

A 3D perspective view of a city street simulation. The street is wide with multiple lanes, including a dedicated green transit lane. Buildings of various heights and styles line the street, and trees are planted along the sidewalks. The scene is brightly lit, suggesting a clear day.

# TransModeler<sup>®</sup>

Traffic Simulation Software

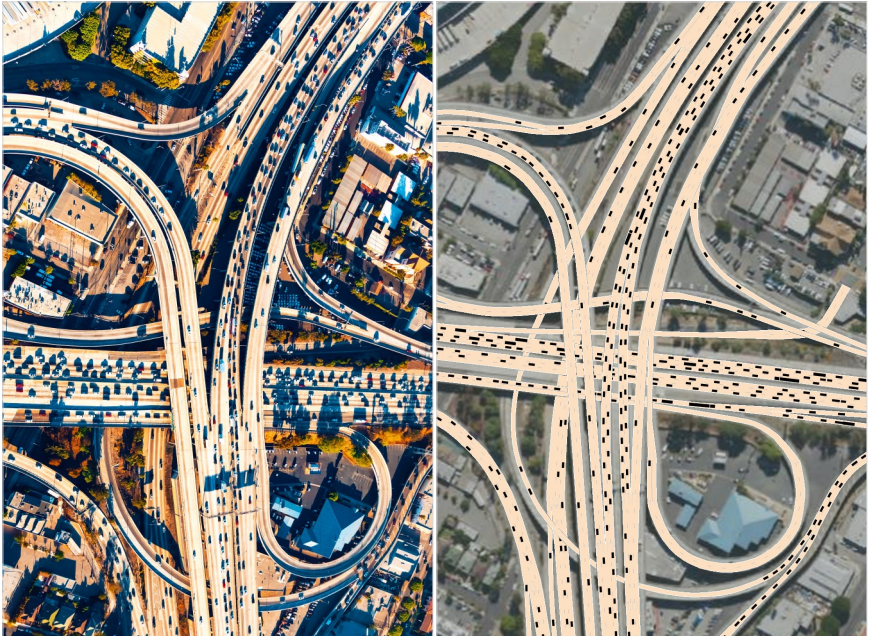


**Caliper<sup>®</sup>**  
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# THE MOST ADVANCED SIMULATION PLATFORM

## BETTER MODELS, BETTER DECISIONS

A traffic simulator must be able to replicate real-world phenomena with behavioral models in which outcomes are determined by the variables that cause them. Legacy platforms require modelers to twist models into knots with local parameters until they mimic what is observed in the field. In TransModeler, behavioral fidelity and operational accuracy are first principles, providing a path to fewer needed interventions, better models, and better investment and transportation management decisions.



## SUPERIOR ARCHITECTURE

TransModeler's architecture is modern, patented, and one-of-a-kind.

- Designed by transportation experts who both use the software and understand the theory.
- Developed by world-class software engineers who have singular mastery of parallel computation.

TransModeler is not only a behaviorally rich, high-fidelity simulator powered by efficient, high-performance computing, but it is also:



An extended GIS with unequaled interoperability and scalability.



Windows-standard for familiarity and ease of use.



Suitable for all network sizes from one intersection to metro areas.



*Fast.* Easily manages large networks that bog down other simulators.

## ALL IN ONE

TransModeler is tailored to support simulation practitioners for today's needs and to take them where they need to go in a rapidly evolving future.

Need a simulator for traditional traffic engineering applications? Use TransModeler to:

- Inform geometric design and optimize signal timing.
- Perform alternatives analyses.
- Support traffic impact analyses and interchange justification reports.

Need a simulator for more advanced modeling? TransModeler is also:

- A micro-, meso-, and hybrid multi-resolution simulator.
- A versatile dynamic traffic assignment model.
- A simulator of connected and autonomous vehicles.

