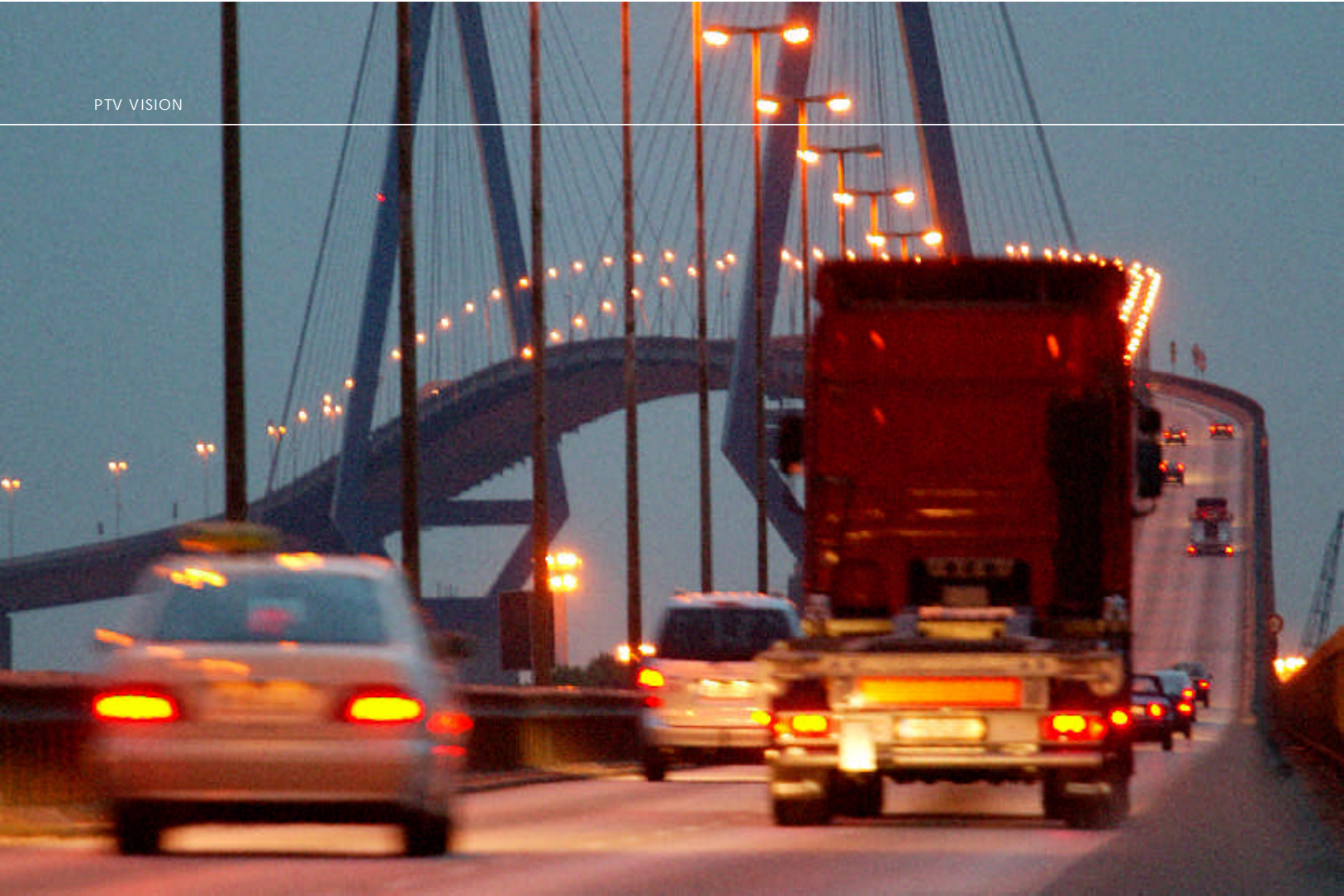


ptv vision

PTV Vision – The Software Suite
for the Transportation Professional





PTV Vision – More than a Vision

Dear Transportation Professional:

Discover why PTV Vision® is the world-wide leading software suite for transportation planning and operation analyses in over 80 countries. No other software suite offers such a high level of integration within the overall transportation planning process and, in particular, between strategic planning, transport operations and traffic engineering.

