



CAMBRIDGE  
SYSTEMATICS

Think  Forward

# Aimsun Model Review Training

## Day 2: Review Model Setup

*Caltrans On-Call Traffic Simulation Training*

*presented to*

*Caltrans District 7*



*presented by*

*Cambridge Systematics & Aimsun*

*Keir Opie*

*Laura Torres*

# Scenario: Main

## ➤ Simulation settings

- » Traffic demand
- » Transit plans
- » Path assignment
- » Master control plans
- » Real Data Set

## ➤ Geometric Configurations

Traffic	
Traffic Demand:	8021698: Profiled Demand - Saturday - 00-05
Transit Plan:	7736783: Saturday
Path Assignment:	8021708: Paths - Saturday - 02-03 AM - 5 Paths
Traffic Signals	
Master Control Plan:	7748215: Weekend
Micro	
Detection Pattern:	None
Real Data Set for Validation	
	RDS 8021743: RDS Calibration - Saturday - 00-24

# Scenario: Master Control Plan

Master Control Plan: 10089211, Name: 2016, External ID: 2016 Master Control Plan {e676ba32-d827-4f22-b2c9-eb8504ad3668}

Main **Controllers**

Name: 2016 External ID: 2016 Master Control Plan

Initial Time: 5:00:00 AM Duration: 15:00:00

	5:00 AM	6:00 AM	7:00 AM	8:00 AM	9:00 AM	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM	7:00 PM	8:00 PM
Zone 1	15:00:00															
	dualRing_v3															
Zone 2	08:00:00 07:00:00															
	2016 AM							2016 PM								
Zone 3	15:00:00															
	SATMS Meters															
Zone 4																

Control Item

Initial Time: 12:00:00 AM Duration: 00:00:00

Add Control Plan Item Remove Control Plan Item

# Scenario: Demands

## ➔ Demand Makeup

Main | Summary | Profile

Name:  External ID:

Initial Time:  Duration:  Type:  Factor:  %

	5:00 AM	5:30 AM	6:00 AM	6:30 AM	7:00 AM	7:30 AM	8:00 AM	8:30 AM	9:00 AM	9:30 AM	10:00 AM	10:30 AM	11:00 AM
Car	01:00:00		01:00:00		01:00:00		01:00:00		01:00:00		01:00:00		
	1Hr_AM_Car_0500-0600 (100%)		1Hr_AM_Car_0600-0700 (100%)		1Hr_AM_Car_0700-0800 (100%)		1Hr_AM_Car_0800-0900 (100%)		1Hr_AM_Car_0900-1000 (100%)		1Hr_AM_Car_1000-1100 (100%)		
HOV	01:00:00		01:00:00		01:00:00		01:00:00		01:00:00		01:00:00		
	1Hr_AM_HOV_0500-0600 (100%)		1Hr_AM_HOV_0600-0700 (100%)		1Hr_AM_HOV_0700-0800 (100%)		1Hr_AM_HOV_0800-0900 (100%)		1Hr_AM_HOV_0900-1000 (100%)		1Hr_AM_HOV_1000-1100 (100%)		
HvyTruck	01:00:00		01:00:00		01:00:00		01:00:00		01:00:00		01:00:00		
	1Hr_AM_HvyTruck_0500-0600 (100)		1Hr_AM_HvyTruck_0600-0700 (100)		1Hr_AM_HvyTruck_0700-0800 (100)		1Hr_AM_HvyTruck_0800-0900 (100)		1Hr_AM_HvyTruck_0900-1000 (100)		1Hr_AM_HvyTruck_1000-1100 (100)		

# Scenario: Demand Summary

## ➔ Sum of all input matrices (by class)

Traffic Demand: 10090162, Name: Total AM 5-11 by VehType {71360e7d-26c4-4e8a-a826-de1fb4ea18f1}