Need a simulator that does more? Extend and customize TransModeler with:

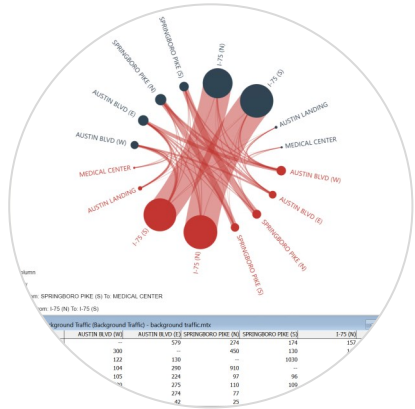
- Built-in scripting and debugging tools.
- A powerful API enabling custom signal and ramp metering control.
- Embedded Python scripting.

# EMPHASIS ON PRODUCTIVITY

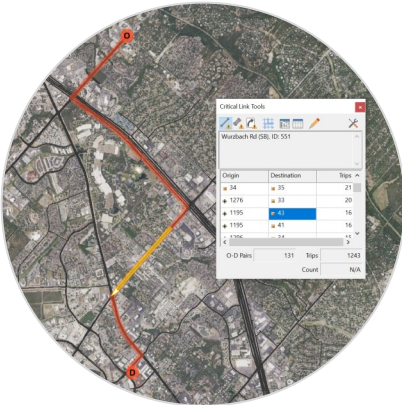
Traffic modelers need a simulator that does more than just simulate traffic. TransModeler offers a wealth of standard features to help modelers be more productive.



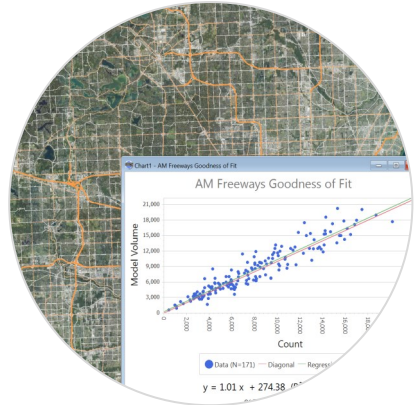
A native lane-level GIS and mapping engine helps visualize survey data and field measurements.



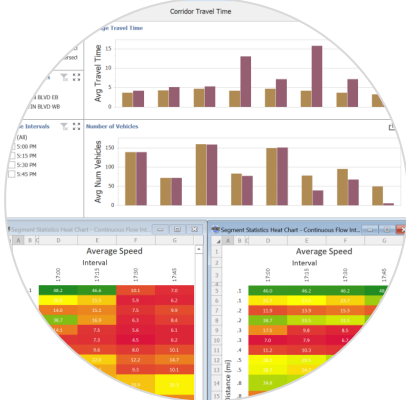
A powerful matrix engine makes developing, manipulating, and visualizing matrices simple.



Path exploration and auditing tools help better understand dynamic traffic assignments.



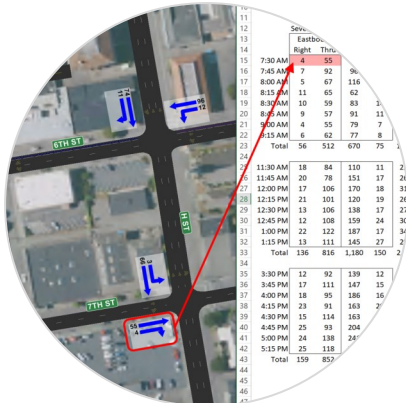
A statistical analysis and charting engine quantifies goodness of fit and identifies weak spots in model validation.



A scenario comparison engine analyzes alternatives automatically by creating helpful maps and charts with a single click.



Illuminating and dynamic color themes can be instantly applied or customized.



A tool to import turning movement counts from spreadsheets cuts the cost of transferring and storing count data.

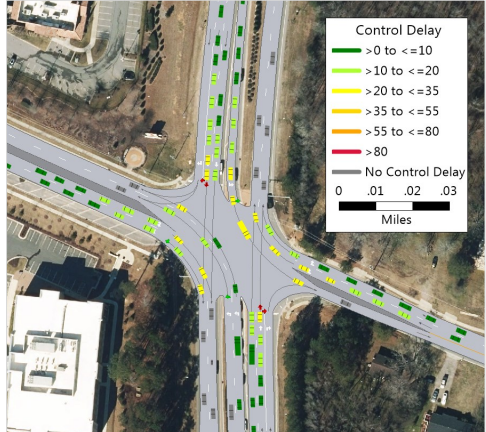


A powerful 3D engine built on a gaming platform brings your simulation to life.