Our team of more than 50 engineers, planners and software developers is committed to the long-term future and maximizing the return of our customers' investment in this software suite. Already today, PTV Vision extends its scope from mere planning and simulation tools to an enterprise resource solution for

public agencies, transportation service and infrastructure providers.

Trust in a proven set of tools developed by engineers and planners for engineers and planners! Gain with PTV Vision:

- ▶ Transparent and well documented data models and methodologies
- ▶ Interoperability with other systems by the support of numerous interfaces and industry standard data
- ▶ Enhanced efficiencies through integration of navigation network data and internet technology

Contained in this brochure are real-world examples of what you can achieve with the PTV Vision suite including:

- ▶ Vertical and horizontal integration of transportation planning
- ▶ Demand, supply, operation and controlling in one system
- ▶ Public transport planning and service optimization
- ▶ Simulation for alternatives analysis
- ▶ Service, support and interfaces

Envision your daily tasks with PTV Vision. Your success is our goal.

ptv vision

Innovation & Sustainability

PTV Vision is the world's only system that covers the entire range of transportation planning and traffic engineering tasks, solves current problems in an efficient way and is scalable to meet future challenges. Its GIS features make it ideal for sharing and exchanging data with existing GIS databases as well as presenting analysis results. Moreover, additional modules can easily be added to expand capabilities – public transport system planning, line costing, timetable optimization, real-time traffic management, intersection and network timing optimization, real-time data management, inner- and inter-agency data sharing.



Closing the gap

PTV Vision does not stop here. A significant opportunity exists to improve the traditional offline planning process by linking strategic and operational planning with real-time applications. PTV Vision is making this opportunity a reality. The comprehensive data model of PTV Vision enables users to integrate real-time data into the planning process for evaluation purposes. Additionally, this ability allows quick operational assessments of existing transportation conditions and testing of strategies to improve these conditions.

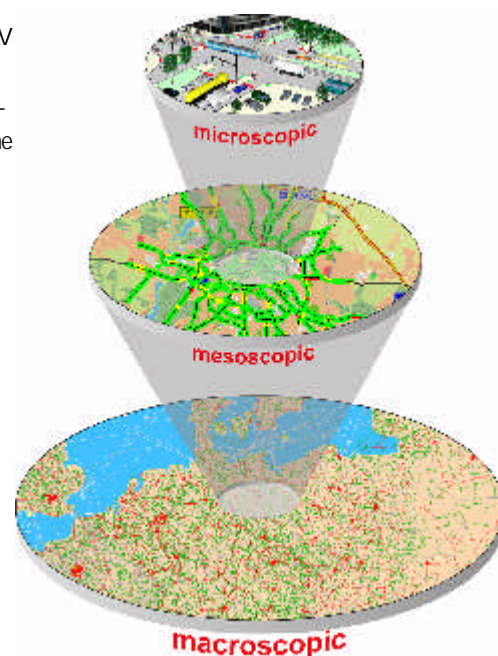
PTV Vision is flexible. It enables users to work on a variety of applications. For example, the same user can apply PTV Vision to a planning study that has regional implications as well as to an operational study along an urban roadway where innovative traffic management concepts are evaluated at the roadway and intersection level. Furthermore, PTV Vision is used as core system of complete transport models for traffic management centers. These extensive applications explain the diversity of our users. Among our customers you will find municipalities, regional governments, metropolitan planning organizations, departments /ministries of transportation, consultants, the automobile industry, research institutions as well as railway and public transportation operators. To all of them, PTV Vision provides a vast range of data analysis and scenario evaluation tools to ensure economical, customer-orientated and ecologically sustainable solutions.

PTV Vision is the result of a constructive dialogue between experienced transportation planners and traffic engineers and our software development experts. Considering this, it is not surprising, that PTV Vision is used and expanded through numerous research projects. Over 100 universities and research institutions around the world rely on PTV Vision.