Main Summary Profile

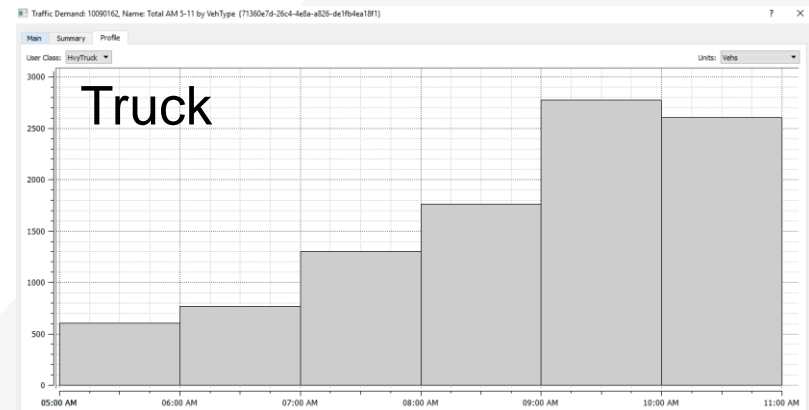
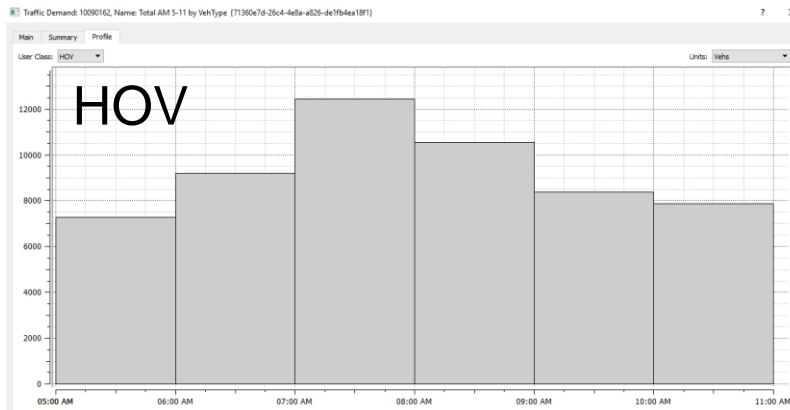
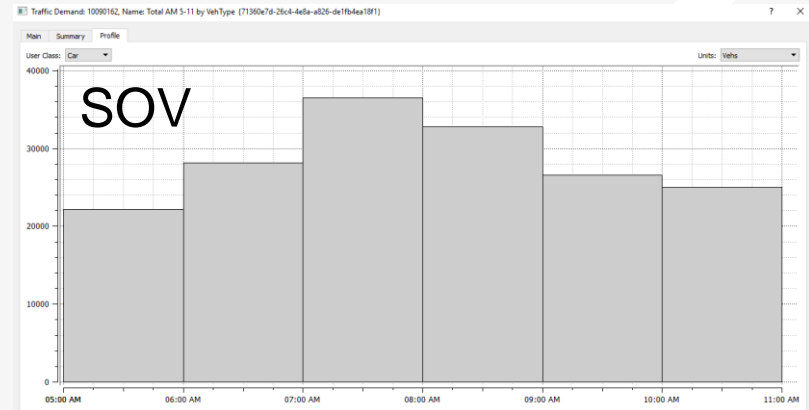
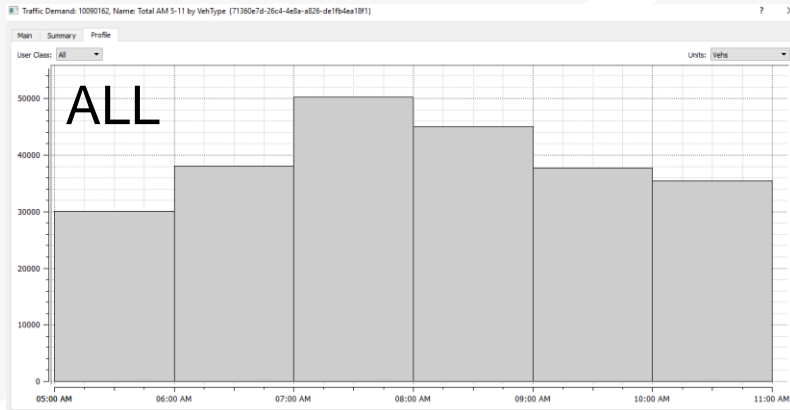
User Class: All Grouping: None Units: Vehs