# A TOOL FOR ENGINEERS

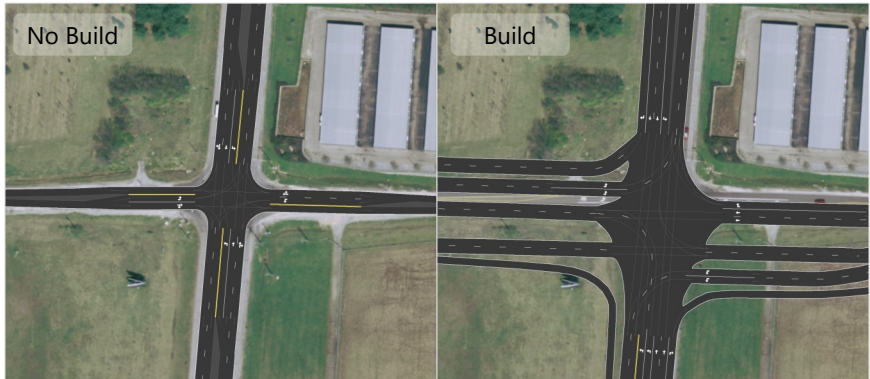
## GEOMETRIC DESIGN

As safety and greenhouse gas emissions take center stage, novel intersection and interchange designs, including restricted-crossing u-turns (RCUTs), dogbone roundabouts, and diverging diamond interchanges (DDIs), are becoming increasingly common. These modern designs do not fit into the box other simulation software developers have built for them. TransModeler boasts a flexible GIS design and modern road editing tools that make modeling the next novel design concept easy and cost-effective.



## ALTERNATIVES ANALYSIS

Simulation is frequently used to tell us which design alternative will work best. TransModeler modularizes model inputs to let you assemble scenarios from inputs common to all alternatives (e.g., demand) and inputs that must be varied (e.g., geometry) so that no inputs or work are duplicated. Moreover, TransModeler automates key performance measure comparisons across alternatives. Let TransModeler help you minimize model input errors and maximize efficiency.



## TRAFFIC IMPACT ANALYSIS

New land use developments bring jobs and other economic opportunities but also questions about access management and operations. TransModeler has a deep set of traffic demand development tools to help answer those questions. You can estimate background traffic demand from traffic counts and calculate trips generated by proposed developments using standard or local trip generation rates. With TransModeler, you can develop turning movement volumes by land use and mix and match sources of demand to represent different buildout years or land use scenarios.

## INTERCHANGE JUSTIFICATION/MODIFICATION



Interstates carry freight between ports and cities and commuters between homes and jobs. Interchanges provide important access to and from these facilities but introduce critical bottleneck and queuing vulnerabilities. Trust your analysis to TransModeler, which simulates nuanced merging and weaving driving behaviors. These behavioral models are designed to capture complex interactions between vehicles and between vehicles and infrastructure in and around interchanges better than any other simulator.

