

Joint SimSub and SimCap Summer Meeting

June 25, 2021 | 9:00 – 10:30a CST
Online | Zoom Platform



Agenda

- A. Welcome and Introductions – *Chris Melson*
- B. SimCap Updates – *Eric Tripi*
- C. SimSub Updates – *Chris Melson, John Shaw*
- D. Vendor Updates – *Matthew Juckes, Daniel Morgan, Jochen Lohmiller*
- E. Update on TSSM Review Process – *Sanhita Lahiri, Mohammed Hadi,*
- F. Wrap Up – *Chris Melson*

POLL



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Joint SimSub and SimCap Summer Meeting – June 25, 2021

AGENDA

2

1. Introductions –

- Eric Tripi, PE PTOE, SimCap Chair, GHD
- Chris Melson, SimCap Co-Chair, LA LTAP
- Doug Noble, ITE Senior Director Management and Operations

2. What is SimCap?

What is SimCap?

- SimCap = Simulation & Capacity
Analysis User(s) Group
- User(s) Group: Group of motivated individuals who have organized to share information and enhance the practice of a common subject area

SimCap is open to all persons with any level of interest or experience in traffic simulation, capacity analysis, and related practice areas.

Mission Statement

- A volunteer network of professionals working across geographic and organizational boundaries to share information, experiences, and to disseminate, promote, and develop guidance and best practices in the application of traffic simulation and capacity analysis tools, methods, and related practice areas.

Goals

- Provide a forum for the meaningful exchange of, ideas, research, questions, and trends;
- Serve as a resource for practitioners and organizations by sharing experiences and developing guidance and best practices; and
- Advocate for consistency, reliability, and advances to the current state of the practice.

AGENDA

6

3. Summary of January 12, 2021 Coordinating Council Call

- Local – LA SimCap Group – Chris Melson
- TRB – SimSub Committee – Chris Melson, Co-Chair, TRB SimSub Committee
- **Presentation: “How to Complete the Circle”** Soheil Sajjadi, Ph.D, PE, Senior Transportation Engineer, Arcadis, Joint SimCap and SimSub Task Group
- FHWA Operations Update – Rachel James
- McTrans – Behzad Aghashi, PhD, PMP, Director McTrans Center
Presentation: “What is New in the HCM6.1”
- On-going Tasks – Website, SimCap E-community
- Open Floor Discussion

AGENDA

7

4. Updates –

- Local: North Carolina SimCap Group update, Soheil Sojjadi, PhD, PE, Arcadis
- FHWA: Rachel James, FHWA Operations

5. Ongoing Tasks

- National SimCap Website – Doug Noble/Chris Melson
- National SimCap Community
- Connect National and Local SimCap Groups
- **Initiatives** – Eric Tripi/Chris Melson
 - Future Webinars
 - SimCap sponsored a May 2021 - *"Traffic Simulation and Calibration: 3 Practitioner-Focused Case Studies"*
 - SimCap is sponsoring a Technical Session at the upcoming 2021 ITE Annual Meeting: -*"Traffic Analysis, Modeling, and Simulation Cornucopia: Core Competencies, Incorporating New Data Sources, Analyzing Emerging Technology."*

AGENDA

8

6. Upcoming Meetings

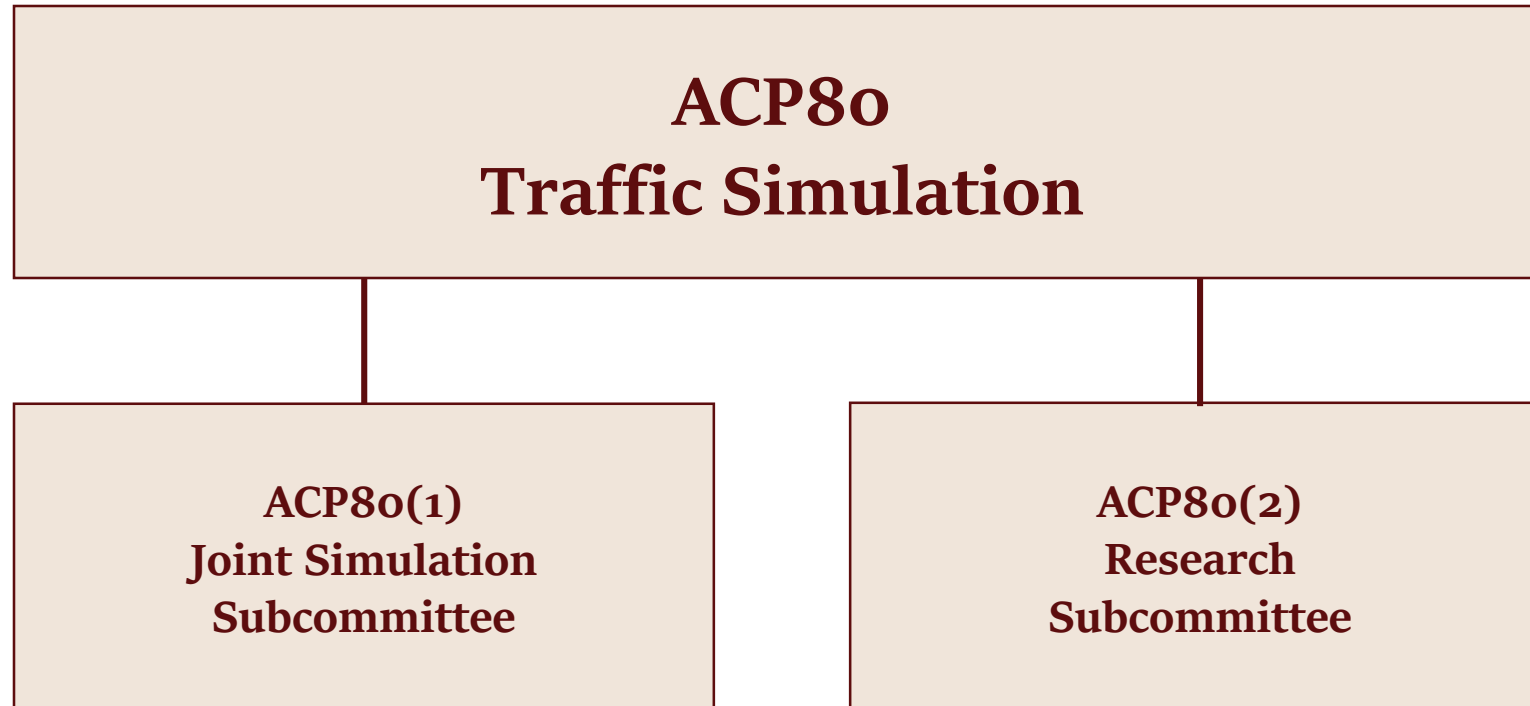
- ITE Annual SimCap Committee Meetings – August 4, 2021 - Eric will send out invite
- Contact me with any SimCap questions or comments:

eric.tripi@ghd.com

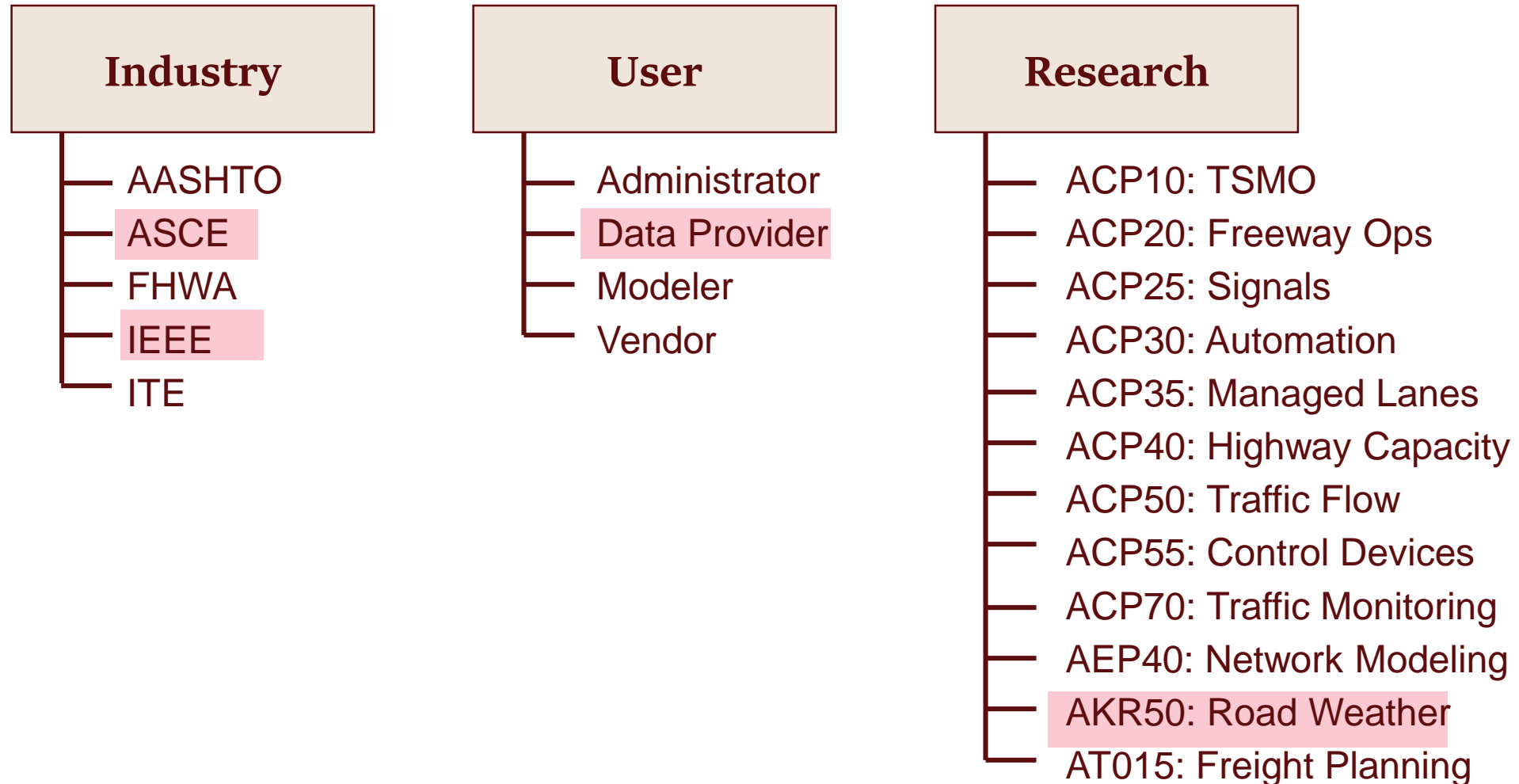
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TRB Structure



Liaison Structure



Goals

ID	Goal	Assigned Task Group
G1	Develop, maintain, or otherwise leverage existing, mechanism(s) to collect user needs and related input	User Needs Task Group
G2	Recommend actions and venue to address user needs	
G3	Develop, maintain, host, or otherwise contribute to existing, “living” library of reference material	Resources Task Group
G4	Provide forum for information exchange and foster joint efforts	Liaison/Outreach Task Group
G5	Maintain comprehensive liaison structure	

Task Groups

User Needs

Name	Affiliation
Sudheer Dhulipala	WSB
Shalini Ghosh	WSP
Vishal Mandal	WSP
Mike Reese	NC DOT
Mark Yedlin	GPI

Liaison/Outreach

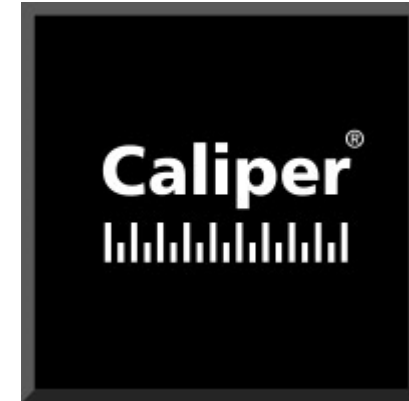
Name	Affiliation
MD Jahedul Alam	Dalhousie University
Georges Bou-Saab	Arcadis
Lin Zhang	Elite Transportation Group

Resources

Name	Affiliation
Apoorba Bibeka	TTI
Joe Blasi	HNTB
Chris Day	Iowa State U
Vicki Haskell	WI DOT
Yingyan Lou	Arizona State U
Abhilasha Saroj	Georgia Tech
Maryam Shirinzad	TTI

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Aimsun vendor update for SimCap

Matthew Juckes

Aimsun Next 20

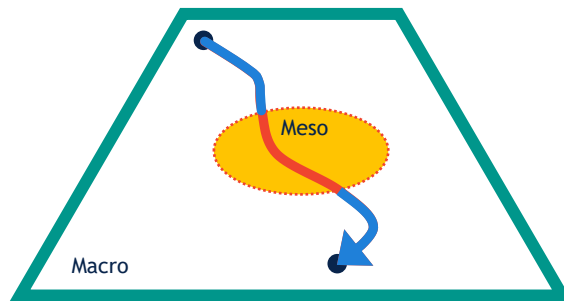
Multimodal simulation



Aimsun Next 20

Hybrid macro-meso

Vehicles



- Meso**
 - Individual vehicles
 - Capacity is an output
 - Travel time experienced from behavioral models
- Macro**
 - Individual vehicles
 - Capacity is an input
 - Travel time from volume-delay function components evaluated with the assigned volume

Every cycle
(e.g. 15 minutes)

