traffic mobility logistics.

# ptv vision

## VISSIM – State-of-the-Art Multi-Modal Simulation

# VISSIM – Microscopic Simulation

**VISSIM is a microscopic traffic, public transport, and pedestrian simulation software and belongs to the PTV Vision® suite. It is the most powerful tool available for simulating multi-modal traffic flows, including cars, goods vehicles, buses, heavy rail, trams, LRT, motorcycles, bicycles and pedestrians. Through the implementation of multi-threading VISSIM operates optimally on multi- processor and multicore computers. Its flexible network structure provides the user with the confidence to know they can model any type of geometric configuration or unique operational/ driver or pedestrian behaviour encountered within a transportation system.**

## Typical VISSIM applications

VISSIM is used for a host of traffic and public transport simulation needs. Common applications include:

- Freeway and arterial corridor studies
- Sub-area planning studies
- Freeway management strategies
- Traffic calming schemes
- Light rail/bus rapid transit studies
- Public transport signal priority evaluations
- Railroad grade crossing analyses
- Toll plaza evaluations
- Intelligent Transport System (ITS) assessments
- Current and future traffic management schemes
- Airport studies for landside and airside traffic
- Environmental impact studies
- Multi-modal public transport interchanges
- Pedestrian modelling in any built environment including evacuation planning

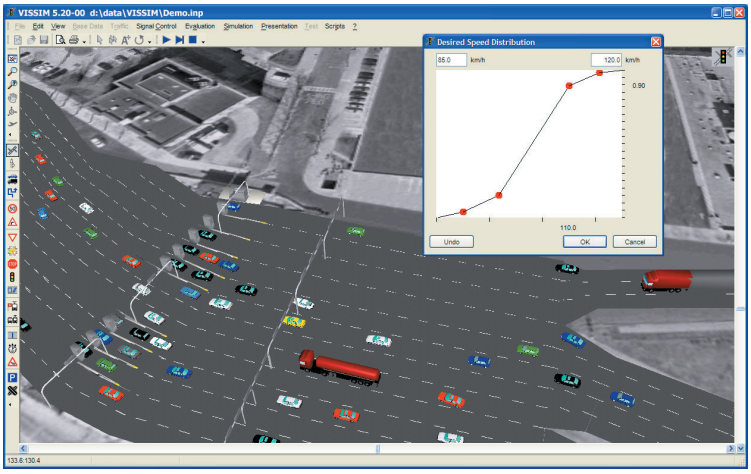
# VISSIM Features – A Close Up View

## What Makes VISSIM Special?

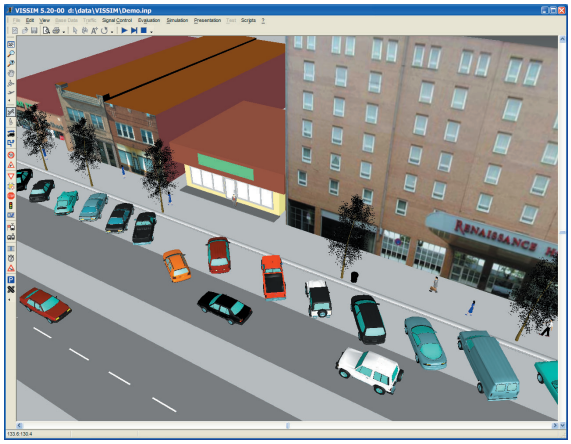
VISSIM is based on decades of intensive research at various academic institutions. Core algorithms are well documented. Open interfaces provide compatibility with external software. Its link-connector topology allows the highest versatility combined with vehicle movements in a detailed 1/10s resolution. Since being introduced to the market in 1992, VISSIM has set the standard for simulation software; intensive research and a large user community worldwide guarantee VISSIM to be the leading edge software of its kind. Furthermore, the PTV Vision suite has been the first of its kind to integrate microscopic simulation with strategic transport planning/travel demand modelling.