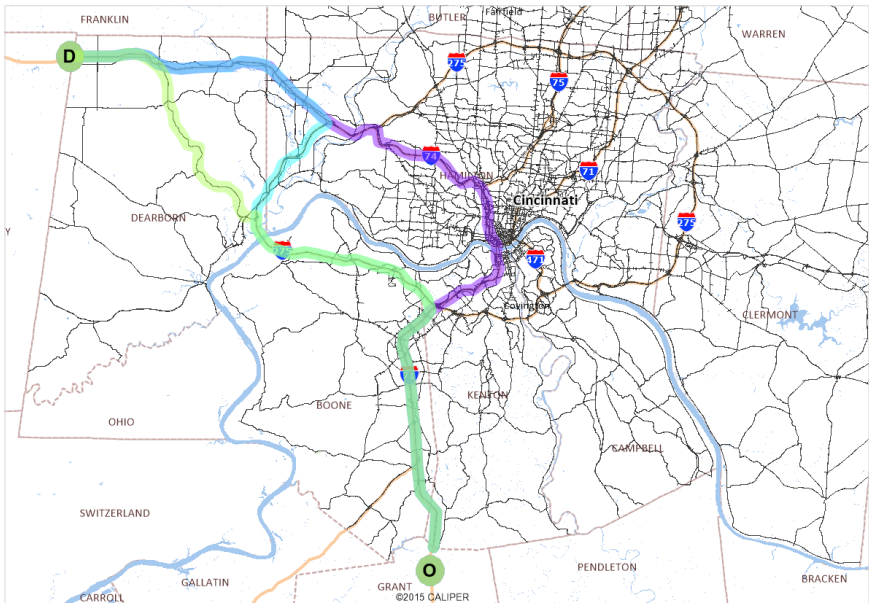
## SIGNAL TIMING AND OPTIMIZATION

Traffic signals are ubiquitous in today's urban transportation infrastructure, but the ways in which their timing impacts motorists, pedestrians, and adjacent intersections or freeways are many and complex. This complexity demands microsimulation capable of capturing the dynamic interplay of traffic flow, roadway configuration, and signal operations. In TransModeler, a unique, parallelized, microsimulation-based approach to signal optimization integrates flexible, multimodal objective functions and meaningful performance measures, including ATSPMs, to accommodate queue spillback and other phenomena that are not well accounted for in traditional signal optimization tools. Leverage this innovative approach to drive your signal timing design, evaluation, and online decision support.

# A TOOL FOR PLANNERS

## TRANSPORTATION PROJECT EVALUATION

When planning for projects that compete for funding, simulation models offer an important complement to traditional four-step planning tools and activity-based models alike. TransModeler enables planners to evaluate projects on a richer variety of performance measures than planning models support and to study the effects that queuing will have on performance in ways that planning models cannot.



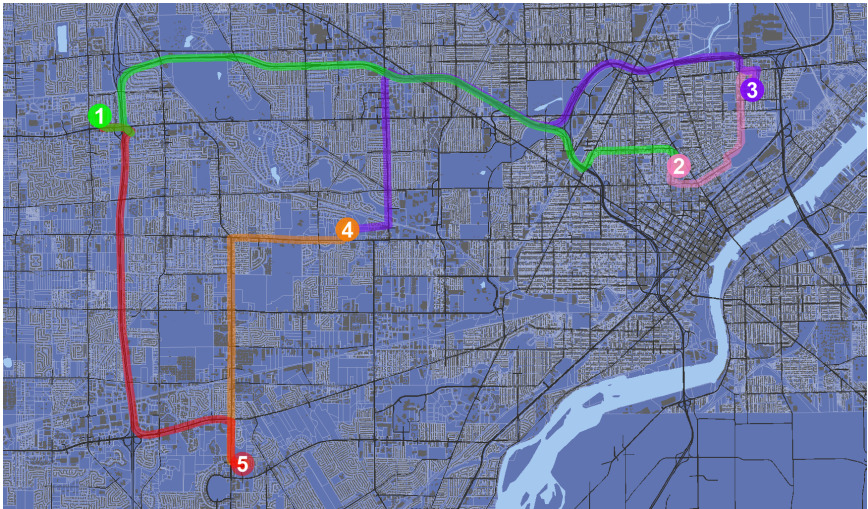
## AIR QUALITY CONFORMITY

TransModeler offers planners a vastly more accurate and reliable means of estimating the air quality (AQ) impacts of projects than those afforded by the planning models typically used for AQ purposes. TransModeler uses a far more detailed treatment of the vehicle fleet and vehicle characteristics, such as mass and engine power, that are relevant to emissions and fuel consumption. Moreover, TransModeler simulates the detailed sub-second by sub-second acceleration activity of every vehicle, leading to more accurate estimates of both speeds and emissions.



## INTEGRATED TRAVEL DEMAND MODELING

TransCAD is Caliper's market-leading travel demand modeling software. Together, TransCAD and TransModeler provide unprecedented capability for integrated travel demand and traffic simulation modeling. TransModeler can help you perform operational analyses of transportation improvement projects and plans developed in TransCAD. TransModeler has the flexibility to integrate with four-step and activity-based models (ABM). When integrated with ABMs, TransModeler faithfully simulates tours and can produce dynamic cost skims for feedback to destination choice models.