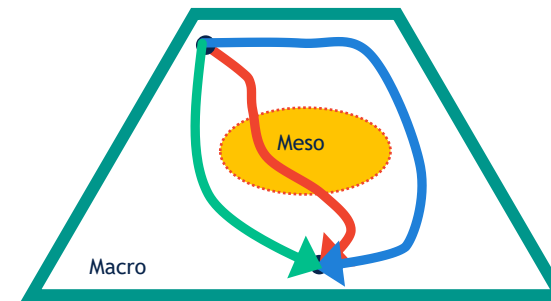
Link costs



Path assignment



Routes

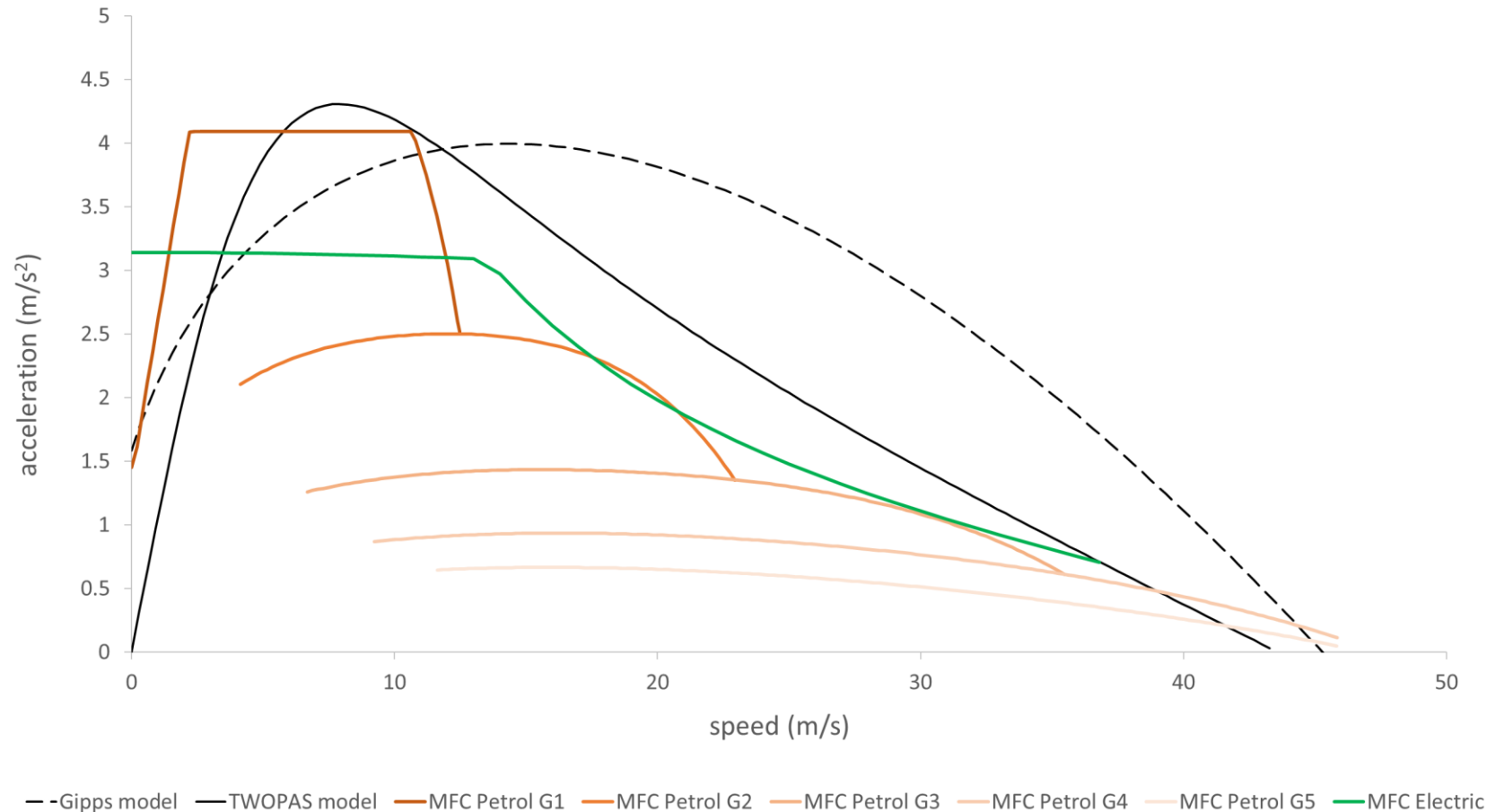


- Meso**
 - Dynamic cost functions (experienced travel time)
- Macro**
 - Volume-delay, turn penalty, junction delay functions (link volume and capacity)

Cost = macro cost + meso cost (mins)

Aimsun Next 22

Microsimulation Free-flow Acceleration Model (MFC)



Aimsun Next 22

Battery consumption model

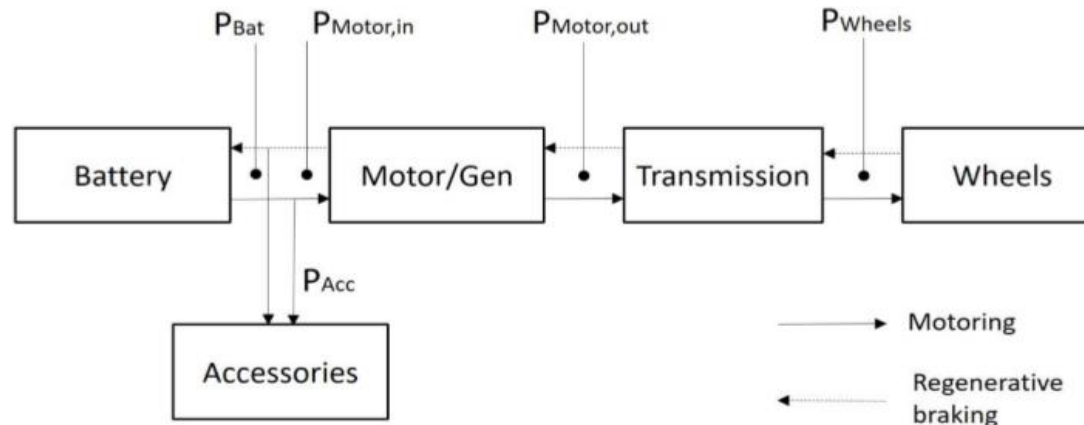
BATTERY ENERGY

MOTOR WORK + ACCESORIES WORK

MOTOR/GENERATOR EFFICIENCY

TRANSMISSION & BREAKING EFFICIENCY (CHARGING)

WHEELS WORK: RESISTANCES



INPUTS

**$v(t)$, $a(t)$, vehicle profile,
battery capacity(vehicle profile)**

OUTPUT

State Of Charge (%)

Aimsun Next 22

Streamlined energy consumption and emission models

Vehicle Type: 53, Name: CAR 1 {c604a198-733b-4af7-bca2-19924e0a5bed}

Main Dynamic Models Microscopic Model Static Models Attributes

Main Engine Experiment Defaults London Emission Model

Vehicle Category: Car

Engine Type Composition

Engine Type	Percentage
Diesel	40.00 %
Electric	10.00 %
Liquefied Petroleum Gas (LPG)	0.00 %
Petrol	50.00 %

Vehicle Type: 53, Name: CAR 1 {c604a198-733b-4af7-bca2-19924e0a5bed}

Main Dynamic Models Microscopic Model Static Models Attributes

Main Articulated and Doors 2D Shapes 3D Shapes Environmental Models

Engine Types

Engine Type (%)
Petrol (50%)
Liquefied Petroleum Gas (LPG) (0%)
Electric (10%)
Diesel (40%)

Energy Consumption Model QUARTET Emission Model Paris et al Emission Model

Energy Consumption Models

Initial Energy Level (SOC or Fuel)	Mean	Deviation	Minimum	Maximum
100.00	0.00	0.00	100.00	

Fuel Consumption Model

Min Consumption Speed	F1 (at 90 km/h):	F2 (at 120 km/h):	Fi (Idling)	C1 (Accelerating)	C2 (Accelerating)	Fd (Decelerating)
0.0000 km/h	0.0000 l/100 km	0.0000 l/100 km	0.0000 ml/s	0.0000 ml/s	0.0000 ml/s/m2	0.0000 ml/s