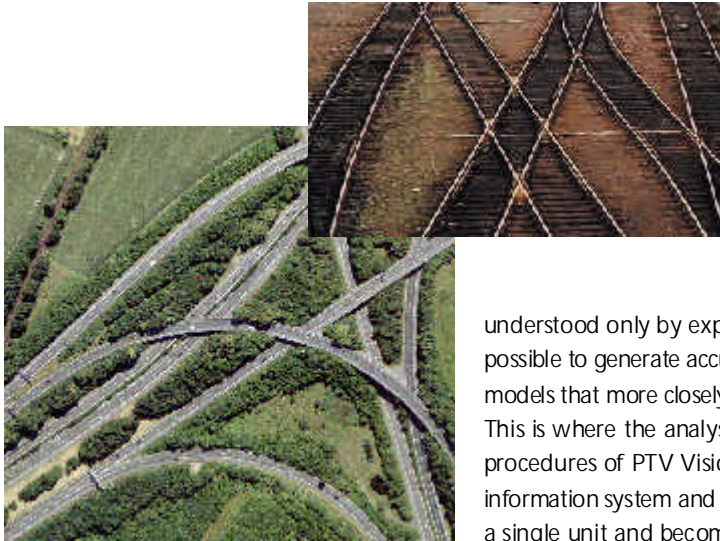
Their decision to use PTV Vision is a sound investment decision. Universities and research institutions, but really all of our users, can actively participate in further developments. We are always listening to our users and truly appreciate their suggestions. These suggestions help to enhance our products and thus to maximize their investment in PTV Vision.

Beyond the user-friendly software, PTV Vision, PTV also provides comprehensive data sets, turnkey traffic models as well as web-based services for traffic information. Our user group meetings, information materials, hotline and Internet service build strong customer relationships, enable continuous education and provide a regular transfer of knowledge. After all, we want our products and services to contribute to your success.

Conclusion: PTV Vision is more than a typical transportation system: Try it yourself and become part of the PTV Vision family.



Forecast, Planning & Control, All on One Data Platform



Investments in transportation infrastructure, traffic management strategies and traffic information systems must be supported by sound technical and financial analysis. The huge array of possible measures aimed at improving the transportation system requires planning software based on sound data and models. Only this way transportation planning can really be sustainable.

The first step is to analyze the initial situation and then develop potential improvements. GIS-based navigation networks, which can integrate multi-modal networks and demand data, enable a cost-efficient and sustainable method for managing this data. Web-based services then provide a means for evaluating, sharing and presenting this data in a meaningful format.

Model the Real World

A transport model is a GIS-based image of reality and at the same time basis for the analysis and forecast of traffic flows. A characteristic of the former traditional abstract models was that they could be

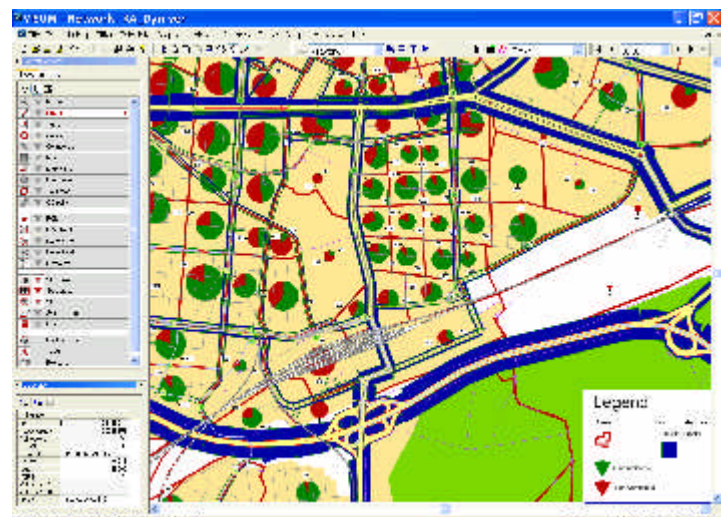
understood only by experts. Nowadays, it is possible to generate accurate and transparent models that more closely approximate reality. This is where the analysis and forecast procedures of PTV Vision excel. Here, the information system and transport model form a single unit and become comprehensible and useful even to the non-expert. Further information can be integrated into this unit on a very exact geographical basis if necessary to answer the user's questions. Dynamic transportation supply data, such as temporarily offered connections (e.g. high occupancy toll lanes, time-of-day HOV restrictions), capacity reductions caused by road works, incidents or recurring congestion, can be recorded and displayed. Images, videos and planning data as well as links to other data preprocessors can be easily integrated

