUE computational times.
- Improve the speed of OD adjustment experiments for static and dynamic matrix adjustment, departure and for departure time profiling.

Supernodes

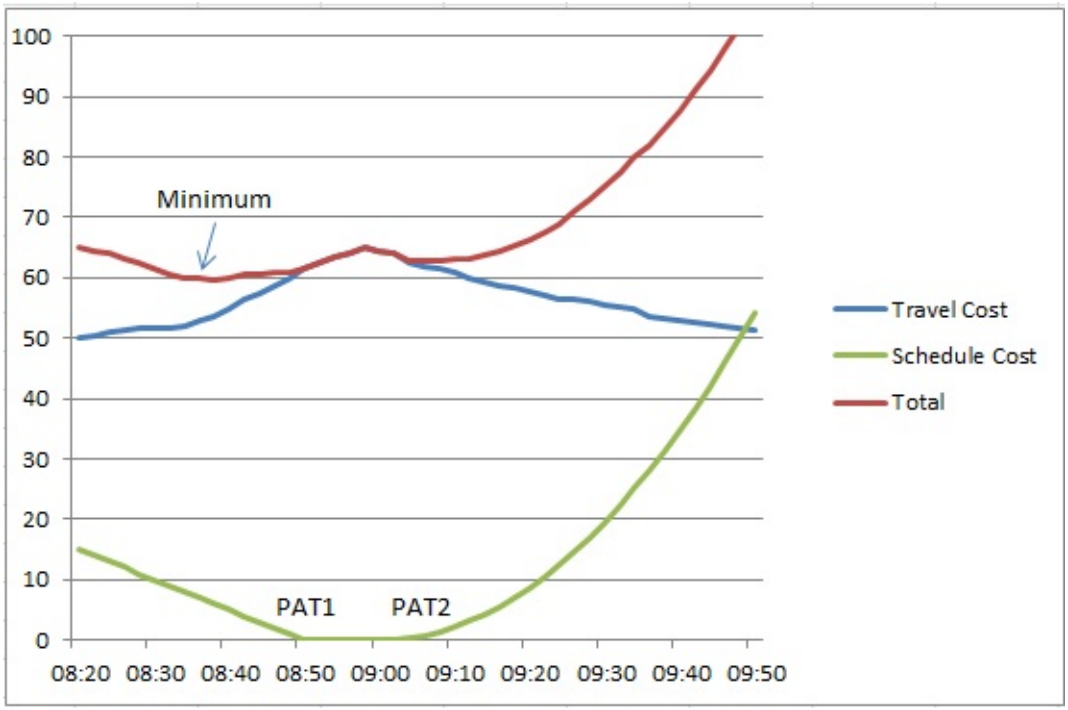
Supernodes have been modified to extend their functionality:

- The User Interface has been improved.
- Real data for Supernode trajectories can be imported as turn counts for a Supernode and used in validation.
- Outputs for Supernode trajectories are available in dynamic simulations providing path and turn counts for composite movements.
- OD Adjustment uses turn count data from supernodes imported in the Real Dataset.

Dynamic Departure Time Adjustment

A new Dynamic Departure adjustment has been provided. This adjustment performs peak spreading to simulate drivers changing their departure time to achieve the same arrival time as congestion in the road network increases. The adjustment is based on the HADES

(Heterogeneous Arrival and Departure Times with Equilibrium Scheduling) algorithm developed on behalf of the UK Dept. for Transport which estimates a new departure time based on the perceived cost of reaching a destination outside of the previously experienced arrival time window.