Battery Consumption Model

	Mean	Deviation	Minimum	Maximum
Electric Accessories Power	0.00 kW	0.00 kW	0.00 kW	0.00 kW

Vehicle Type: 53, Name: CAR 1 {c604a198-733b-4af7-bca2-19924e0a5bed}

Main Dynamic Models Microscopic Model Static Models Attributes

Main Engine Experiment Defaults London Emission Model

Fleet Mix

Emission Vehicle Type

Emission Vehicle Type: Car

Configuration

Fleet Mix Configuration: Custom Configuration

Engine Types

Engine Type (%)
Petrol (50%)
Diesel (40%)
Electric (10%)

Standard Emission Percentages


Standard Emission	Percentage
Euro 0	0.00 %
Euro 1	0.00 %
Euro 2	0.00 %
Euro 3	0.00 %
Euro 4	0.00 %

Aimsun Next 22

Other new features

- Flash don't walk behavior for pedestrians
- Yield model for pedestrians
- Target gap for all vehicles (to model CAVs and human drivers)
- Rerouting action for transit vehicles
- Improved automatic turn capacity calculation
- Zone splitting
- Time-dependent shortest path calculation in DUE
- Capacity-constrained macro network loading in hybrid macro-meso
- Dynamic transit assignment in meso

For more information
matthew.juckles@aimsun.com



New Features in TransModeler 6.0

Daniel Morgan
Vice President

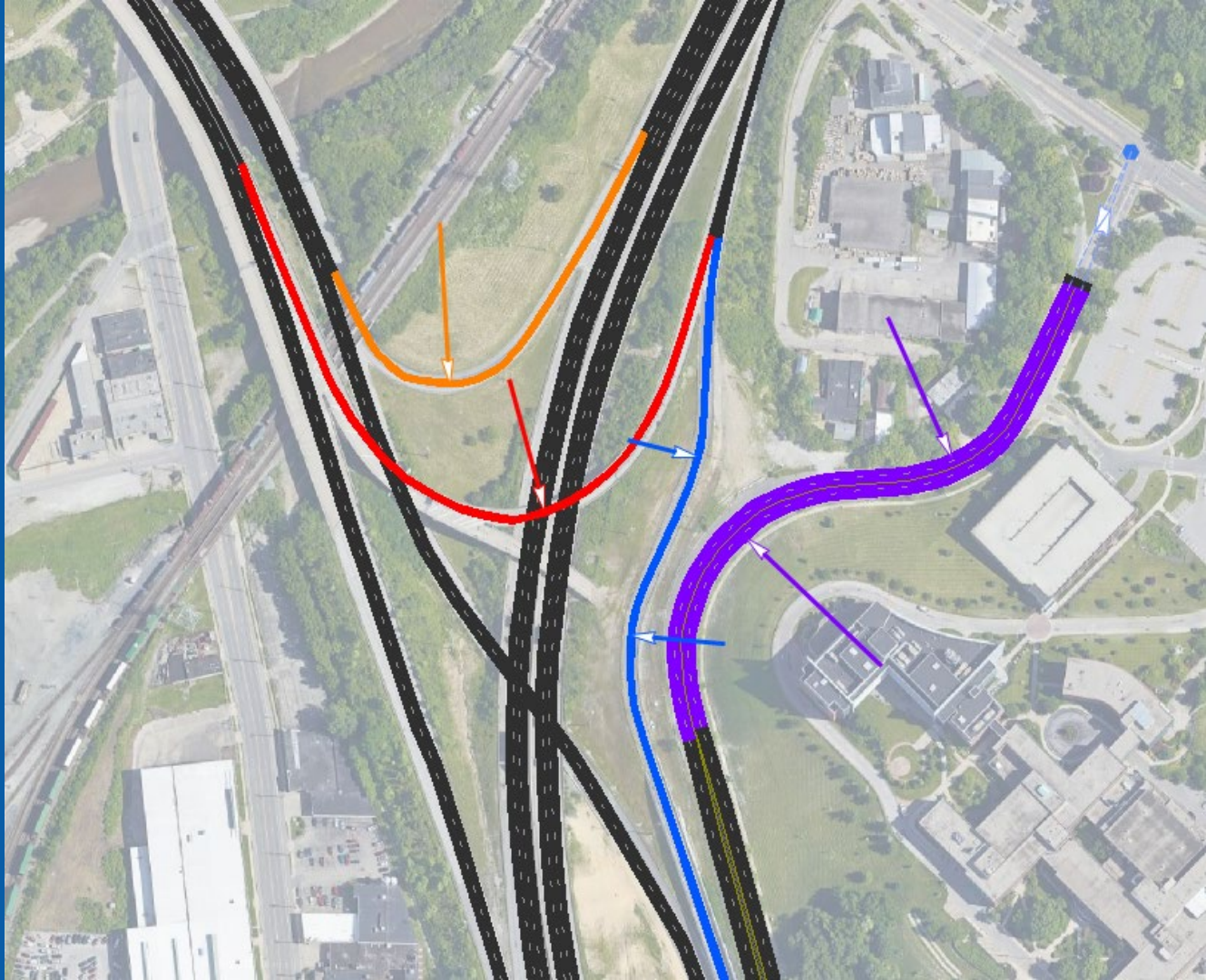


TransModeler
Traffic Simulation Software

© 2014 Demarcq

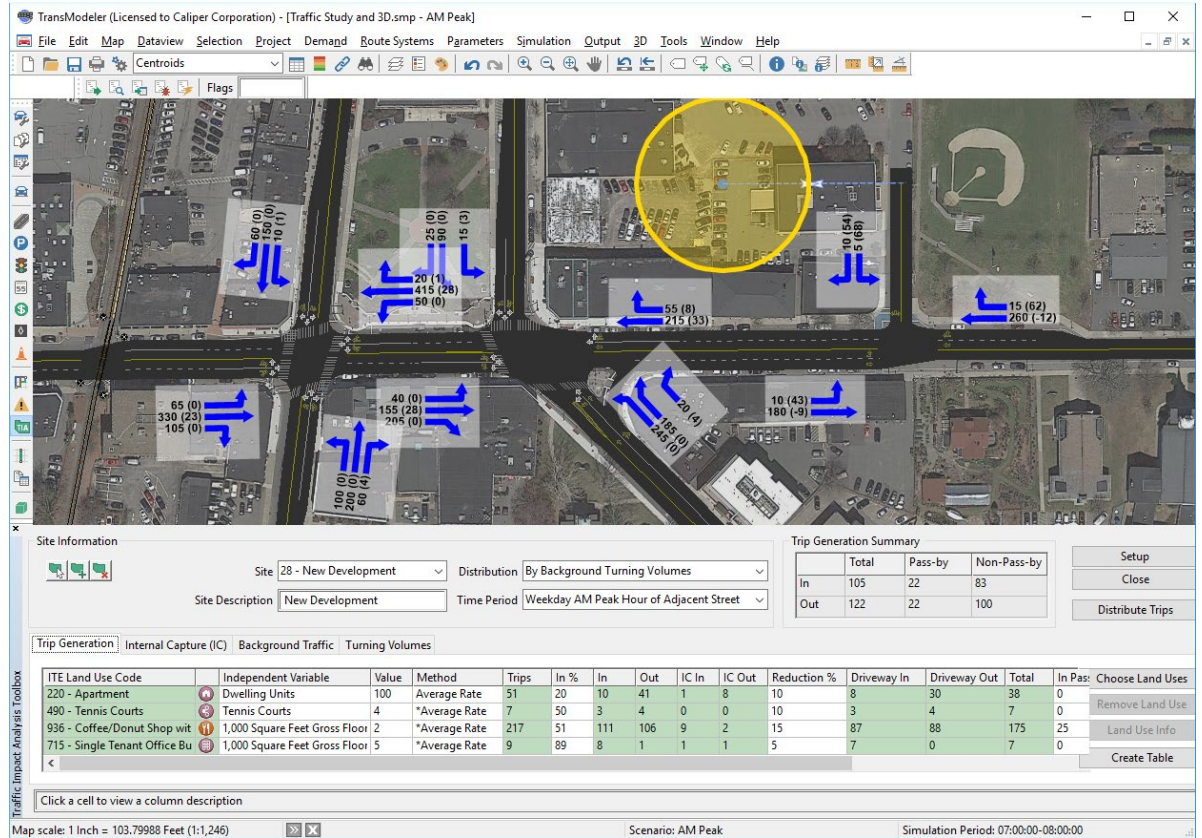
Horizontal Curves

- Automatic detection of curve geometry: start, end, midpoint, radius
- Multiple curves per segment
- More accurate treatment of driver behavior



Enhancements to TIA Toolbox

