

PTV VISSIM - MODULES

Common Add-ons

Dynamic assignment

The Dynamic assignment module is used to automatically distribute vehicles among the routes available. Users only need to specify an origin-destination matrix and the parking lots assigned to the corresponding zones. They are not required to enter static routes manually.

In a series of simulation runs, vehicles travel on an increasing number of possible routes and the average travel times are calculated. Using this information, the program continuously adapts the distribution of vehicles among the routes, using vehicle-specific weight factors for travel time, route distance and costs (e.g. toll).

Various parameters are available for selection of the destination parking lots, routes and iteration processing. Navigation devices and parking management systems can also be modeled.

Mesoscopic Simulation

This module allows you to simulate larger networks in higher speed compared to the classical microsimulation. The underlying driving behavior is still based on single vehicles and time intervals of e.g. 0.1 seconds, however, vehicle behavior is not updated in every time step, but only for certain events like driving on a new link or a signal controller changing to green.

Main advantages of this mesoscopic simulation are higher speed of simulation and less effort of network coding and calibration, as less details are required.

If some areas of the network shall be simulated with all details known from the microscopic simulation, the user can choose to run a hybrid simulation with certain parts being mesoscopic and others being microscopic.

enViVer Pro

EnViVer Pro is a tool used to calculate emissions based on vehicle record data. It is based on the microscopic exhaust gas/emission model VERSIT+ by TNO. This model is based on data collected from approx. 2,800 vehicles, whose emissions were measured under several driving conditions. EnViVer Pro imports the PTV Vissim vehicle record files and calculates the CO₂, NO_x and PM₁₀ emissions in the study area at spatial detail. The results can be output in a table or graph.

enViVer Enterprise

In addition to the functions of EnViVer Pro, EnViVer Enterprise allows the modeling of additional vehicle classes, individual time periods as well as automatic processing of several input files.

3D packages (3DS max export and V3DM)	<p>3ds max Export Network data and vehicle positions are exported from PTV Vissim as a text file and can be imported into Autodesk's 3ds Max software. The 3D package contains a script in Autodesk's macro language as well as numerous vehicle models.</p> <p>V3DM V3DM allows users to convert 3D models of the formats DWF, 3DS (both by Autodesk) and SKP (Google Sketchup) into V3D, the PTV Vissim 3D format. This works for both vehicles and static models. Besides basic scaling and positioning functions, V3DM allows to define additional vehicle attributes (color, axles, indicators, doors, etc.). Moreover, V3DM can also be used to create simple 3D models (e.g. buildings) with texturized surfaces that make them look more realistic. In V3DM, users can define up to 30 states for dynamic 3D objects (e.g. variable message signs controlled via COM) and export them to a V3D file.</p>
SYNCHRO Import	<p>Using this module, users can generate PTV Vissim models from SYNCHRO. The network geometry, volumes, turns, vehicle compositions and signalization are imported. The module supports adaptive import, i.e. changes made in PTV Vissim are not lost when more current versions of the SYNCHRO model are imported.</p>
PTV Viswalk	<p>PTV Viswalk provides complete simulation of pedestrians and is seamlessly integrated with PTV Vissim. The dynamic model is based on the social force model, developed in 1995 by Prof. Dirk Helbing. It allows for free movement of the pedestrians within specific levels. Pedestrians find the way to their destination without users having to create a network that specifies trajectories. A pedestrian simulation based on directed links (in contrast to areas) is included in PTV Vissim right away. Like the simulation of vehicles it is based on the car following model of Wiedemann. PTV Viswalk is not required for this type of pedestrian simulation.</p>
BIM Import	<p>The BIM import module converts BIM (Building Information Model) files of the IFC (Industry Foundation Class) file format into INPX files. The resulting INPX files are destined for pedestrian simulation. Thus the BIM importer module is offered for usage with Viswalk. IFC export is offered by most, if not all CAD software tools such that in this way a general data flow link between CAD and Viswalk is available. This importer converts slabs to areas, walls to obstacles, can handle stairs and maintains the floor/level structure. Curved slabs and slabs with holes are automatically processed in a way that is appropriate for usage in Viswalk.</p>