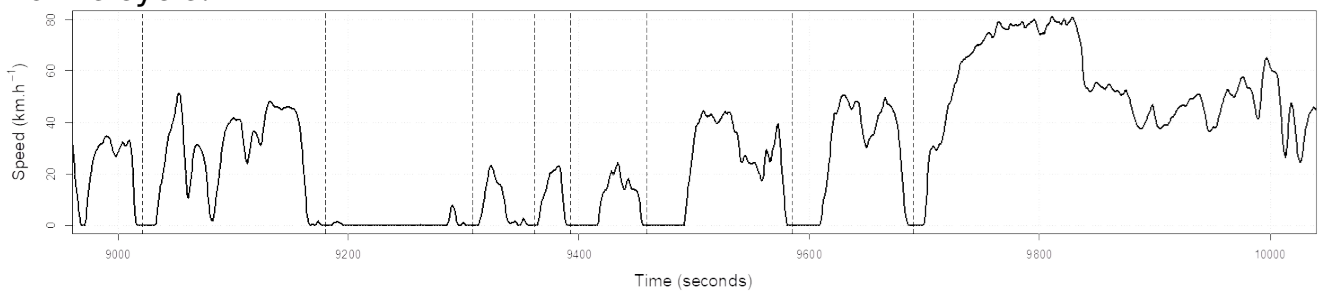


Departure Time Choice

Outputs

London Emissions Model (LEM)

The London Emissions Model (LEM) is a new mesoscopic emissions model developed in collaboration with Transport for London (TfL) The LEM was developed in response to observations that average speed models tended to under-predict emissions at low speeds and that variability in vehicle activity meant that predictions based on average link speeds on short links or for short time periods had significant uncertainty.Therefore, the approach taken by the LEM model is to derive the emissions for and individual vehicle using its average speed in a set of micro trips that form its whole journey. A micro trip is defined as a segment of the trip where the speed rises from stationary to → 5 km/h and back to stationary as illustrated below in a typical plot of speed vs time in an urban drive cycle.



LEM micro trips

The LEM was calibrated in 2017 using measurements taken in London.

Subpath Output Selection

Subpaths are able to filter the outputs they collect to select only those vehicles on a selection of public transport routes.

Traffic management

Forced Enroute assignement

The *Re-Evaluate when Travel Time Is Updated* option in the Forced Enroute Assignment action causes vehicles that have already been affected by the enroute action to re-consider their route choice if a DTA paths update occurs while they are on the road section where the traffic action takes place.

Microscopic simulator

Decoupling of the Vehicle and Pedestrian Simulation Timestep

The requirement to use a 0.6 second timestep when simulating using Legion for Aimsun has been removed. Legion for Aimsun will still use a fixed 0.6 second timestep, but the microsimulation model hosting the Legion pedestrians can now be configured to use any timestep length.

Mesoscopic simulator

Multi-threaded Mesoscopic Simulation

Mesoscopic simulation is now able to use multiple threads in a CPU and hence run faster in large models. The number of threads is specified in the mesoscopic experiment

Mesocopic DUE Simulation without Queue Propagation

In a DUE Result there is an option to disable queue propagation. This has the effect of giving road sections an infinite storage space and prevents queue propagation. This option is intended to be used in the early outer loop iterations of an Incremental DUE where over-saturation on critical sections causes gridlock,This option allows the assignment to complete and hence find feasible paths for the next iteration. This option should however not be used in the final incremental assignment.

Hybrid simulator

Initial state for Hybrid Simulations

An Initial State may be saved and used to initialise a hybrid simulation experiment.

Path Management

Route Choice Intervals

The cycle time for the route choice intervals gives a basic division of the simulated time into a set of regular intervals and the path costs are re-computed at the end of each interval. The need for this re-calculation may, however, vary over the modelled period. The changes in path costs, and hence path choice will be higher in times of peak congestion while, in the same model, the changes in path cost in off peak periods will be less, with correspondingly few changes in path choice.

The Profiled Route Choice option allows route choice intervals to be grouped and the path costs evaluated at less frequent intervals when there is less variation in congestion and hence less need to re-compute path costs and vary path choice.