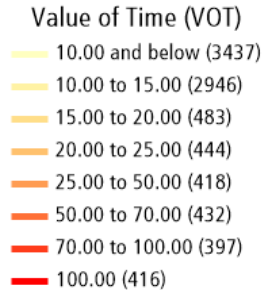
- 10th Edition Trip Generation Rates



New Options for Managed Lanes

- Combinatory toll surcharges and discounts
- Surcharges and discounts as absolute or percent values

Relative Surcharge (+) / Discount (-)		
Apply	None	
Category	Toll Plazas (%)	HOT Lanes (%)
No electronic toll pass (ETC=No)	0.0	0.0
Trucks	0.0	0.0
User A	0.0	0.0
User B	0.0	0.0



New Road Editing Tools

- Couple two one-way streets into a single link



Road Editor

Tools: [Select] [Info] [Add] [Remove] [Merge] [Split] [Move] [Rotate] [Copy] [Paste] [Undo] [Redo] [Zoom In] [Zoom Out] [Reset View]

Road Class: {Undefined}

Lanes on Left: 1 | on Right: 1

Lane Width (ft): 12 | ☒ One Way

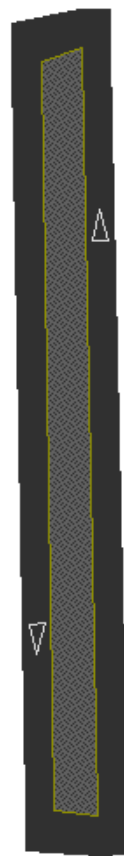
Confirm

This link is one-way.

Do you want to merge it with the link in the opposite direction to form a two-way link?

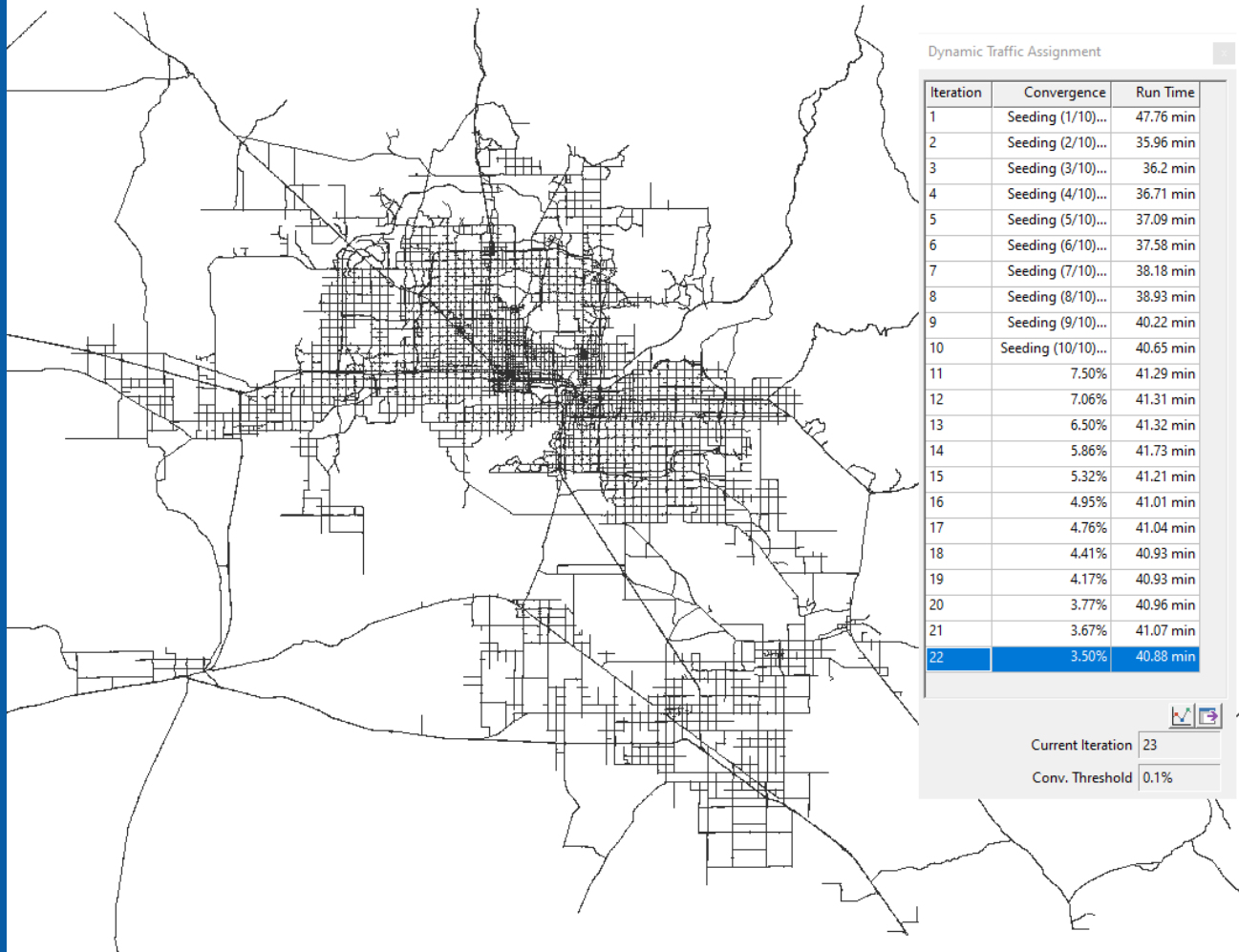
☐ Remember my choice

Yes No



Improved Parallelization

- Faster run times
- Increased productivity
- Reduces costs and schedules for sensitivity and reliability analyses



Ongoing Research Efforts

- Integration of **Highway Safety Manual** methods for freeways and ramps into TransModeler
- New driver behavior models including the **Intelligent Driver Model (IDM)** car following algorithm, which has been widely used in the research to simulate autonomous vehicles
- Development of **traffic simulation and analysis guidance** using TransModeler SE and HCS for the Ohio DOT
- Major improvements to **dynamic traffic assignment (DTA) methods**