	757: 183RD S	10089760	9763: CARMENITA	89767: ARTESIA F	089768: SR 91 HC	6 SAN GABRIEL RI	7 SAN GABRIEL RI	10089946	10089949	Total
10089709: BLOOMFIELD AVE	0	0	0	0	0	0	0	0.888	0	5152.43
10089713: ARTESIA BLVD	0	0	0	0	0	0	0	0	0	3652.52
10089717: NORWALK BLVD	3	0	914.6	174.56	5.82	0	0.194	43.29		4426.23
10089721: PIONEER BLVD	9.61	22.92	1144.87	168.31	0	0	45.417	0		4039.07
10089725: GRIDLEY RD	0	0	0	0	0	0	3.794	0		1454
10089729: STUDEBAKER RD	6.58	36.21	618.79	160.8	0	0	0.2	0		4192.37
10089733: SR 91 HOV	4	73.75	367.11	985.59	2089.75	0	0	0		4725.63
10089735: ARTESIA FWY	24.29	500.82	16991.6	25.74	3073.65	1	28.042	1.949		33397
10089741: PARK PLAZA DR	27.4	0	1138.58	0	0	0	0	0		1841.11
10089744: CARMENITA RD	86.47	1935.25	0	0	0	0	0.1	0.1		3290.63
10089749: SHOEMAKER AVE	0	0	15.52	0	0	0	0	0		1814.83
10089751: 183RD ST	8	61.64	9.82	0	0	0	0	0		1789.21
10089756: 183RD ST	0	56.35	0	0	0	0	0	0		1267.95
10089760	0	46.21	0	0	0	0	0	0		510.99
10089764: CARMENITA RD	37.08	0	0	0	0	0	0.1	0		2357.38
10089769: SR 91 HOV	0	0	0	0	54.96	1	7.162	2.974		6245.28
10089770: ARTESIA FWY	0	269.16	0	0	91.77	3	8.058	10.699		28349.3
10089776: SAN GABRIEL RIVER FWY	0	1.94	455.33	174.23	0	0	14.077	0.958		26188.4
10089778: SAN GABRIEL RIVER FWY	0	0	0	0	0	0	0	0		4171.02
10089946	0.2	2.341	31.048	2.753	4.36	0	0	0		195.443
10089949	0	1.692	13.98	1.325	0.3	0	0.0358	0		106.283
<b>Total</b>	<b>93</b>	<b>399.13</b>	<b>4223.74</b>	<b>27345.4</b>	<b>4017.79</b>	<b>29926</b>	<b>4387.66</b>	<b>144.825</b>	<b>92.26</b>	<b>236692</b>

Help OK Cancel

# Scenario: Demand Profile

## By Class



# Scenario: Outputs to Generate

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- Are the right statistics being saved?
- Where are results saved?
- Keep in memory vs Store

# Scenario: Aimsun Next APIs

Main   Outputs to Generate   **Aimsun Next APIs**   Variables   Strategies and Conditions   Parameters   Attributes

Simulator Extensions

Name	Version
<input type="checkbox"/> Microsimulator Network Checker	8.2.2
<input type="checkbox"/> Mesosimulator Network Checker	8.2.2
<input type="checkbox"/> Atmospheric Effects	8.2.2
<input type="checkbox"/> Discharge Rate Evaluation Extension (Meso)	8.2.2
<input type="checkbox"/> Discharge Rate Evaluation Extension (Micro)	8.2.2
<input type="checkbox"/> FZP Exporter	8.2.2

Properties...

Aimsun Next APIs

Name	Path
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Edit Python   Add   Delete





# Scenario: Strategies and Conditions

- ➔ What strategies are used?
- ➔ What do they do?

Name	Type
<input type="checkbox"/> Bus Only Turn	Traffic Condition
<input checked="" type="checkbox"/> I605 End point congestion	Traffic Condition
<input checked="" type="checkbox"/> MergeIncidents	Traffic Condition
<input checked="" type="checkbox"/> SR91 End point congestion	Traffic Condition

Strategy Description

# Experiment: Main

- ➔ Warmup vs Initial State
- ➔ Attribute Overrides?
- ➔ Performance Settings

Main Behaviour Reaction Time Arrivals Dynamic Traffic Assignment Variables Policies Attributes Legion Pedestrians

Name:  External ID:

Dynamic Traffic Assignment  
Network Loading: Microscopic Simulator Assignment Approach: Stochastic Route Choice

Initial Simulation State  
 Using Warm-Up:    
 Using a Saved Initial State:

Attributes Overrides  
  
Up  
Down  
Check All  
Uncheck All

Performance Settings  
Simulation Threads:  Route Choice Threads:

Scripts  
Pre-Run:  Post-Run:

# Experiment: Behavior

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- Car Following
  - » Two-Car Following
  - » Slope Model
- Lane Changing
  - » Distance Zone Variability
  - » Two-Way Overtaking model
- Queue Speeds

# Experiment: Reaction Time

- Simulation Step
- Reaction Time Settings
  - » Fixed (Same for all vehicle types)
  - » Variable (Different for all vehicle types)

The screenshot shows a software interface with a tabbed menu at the top: Main, Behaviour, Reaction Time (selected), Arrivals, Dynamic Traffic Assignment, Variables, Policies, Attributes, and Legion Pedestrians. Below the tabs, there are two main sections. The first section, titled 'Simulation Step', contains a text input field with the value '0.90 sec'. The second section, titled 'Reaction Time Settings', contains two radio buttons: 'Fixed (Same for All Vehicle Types)' (which is selected) and 'Variable (Different for Each Vehicle Type)'. Below the radio buttons is a 'Values' section with two text input fields: 'Reaction Time' (with the value '(Same as Simulation Step)') and 'Reaction Time at Stop' (with the value '1.20 sec'). To the right of the 'Reaction Time at Stop' field is another text input field for 'Reaction Time at Traffic Light' with the value '1.60 sec'. All input fields have small up/down arrow icons on their right sides.