## Network

VISSIM has been used to analyse networks of all sizes ranging from individual intersections to entire metropolitan areas. Within these transportation networks, VISSIM is able to model all roadway functional classifications from freeways (motorways) to driveways. VISSIM's breadth of network applications also includes public transport, bicycle and pedestrian facilities. Many common, as well as unique, geometric and operational conditions exist throughout the transportation system which VISSIM can simulate.




Toll plaza, Camden, NJ

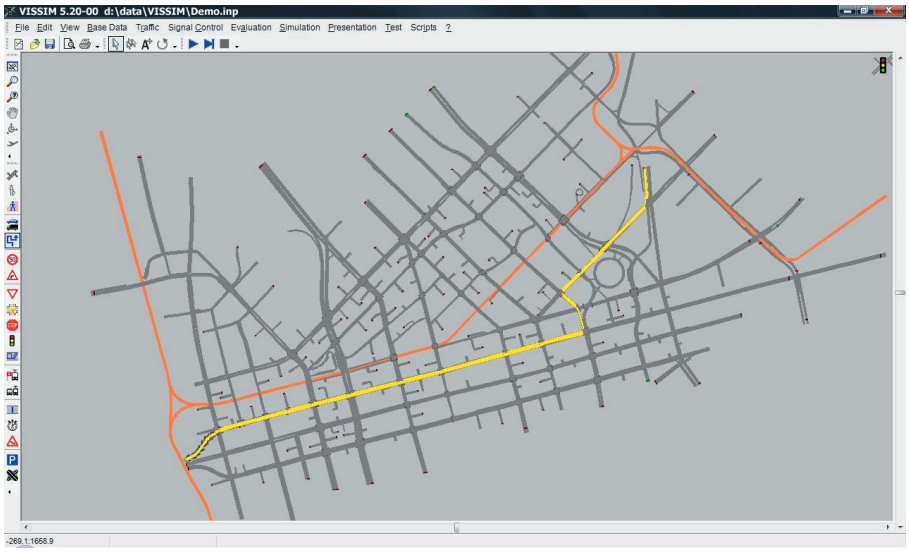


Diagonal parking, New York, NY

## Some examples include:

- Multi-lane freeways, interchanges, roadway grades
- High Occupancy Vehicles (HOV) and
- High Occupancy Toll (HOT) lanes
- Merging and weaving areas
- Complex signalised and unsignalised intersections
- U-turns, exclusive lanes, mixed flow lanes
- 2-way left turn lanes
- Bike lanes
- Multi-modal lane sharing and passing (e.g. bikes and cars)
- Angle and parallel parking
- Roundabouts, continuous flow intersections
- Airport curbside drop-off areas
- Exclusive lanes, mixed-flow lanes, queue jumps, queue-bypass lanes
- Public transport stops, terminals
- Centre and side-running LRT alignments
- Pedestrian queuing
- Pedestrian - vehicle interaction
- Railroad lines

# Traffic Volumes




Shortest Path Search in Dallas, TX

An unlimited number of vehicle types exist in VISSIM allowing the user to model a full range of multi-modal operations. These vehicle types include cars, trucks, vehicles equipped with route guidance systems, buses, heavy rail and light rail vehicles, bicyclists, wheelchairs, pedestrians and even aircraft.