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PTV Group – Vendor update

Jochen Lohmiller



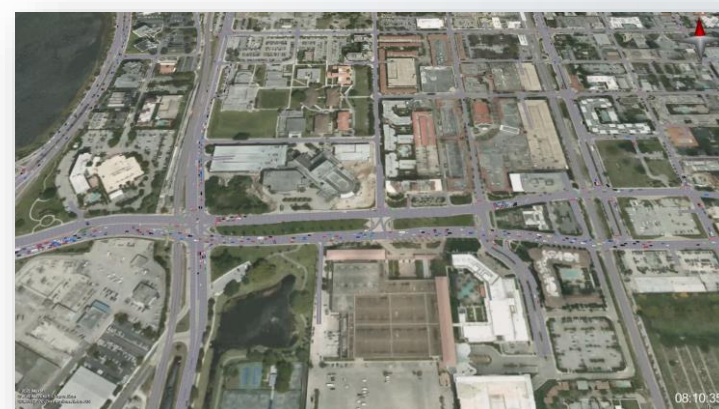
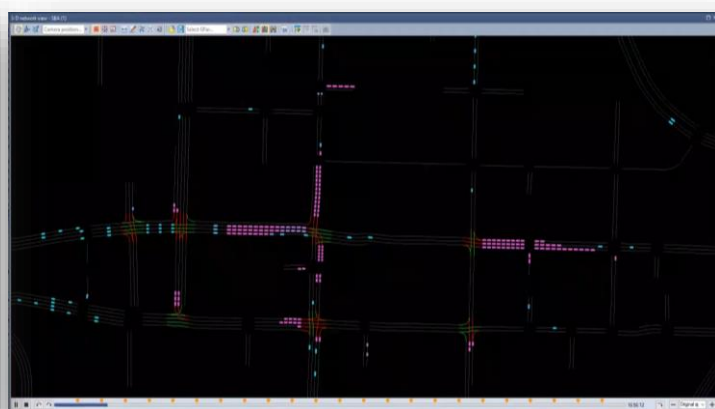
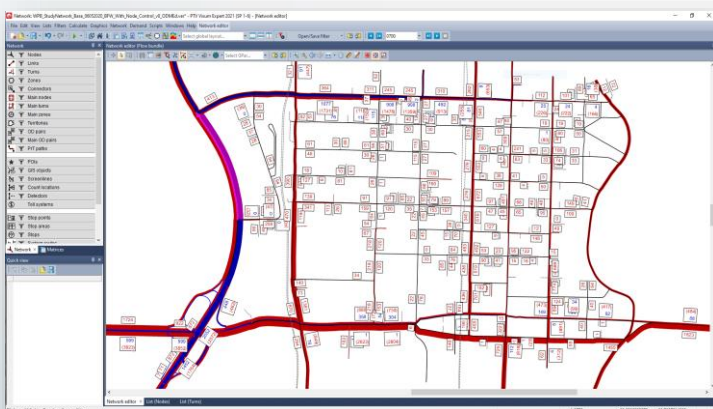
PTV Visum & PTV Vissim

PTV

VISUM

PTV

VISSIM



Macro

Meso

Micro

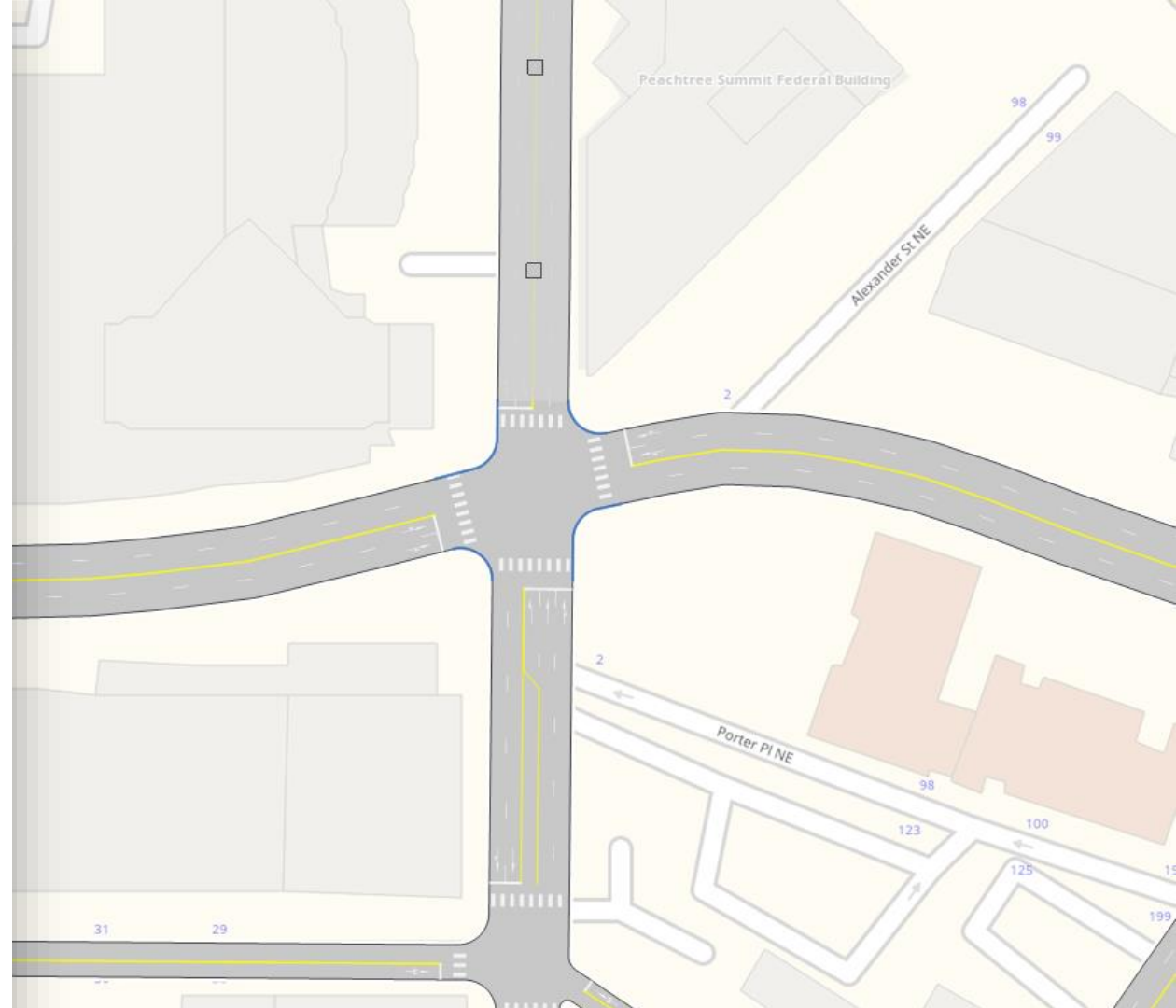
Junction editor for PTV Visum

Junction editor improvement

- New network display with easy navigation through network
- spatial extension of nodes, i.e. show „asphalt“