User Interface

Detector stations

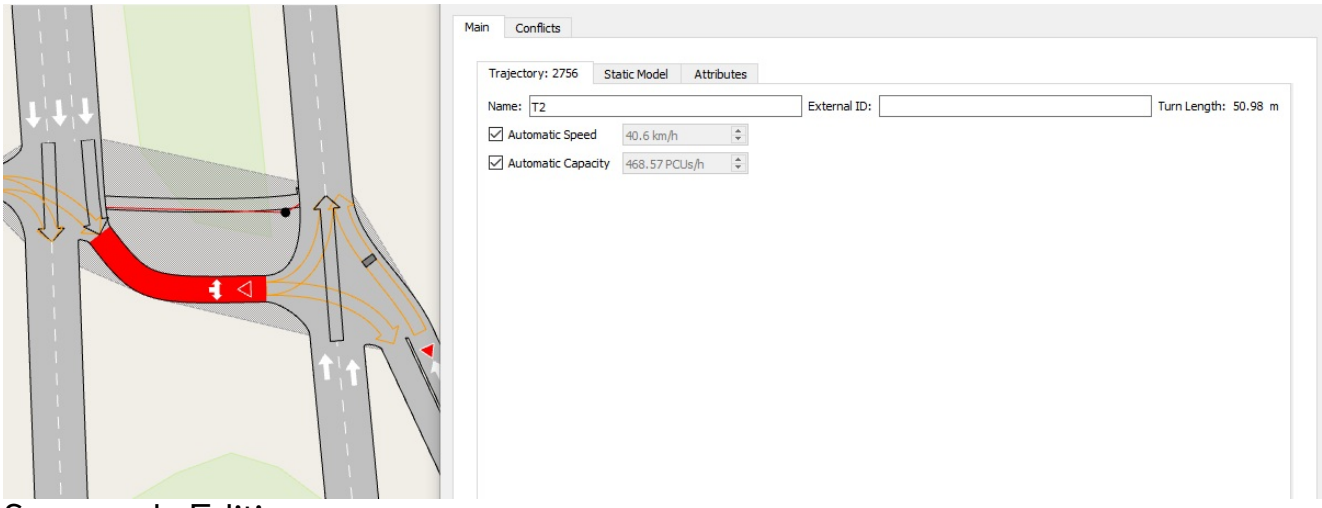
A Detector Station is a defined set of detectors in a single section used to automatically aggregate statistics from them. Data for detector stations can be imported into a Real Data Set and used as if it represented one detector.Detector stations have two main objectives:

- **Demand Adjustment:** The detector station emulates a single detector that covers several lanes merged from several lane detectors.
- **Results Validation:** Detector stations support simulation validation at station level when the real data set has data by section instead of by lane.

Detector Station Editor

Supernodes

The UI to create and edit Supernodes has been improved



Supernode Editing

Geometry Configuration Editor

A filter in the Geometry Configuration Editor has been implemented to help manage the list of objects which exist, or do not exist in a Geometry Configuration.

User interface available in Russian

Russian has been added to the Aimsun Next Software in addition to the existing Spanish, Portuguese, French and Chinese translations.

Adaptive Control Interfaces

LISA+ Controller

The Lisa+ adaptive signal controller dynamically controls signals based on the actions of vehicles passing over detector loops in the vicinity of the signalised junctions to optimise the traffic flows. Aimsun Next is now able to use the Lisa+ Contoller to provide dynamic control of simulated signals using the Adaptive Control Interfaces extension.

Signal Optimisation Interfaces

SIDRA interface

The existing SIDRA control plan importer/exporter is now able to export the network geometry to SIDRA.

Third-party data

WMS (Web Map Service)

WMS (Web Map Service) is a protocol for serving geo-referenced map images from a server. Aimsun Next is now able to import WMS images into a new graphical layer and display them in the simulation model.

Programming

APIs

Traffic Management Functions for PT Re-routing

Functions are available to manage public transport routes in response to incidents by making changes to the route either for all vehicles, a proportion of vehicles, or for a specific vehicle following that route. Changes are made using new API functions

Traffic Management Functions for all Traffic Management Actions

Some Traffic Management Actions were not accessible via the API. New functions have been included in Aimsun Next 8.3 to correct this. The new functions are:

- AKIActionAddChangeDestActionByID: Activate the action to change the destination centroid.
- AKIActionAddChangeDestParkRideActionByID: Change the destination for a vehicle in a park and ride action.
- AKIActionAddEnRouteAssignmentAction: Activate an "en-route assignment" action.

Scripting

The main change in Aimsun 8.3 is the deprecation of all the different scripting classes to do the calculation procedures (dynamic simulations, assignment, adjustment, outputs retrieval, etc.).

Those classes and functions have been substituted by a mechanism, called Kernel Actions, for the different calculation procedures (dynamic simulations, assignment, adjustment, etc.) to provide a common interface to command their execution.

New version of the QT library

Aimsun Next version 8.3 uses QT 5.9 in the Mac and Linux versions and QT 5.6 in the Windows version.