## MULTI-RESOLUTION MODELING

Planning models offer a valuable point of entry for simulation studies. Through subarea analysis or extraction tools, traffic assignments in planning models can provide a first estimate of the origin-destination matrices for a selected study area. TransModeler makes it easy to create simulation models from planning networks and matrices, whether they be produced by TransCAD or another planning platform. This most basic form of multi-resolution modeling (MRM) – the coupling of macro planning tools with microsimulation – is routine with TransModeler. However, TransModeler takes MRM several steps further, enabling modelers to perform hybrid simulations in which mesoscopic and microscopic simulation can be run seamlessly in different parts of the same network.

# ACTIVE TRAFFIC & DEMAND MANAGEMENT

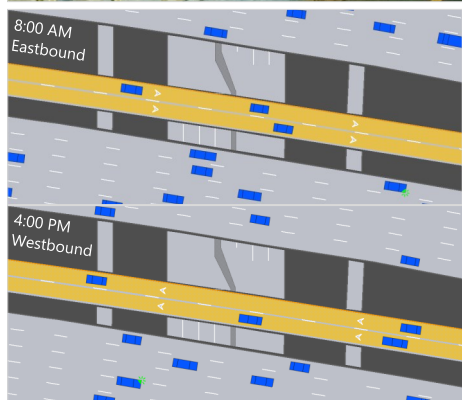
## RAMP METERING

TransModeler has four built-in types of ramp meter control – pretimed signals, actuated signals, a traffic-responsive lookup table, and an ALINEA algorithm – you can easily apply to your model. For even further customization and flexibility, the API allows you to model any ramp metering strategy, including coordinated and adaptive systems.



## REVERSIBLE LANES

Changing the direction of flow on reversible lanes is simple in TransModeler. You can use a straightforward schedule to tell TransModeler which direction of flow is open or closed by time of day. Analyze the impacts of each direction of flow as well as the transition period in one simulation.



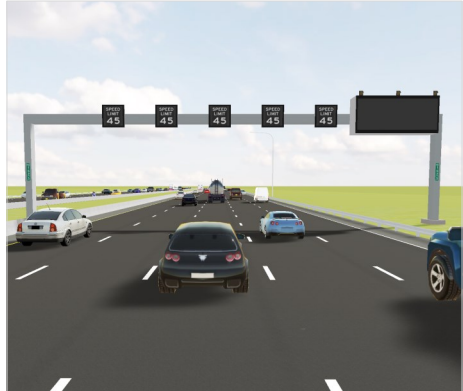
## TRANSIT SIGNAL PRIORITY

Explore strategies to improve public transportation service, such as transit signal priority, queue jumping, and dedicated bus lanes. Signal priority requires technology that allows the vehicle to communicate with the controller. TransModeler can model this technology, and traffic signals will either adjust the duration of existing signal phases or insert phases to give preference to the approaching vehicle.



## VARIABLE SPEED LIMITS

Variable speed limits (VSL) are seeing increasing attention in practice and research as speed harmonization and integrated corridor management strategies gain traction. With TransModeler, you can simulate VSLs and fully customize the control strategies that govern their operation as well as the range of surveillance technologies, from detectors to V2I, upon which those strategies rely.



## HARD SHOULDER RUNNING

Use of the paved shoulder as a temporary travel lane, known as hard shoulder running (HSR), can address peak period congestion where expansion is not feasible. TransModeler makes it easy to model the opening and closing of the shoulder lane to traffic so you can analyze the benefits of HSR strategies.



## MANAGED LANES

Explore the tradeoff between travel time savings and tolls by modeling managed lanes in TransModeler. You can simulate a wide variety of fixed and dynamic pricing strategies with flexible surcharge, discount, and exemption policies and base your analysis on incisive performance and revenue metrics.





## ABOUT CALIPER

Caliper is a US-owned and operated corporation and is a leading developer of transportation and mapping software. Caliper is the creator of **TransCAD** transportation planning software, **TransModeler** traffic simulation software, and **Maptitude** geographic information system software packages. Caliper is also a highly regarded consulting and R&D provider offering professional services in transportation and quantitative management consulting.

Caliper's software applications are being used by more than 100,000 users in over 90 countries around the globe and are making businesses and governments more efficient and effective.



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