Motivation

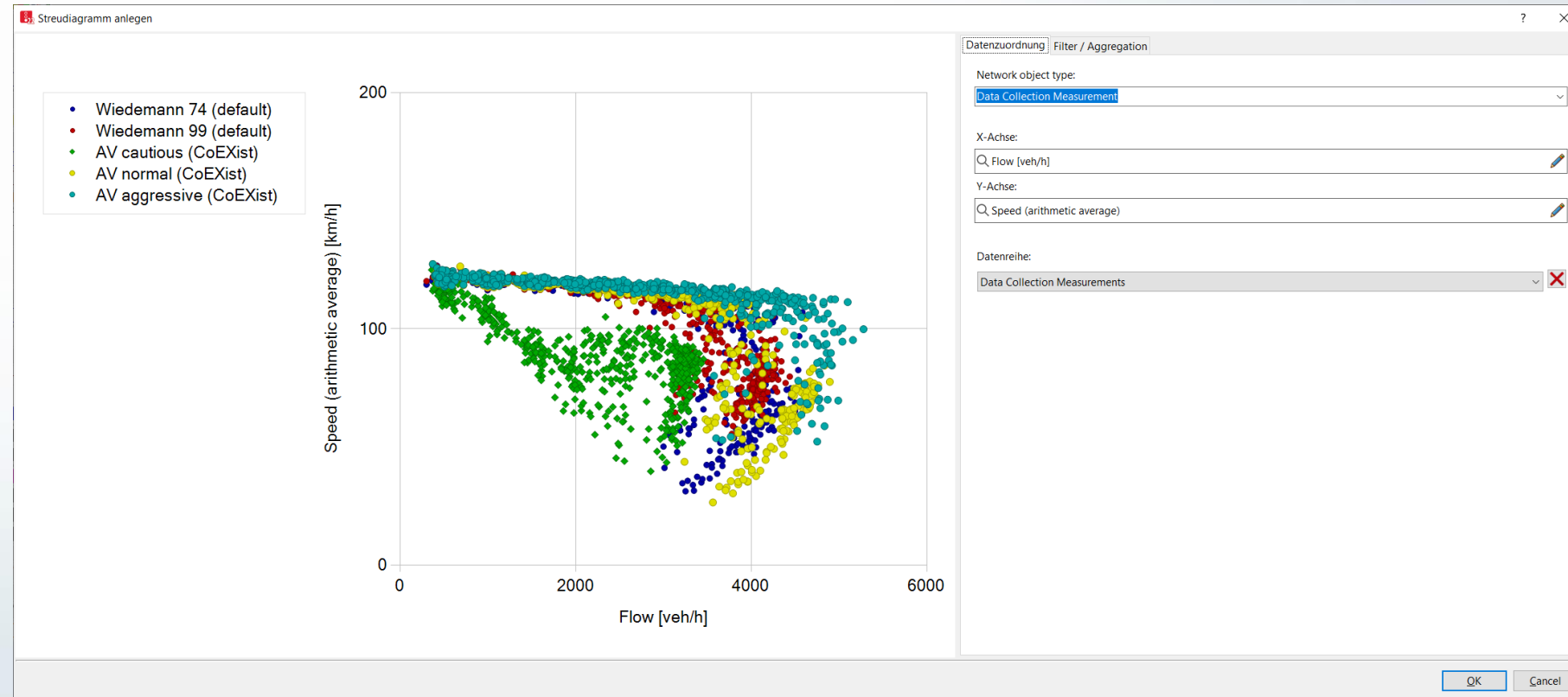
- Similarities to result of export/import PTV Vissim
- Trouble-shooting of networks



Lanes: 17	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
LinkNo	11	11	11	11	9	9	9	9	66	66	66	66	75	75	75	75	75
No	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	5
Length	0.00ft	0.00ft	0.00ft	0.00ft	0.00ft	0.00ft	0.00ft	0.00ft	0.00ft	0.00ft	0.00ft	0.00ft	0.00ft	0.00ft	50.00ft	0.00ft	0.00ft
Width	12.00ft	12.00ft	12.00ft	12.00ft	12.00ft	12.00ft	12.00ft	12.00ft	12.00ft	12.00ft	12.00ft	12.00ft	12.00ft	12.00ft	12.00ft	12.00ft	12.00ft
TSysSet	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Signal groups			4	4			5	2			8	8			6	6	6
Detectors	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...

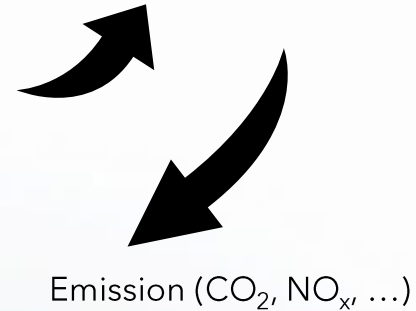
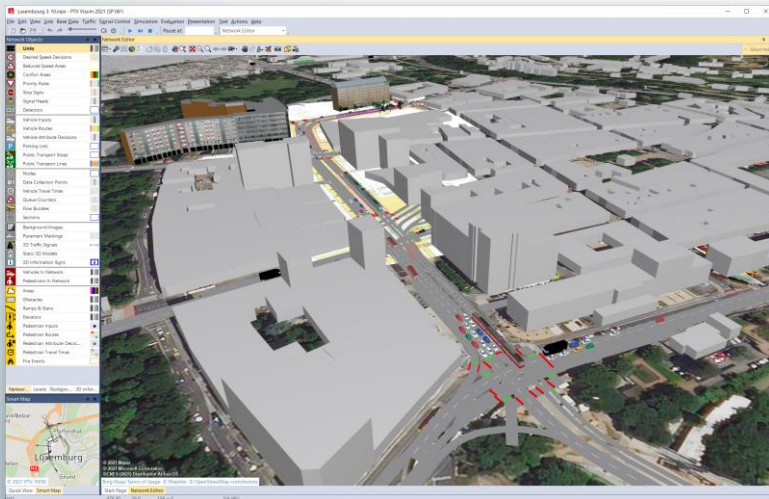
Scatterplot

- Attribute X over Attribute Y
e.g. Speed [km/h] over
Flow [veh/h]
- Filters and configurations