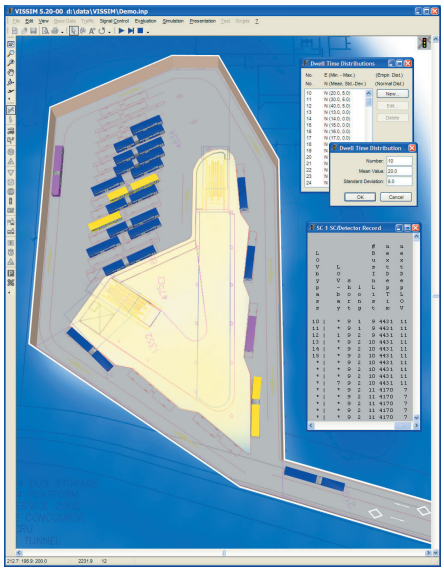
VISSIM also offers the unprecedented ability to assign these vehicles to the network using one or a combination of three methods. The basic method assumes that traffic is stochastically distributed over Fixed Routes from user-definable start to end points. For coding intersection turning movement counts, these start and end points cover a single intersection, but they can also continue through multiple intersections (e.g. freeway interchange) or even the entire study area. Dynamic Routes allow traffic to be dynamically assigned to user-specified paths when specific events occur. One example of Dynamic Routes is the assignment of vehicles to a railroad underpass only when the railroad grade crossing is occupied on the more commonly travelled path. Dynamic Traffic Assignment (DTA) allows VISSIM to assign traffic to the network using origin/destination matrices (time- and vehicle class-dependent) and travel cost stochastic assignment techniques. Origin/destination matrices can be generated using the integrated demand model of VISUM with its advanced matrix estimation and calibration functionality.

## Public Transport

VISSIM has long been the software of choice for transit related studies including bus rapid transit, light rail transit and multimodal transit terminals. Besides being able to analyse the transit related network and signal control aspects listed in the previous sections, VISSIM models transit routes, various transit vehicle types, schedules, stops, stop types and dwell times.

## Analysis

When, where and how data is reported in VISSIM is up to the user. Data can be reported for any time period and interval within that time period. Data can be reported for any point-location in the network, for an intersection, along any path and/or for the entire network. Data can be aggregated by mode or by vehicle class. It can also be reported for an individual vehicle. Numerous measures of effectiveness (MOEs) can be reported from VISSIM. Typical ones include delay, speed, density, travel time, stops and queues. The decision on which data to report and when, where and how the data is reported, is based on the needs of the project. For graphical representation of simulation output, VISSIM uses its PTV Vision suite's sister product VISUM. VISUM provides an extensive graphics library for effectively visualising transportation modelling results.



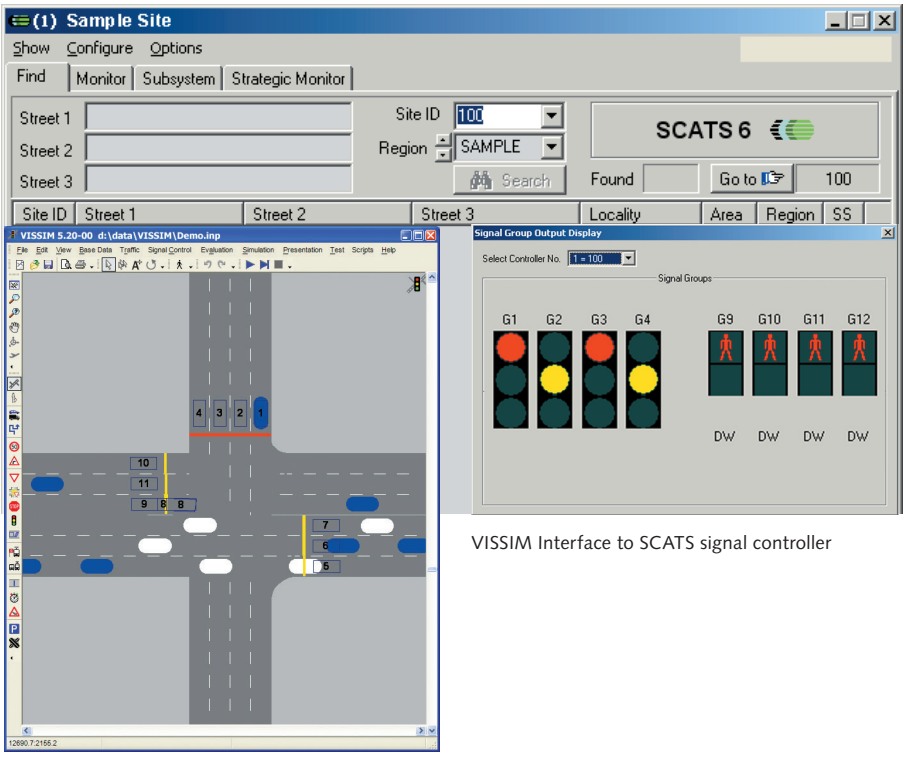
Bus terminal (route/time dependent bay usage/dwell time distribution), Vancouver, BC