Signal Controllers

Econolite ASC/3	<p>This module enables users to simulate signalized intersections that run on ASC/3 North American controller devices by Econolite. It provides a dedicated user interface for its control parameters.</p>
RBC (Ring Barrier Controller)	<p>This module enables PTV Vissim to simulate signalised intersections controlled according to the North American standard procedure "ring barrier controller". It provides a dedicated user interface for the RBC parameters.</p>
VAP Controller	<p>VAP (vehicle actuated programming) enables PTV Vissim to simulate programmable traffic actuated signal controls, both phase or stage based. During PTV Vissim simulation runs or in the test mode, VAP interprets the control logic commands and creates the signal control commands for the PTV Vissim network. At the same time, actual detector variables are retrieved from the simulation and processed in the logic. The VAP control logic is described in a text file (*.VAP) using a simple programming language. It can also be exported from VisVAP. The VAP signal data set (*.PUA) can either be comfortably exported from Vissig or generated manually in a text editor. The range of application stretches from single junction controls over public transport pre-emption to network or corridor controls and even VMS applications such as variable speed control or temporary use of should lanes.</p>

VisVAP: Flow Chart Editor for VAP	<p>VisVAP (short for "Visual VAP") is an easy to use tool for defining the program logic of VAP signal controllers as a flow chart. All VAP commands are listed in a function library. The export function allows users to generate VAP files. This saves additional changes to the VAP file.</p> <p>Moreover, VisVAP provides a debug functionality that during a running simulation allows users to go through the control logic step by step. It also shows the current values of all parameters used in the logic.</p>
Vissig	<p>Vissig complements the phase-based fixed time control (which is included in any PTV Vissim version and in the PTV Visum module "Node editor/control") by additionally providing stage-based fixed time signal control. Vissig contains a graphical editor for defining stages and interstages. Interstages can also be automatically generated by Vissig. Besides providing the usual functionality, the signal program editor allows users to easily extend or shorten stages and interstages. In addition, Vissig offers an interface for signal data export in the PUA format for use with VAP controllers Hence a vehicle actuated signal control based on stages and interstages can easily be generated. All signal plan information can be exported to Microsoft Excel and easily added to reports.</p>
Balance/Epics	<p>Balance is a complete and well-proven adaptive traffic network control that is now integrated into PTV Vissim. Together with its local companion PTV Epics or on its own it updates the signal control every 5 minutes, according to the present traffic demand as measured by the sensors. The road network supply for Balance is done with PTV Visum (a limited version of which ships with this module), and the traffic signal related parameters are supplied with an extended version of Vissig. Balance has an integrated web-based and user-friendly GUI that allows to check the output parameters and compare them with the Vissim simulation side-by-side. And furthermore this supply is the same as it would be used for real-world adaptive network control projects.</p> <p>PTV Epics is an adaptive local signal control within PTV Vissim that was designed especially for transit signal priority. The mathematical optimization inside of Epics calculates every second the best signal plan for the next 100 seconds according to the present detector situation and transfers it to Vissim. All Epics' parameters are supplied with an extend version of Vissig. Since all types of traffic (individual, public, pedestrian) are treated in a similar way but equipped with different weights it is especially easy to accomplish transit signal priority within PTV Epics.</p>

Signal Control interfaces

External Signal Control	<p>This module allows users to simulate signal controllers that are available as a separate application (*.exe) or a program library (*.dll). These can either be standard controllers supplied by PTV AG or other providers or control procedures that users have developed themselves (using the API add-on).</p>
LISA + OMTC	<p>This add-on is used to simulate signal controllers specified with the LISA+ procedure by Schlothauer. The actual control DLL and the GUI for the controller parameters can be obtained from Schlothauer.</p>
SCATS interface	<p>This module is used to simulate signal controllers specified according to the Australian SCATS procedure. The actual control DLL and the GUI for the control parameters (SCATS.DLL, SCATS_GUI.DLL, WinTraff, ScatSim can be obtained from Roads and Maritime Services, Australia)</p>
SCOOT interface	<p>The SCOOT interface is used to simulate signal controllers that are specified according to the English SCOOT procedure. The actual control DLL and the GUI for the control parameters (SCOOT.DLL, SCOOT_GUI.DLL, PCScoot) can be obtained from Siemens UK.</p>

Programming interfaces

API package (Application Programmer's Interface):	<p>PTV Vissim API package enables users to integrate their own or external applications in order to take influence on a PTV Vissim simulation.</p> <ul style="list-style-type: none"> ■ The SignalControl.DLL and SignalGUI.DLL allow for the integration of user-defined signal controllers as DLLs. Functionality is provided to read relevant information (detector information, current signal states) and write signal states.
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- ▶ The DriverModel.DLL allows for the implementation of car-following and lane change models. These are assigned to specific vehicle types in PTV Vissim and can overwrite the standard driving behavior.
- ▶ The EmissionsModel.DLL is used to add user-defined emission models to PTV Vissim. Relevant vehicle attributes and dynamic parameters are available via the interface. The emissions calculated can be output in PTV Vissim evaluations.