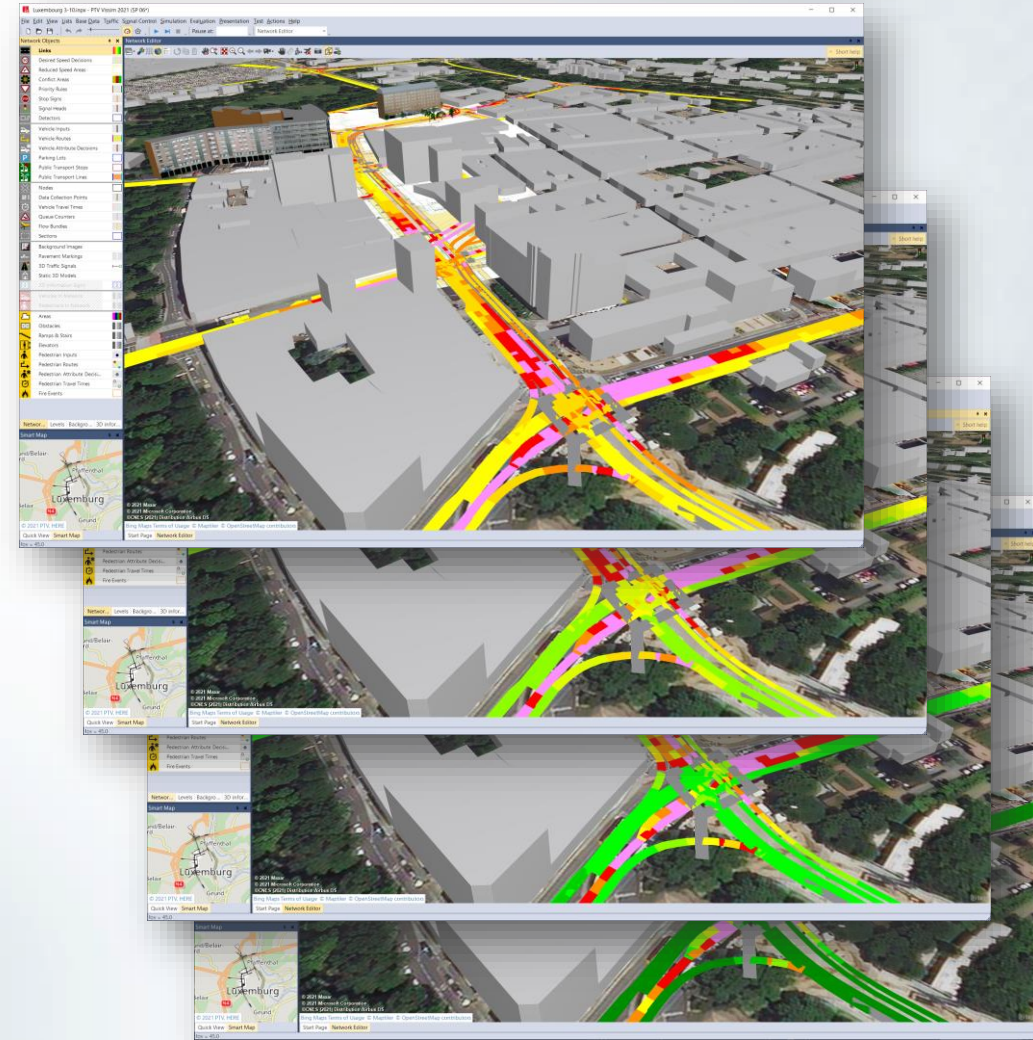
PTV Vissim - Bosch ESTM (Environmentally Sensitive Traffic Management)

Simulated Trajectories
Vehicle Type (Car, Truck, ...)
Emission classes (EU4, EU5, ...)

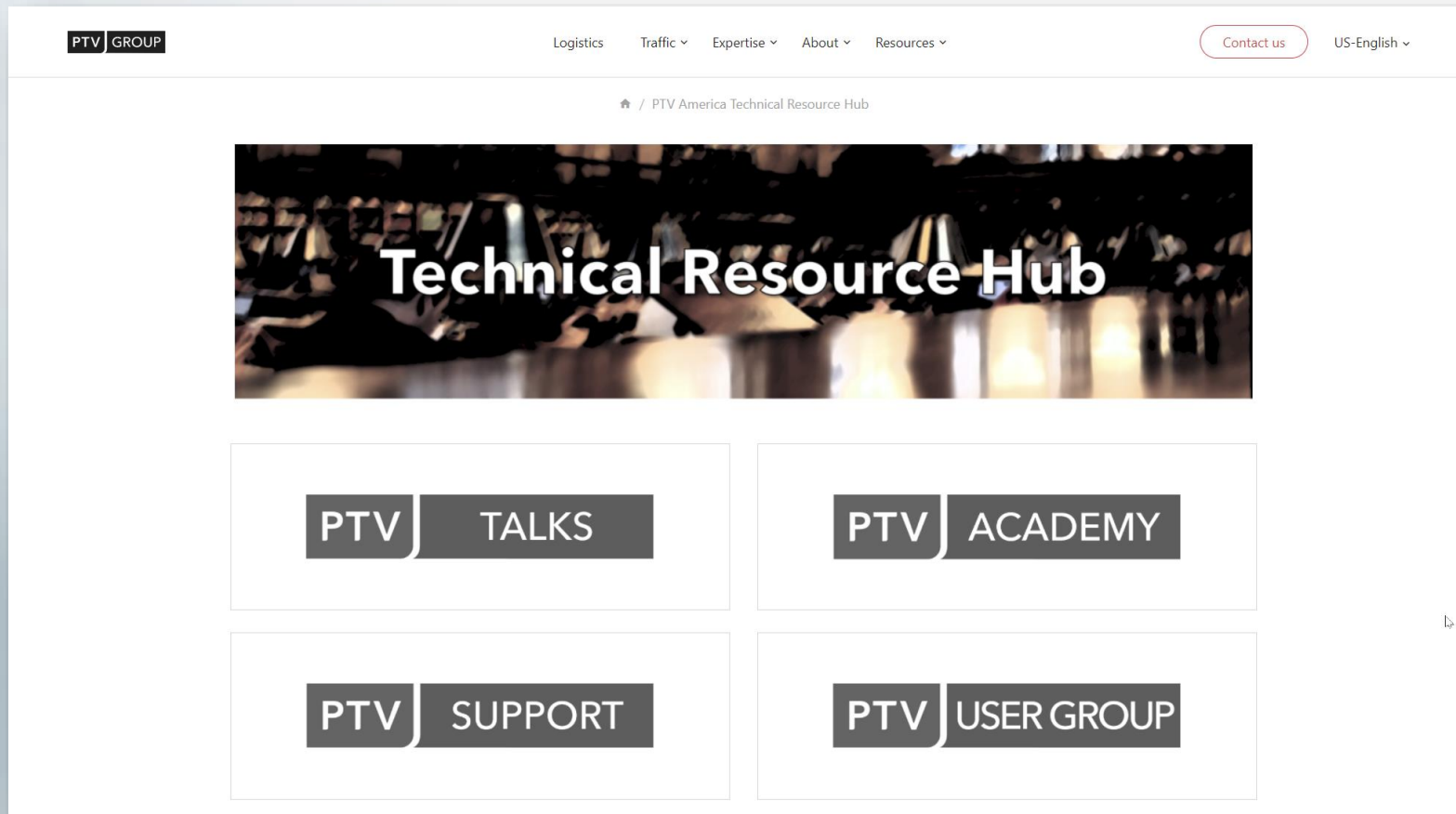


PTV Vissim - Bosch ESTM

- Emission results fed back into PTV Vissim data model
 - Link evaluation segments
- Use of PTV Vissim built-in evaluations
 - Lists
 - (3D) Visualization
 - Charts
 - (2D/3D) AVI recording
 - Scenario comparison



Resource page



<http://ptv.to/learn>



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Join the conversation

#MindOfMovement



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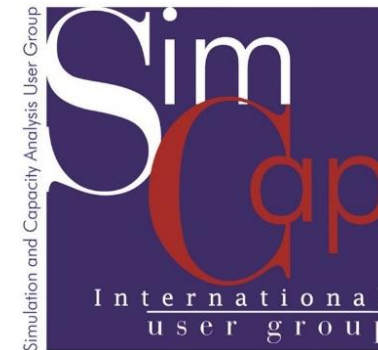
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[Chris Melson](#)
Program Manager
LTRC
cmelson1@lsu.edu

[John Shaw](#)
Researcher
InTrans
jwshaw@iastate.edu



[Eric Tripi](#)
Regional Transportation
Leader
GHD
Eric.Tripi@ghd.com