# Traffic Control

VISSIM can model intersections that control traffic using yield signs, stop signs (all-way, 2-way stop control), signals, and any combination thereof. What sets VISSIM apart from other simulation software packages is its flexibility in modelling all forms of signal control. There are several ways to model signal control in VISSIM:

- Fixed-time/pre-timed signal plans
- Actuated (via a NEMA graphical user interface)
- User definable signal control logic through VISSIM's VAP macro language logic
- Interfaces to signal controller firmware (virtual controllers) such as Siemens NextPhase and Traffic Language, D4, VS-PLUS and Vialis
- Interfaces to adaptive algorithms such as Peek's Spot/Utopia, SCATS and SCOOT
- Serial communication to external controllers
- Interfaces to the McCain CID II allowing users to connect signal controllers directly to VISSIM

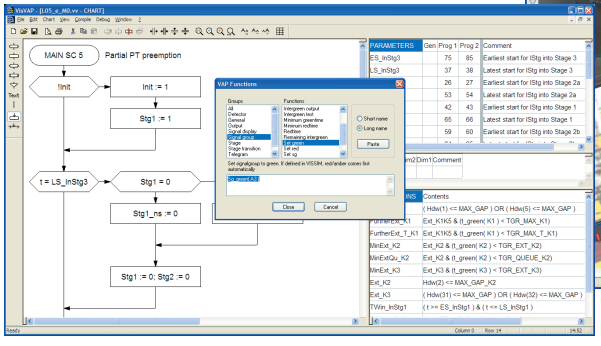
The C-like traffic control macro language, VAP, is supplemented with a flow chart editor VisVAP for easy data entry, error checking and debugging. In addition, the NEMA GUI used to enter actuated signal timings in VISSIM also has custom menus to allow users to model bus and LRT priority and railroad pre-emption.



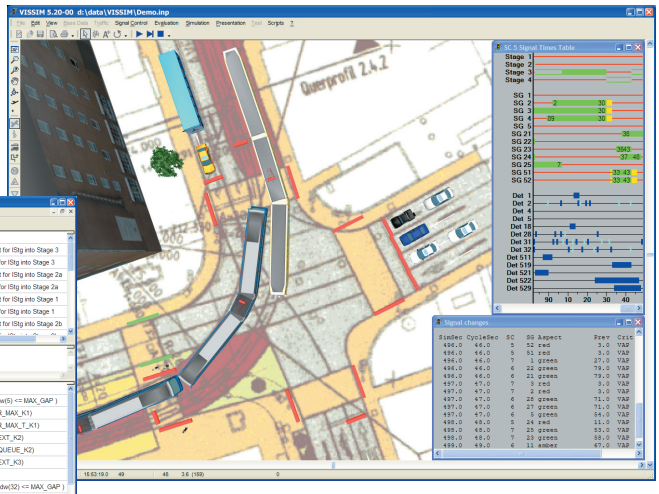

VISSIM Interface to SCATS signal controller

Some examples of signal control and related ITS applications of VISSIM include:

- Ramp metering
- Adaptive signal control
- LRT and bus signal priority
- Railroad pre-emption
- Emergency vehicle pre-emption
- Dynamic speed control
- Lane control signals
- Dynamic lane assignment signals
- Changeable message signs




VISVAP flow chart editor to define complex actuated control strategies



Public transport signal priority and dynamic signal settings

# Pedestrian Simulation

VISSIM is a microscopic simulation tool, meaning that all vehicles and pedestrians are simulated individually. Pedestrian travel creates complex interactions. The VISSIM pedestrian simulation has been designed to be flexible enough to handle complex design situations, to make VISSIM suitable for a broad range of applications. These include traffic engineering and transportation planning, city planning, building design as well as evacuation and also animation.