# Experiment: Arrivals

➔ Exponential

➔ Uniform

➔ Normal

➔ Constant

➔ External (API)

➔ ASAP

Main Behaviour Reaction Time Arrivals Dynamic Traffic Assignment Variables Policies Attributes Legion Pedestrians

Global Arrivals

Exponential

Arrivals per Origin (Different from Global Arrivals)

Centroid	Arrival Type	
10089632: SAN GABRIEL RIVER FWY (10087329)	Exponential	Add
10089632: SAN GABRIEL RIVER FWY (10087329)	Exponential	Delete
10089632: SAN GABRIEL RIVER FWY (10087329)	Uniform	

# Experiment: DTA – DUE (1/2)

Main Behaviour Reaction Time Arrivals **Dynamic Traffic Assignment** Variables Policies Attributes Legion Pedestrians

Costs

Cycle: 00:15:00 Number of Intervals: 1

Attractiveness Weight: 0.00 User-Defined Cost Weight: 0.00

Path Cost:  Instantaneous  Experienced

Use Profiled RC

Join Disjoin Reset

Fixed Routes

Vehicle Type	Following OD Routes
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# Experiment: DTA – DUE (2/2)

## Dynamic User Equilibrium

Model: Gradient-Based  Enroute After Virtual Queue

Do Not Consider Paths with a Percentage Below: 1.00 Initial Step Size:  Start the Assignment Process  Continue the Assignment Process

### Stopping Criteria

Maximum Iterations: 20 Relative Gap: 0.50 % Relative Gap Matrix: None

## Basic

### Path Calculation

Source	Maximum Number of Initial Paths to Consider

Calculate Additional Paths: Yes Blocked Cells Matrix for OD Pairs with No Additional Paths: None

Maximum Paths per Interval: For All the Vehicles 3

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# Experiment: DTA – SRC (1/2)

Main Behaviour Reaction Time Arrivals **Dynamic Traffic Assignment** Variables Policies Attributes Legion Pedestrians

Costs

Cycle: 00:15:00 Number of Intervals: 1

Attractiveness Weight: 0.00 User-Defined Cost Weight: 0.00

Use Link Costs from Replication: None

Use Profiled RC

14:00 - 14:15	14:15 - 14:30	14:30 - 14:45	14:45 - 15:00	15:00 - 15:15	15:15 - 15:30	15:30 - 15:45
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Join Disjoin Reset

Fixed Routes

Vehicle Type	Following OD Routes	Following Input Path Assignment
56: Truck	100.00 %	100.00 %
685412: HOV	100.00 %	100.00 %

Maximum Paths to Use from Input Path Assignment: 3



# Experiment: DTA – SRC (2/2)

## Stochastic Route Choice

Model: C-Logit

Enroute  Enroute After Virtual Queue

Basic

Parameters

Enroute Percentage

### Path Calculation

Source	Maximum Number of Initial Paths to Consider
K-SP	1

Maximum Paths per Interval: For All the Vehicles

3

Vehicle Type	Number of Paths
56: Truck	3
685442: HOV	3
10030821: HvyTruck	3

# Replication (SRC) or Result (DUE): Main

Replication: 10090522, Name: Replication 10090522 {ebb167ec-29fa-42e6-952a-4c5594a96121}

Main   Outputs to Generate   Validation   Attributes

Name:  External ID:

ID in Database:   Random Seed:

Status

Status: Simulated and loaded

Retrieve Settings

Use Objects' External ID Instead of Objects' ID

Run Information

Simulation carried out in Thu Sep 20 22:09:36 2018  
using the Simulation Engine Microscopic Simulator Version 8.2.4 (R06f13cf).  
The simulation took 1045 seconds.

# Replication or Results: Outputs to Generate

Main   **Outputs to Generate**   Validation   Attributes

Path Assignment:  Store

Traffic Arrivals:  Store

Path Assignment and Statistics Store Location

Path Assignment: None

Store Vehicles as Initial State

Initial State:

Save at Time: 11/1/2016 11:00 AM

Traffic Arrivals

Traffic Arrivals: None

# Replications

- ➔ Number of Replications
- ➔ Averages

Dynamic Scenario AM Calibration

- Micro SRC Experiment Calibration
  - AVG Average 10090794
  - RPL Replication 10090319
  - RPL Replication 10090795
  - RPL Replication 10090796
  - RPL Replication 10090797
  - RPL Replication 10090798
  - RPL Replication 10090799
  - RPL Replication 10090800
  - RPL Replication 10090801
  - RPL Replication 10090802
  - RPL Replication 10090803