Furthermore there are several advantages in using VISSIM such as:

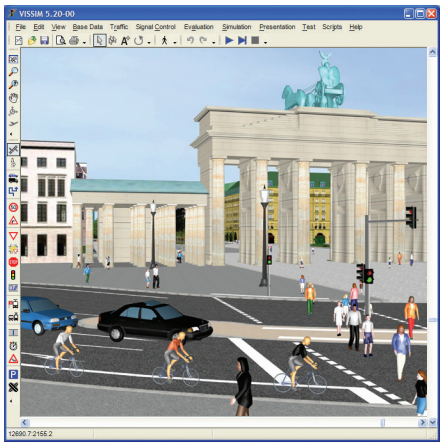
- Area-based walking behaviour
- Multi-story modelling
- Recording of simulations
- Background import
- COM Support
- Pedestrian - vehicle interaction

VISSIM is the first multi-modal microscopic simulation program to include real interaction between pedestrians and vehicles. Traffic lights, pedestrian crossings, and normal parts of streets can all be modelled and simulated in VISSIM. For example, you can define road users who willingly infringe upon the traffic rules like pedestrians who do not obey red crossing signals.

3D animation of multi-modal public transport terminal

# Graphics

VISSIM features 3D animation. This feature allows users to create realistic video clips in AVI format, an excellent tool for communicating a project's vision. VISSIM also offers users background mapping capabilities with aerial photographs and CAD drawings. Building models can be imported from Google Sketchup. For even more advanced virtual reality visualisation, the simulated traffic can be exported to Autodesks® 3dsmax software.



3D pedestrian animation of Brandenburger Tor area, Berlin, Germany

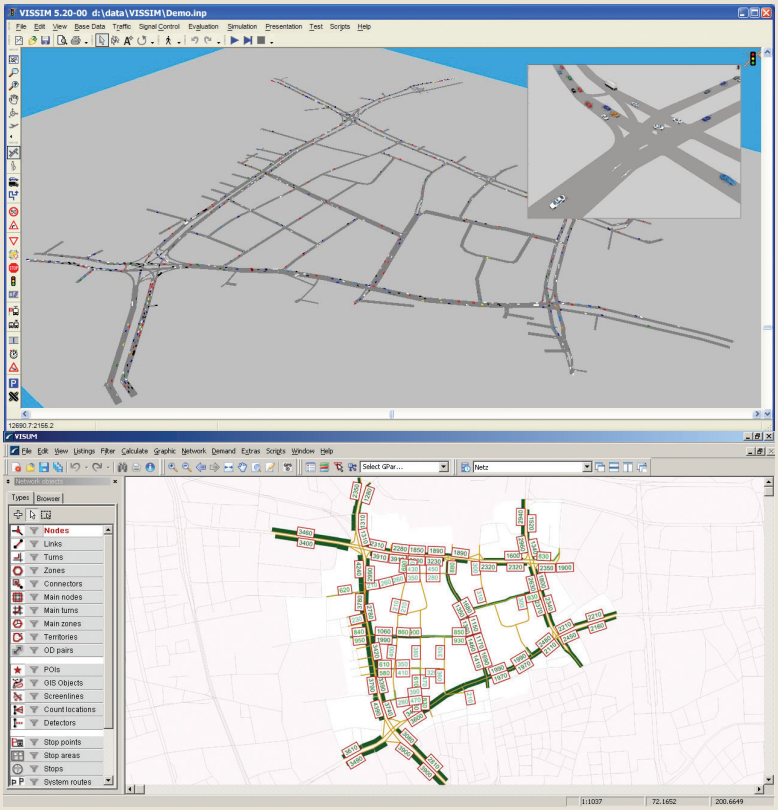
# Interfaces Increase Efficiency

## Interfaces Increase Efficiency

One of VISSIM's strengths is its ability to interface with a number of programs that are common to the transportation engineering and planning profession. These include:

- Signal optimisation tools – Synchro™, TEAPAC; Transyt*
- Control programs – Scoot, PCmova*
- Travel demand models - emme/2, TranPlan, Cube etc.
- Geographic information systems (GIS) and navigation data - ArcGIS* and NAVTEQ

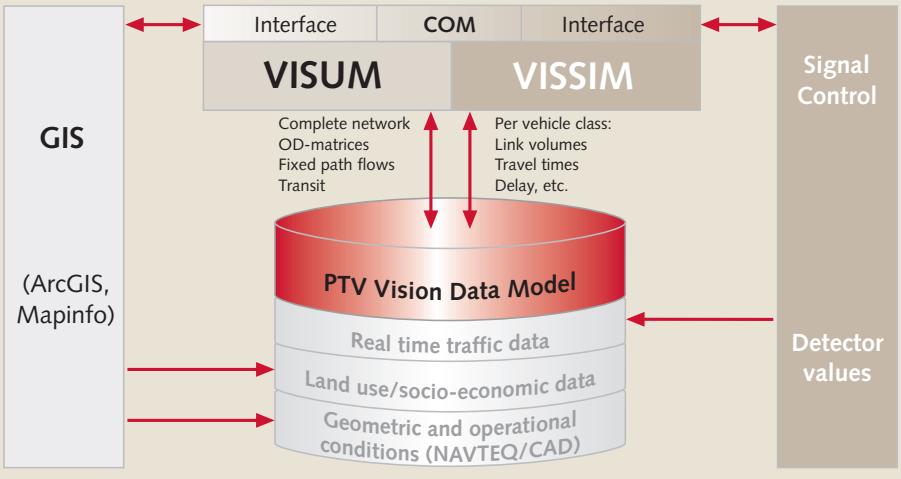
PTV pioneered the integration of simulation and travel demand software. This effort has led to the first truly integrated simulation software, VISSIM, and travel demand software, VISUM, in the market. Simply put, the benefit to the transportation community is increased efficiency.



* Synchro TM is a registered trademark of the Trafficware Corporation,TEAPAC is a product of Strong Concepts, Transyt and PCmova are a product of TRL, Scoot is a product of Siemens, TRL and Peek

# PTV Vision – The Transportation Software Suite

**For the past quarter century, PTV has been developing software tools to address the spectrum of needs within the transportation profession from traffic analysis to real-time traffic management. Our vision has been to seamlessly integrate these tools into a transportation software suite. Today, our vision has become a reality! The transportation software suite, PTV Vision, integrates these tools to increase efficiency in your work tasks and is scalable to grow with the needs of your organisation.**




VISSIM is a key component in PTV Vision as shown in the data flow diagram above. It allows for a detailed analysis of multi-modal traffic operations.

PTV Vision enables you to expand your analysis to a more macroscopic view with VISUM, VISSIM's complimentary travel demand model.

traffic mobility logistics.

- Traffic Software
- Logistics Software
- Transport Consulting

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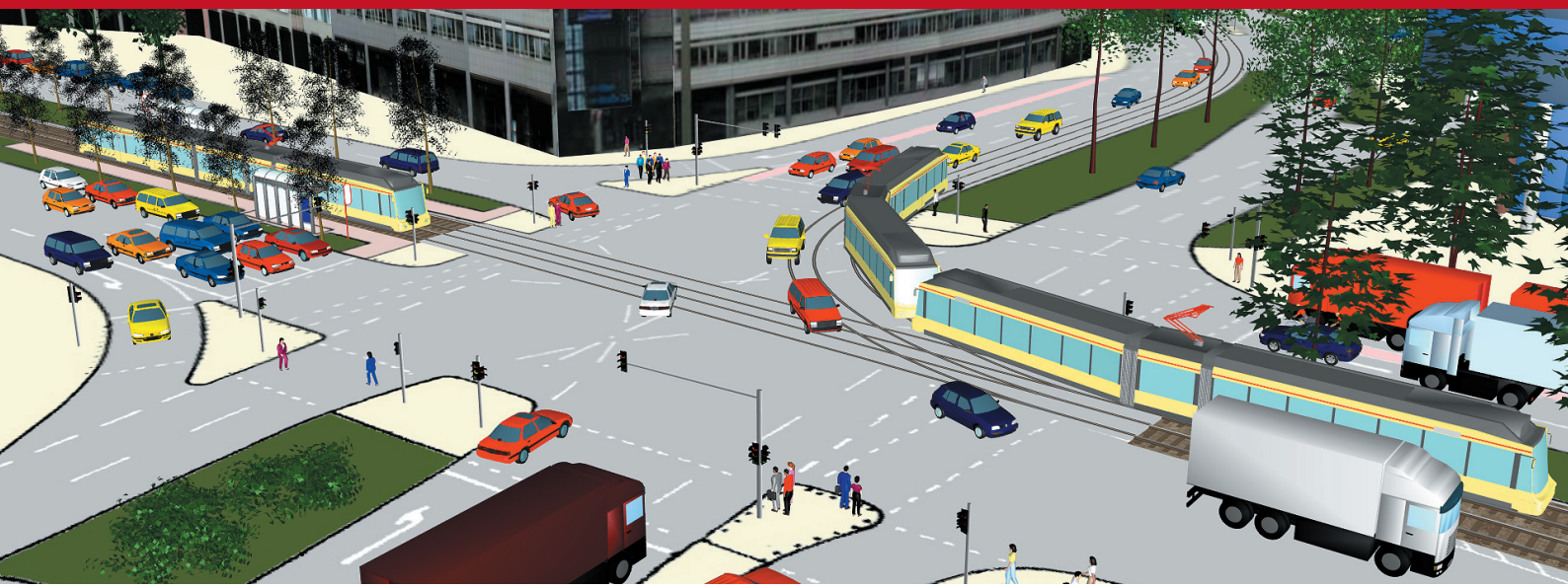

# VISSIM – State-of-the-Art Multi-Modal Simulation

## 5 Reasons for VISSIM

- Integration with travel demand modelling: exchange of network, demand and result data
- All modes in one simulation: cars, trucks, busses, LRT, bicycles and pedestrians
- Road geometry as detailed as you need it
- Comprehensive toolbox for signal control: interface to signal control firmware, user definable signal control logic, manual and automated testing
- Convincing 3D visualisation

## Application Development Platform

VISSIM offers a COM programming interface allowing users to integrate VISSIM in their own applications using languages like Visual Basic (e.g. in MS Excel), Python or C++. The COM interface provides access to the network topology, signal control, path flows, vehicle behaviour and evaluation data. Typical applications include automation of work flow processes, modification of simulation parameters during run time, and customised display options. Important is that COM allows full flexibility and thus empowers the user to use his or her own creativity to the fullest extent.

## PTV's Focus on the Users

Fore more than 15 years, the PTV Vision development team has been setting new standards that our clients value and our competitors aspire to. Today, PTV Vision is helping increase the productivity of transportation professionals and the value they provide to their countries in more than 90 countries. We view our clients as a pivotal resource for ideas. Our industry leading products combined with our desire and motivation to continue setting new standards guarantees a sound investment for years to come.