into a common geographical platform. Scenarios can then be analyzed by calculating, displaying and comparing measures of effectiveness. The PTV Vision approach matches the right information to the right analysis tools to identify the right solution.

Powerful Comprehensive Data Model

Digital data is the foundation of a transportation model. It is the ideal starting point for extending systems to support the operational and organizational tasks within public transport (transit) agencies and mobility service providers. The keywords are data integration and multi-user data access. With the support of the German Federal Ministry for Education and Research BMBF and the significant contribution of PTV, a data model has been developed, which combines timetable data from operational planning systems and/or public transport information systems with navigation networks and road network data.

The PTV Vision transport model further integrates data such as traffic flows, structural data and behavioral data. Parameters such as level of accessibility and traffic loads, which



Traffic volumes and demand data in Karlsruhe, Germany



can be defined in individual time slices (e.g. between 7:00 and 7:30 am) and according to transportation mode (cars, passenger, motorized commuters, packages) round out the Transportation Data Warehouse. The PTV Vision procedures and external optimization procedures can build on this dynamic database. It is an open system with a powerful programming interface, which enables easy access to data objects and procedures.

Basic data provided by PTV and its solution partners

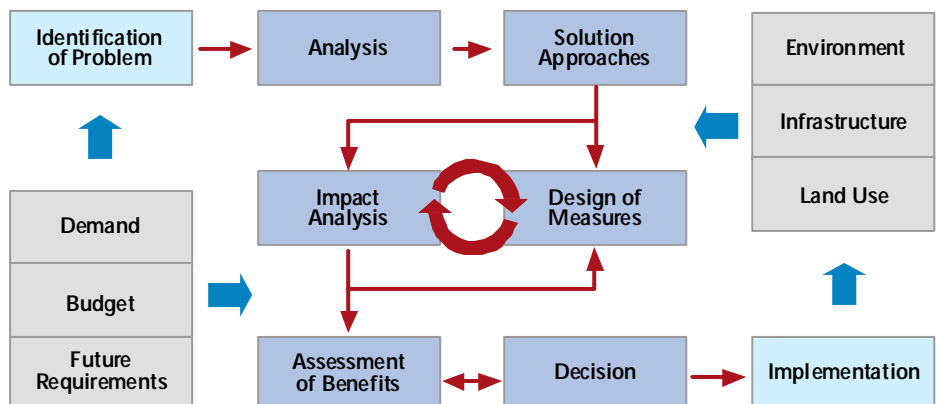
The dramatic increase in on-board navigation systems and the availability of navigation networks make it possible to use this database for transportation modeling and for the provision of individualized, trip specific information concerning real-time (or even

short term forecast) traffic conditions. With PTV Vision you can aggregate real-time data in a cost-effective manner and then package it for dissemination to the traveling public or share this information on the planning and management level. The spectrum of the PTV Vision information system, whose core is a sound analytical platform, can help you to achieve your goals.

Customized for You

PTV Vision is extremely flexible and scalable. The modular system architecture of PTV Vision can take on different forms based on the user's needs. Users can analyze regional travel within metropolitan areas all the way down to a particular lane at a selected intersection. With VISUM at the core of PTV Vision, transportation planners and engineers can calculate traffic flows, operational measures of effectiveness as well as noise and air quality impacts.

The cycle of planning projects embedded in development strategies





Comprehensive Transportation Planning

Transportation supply, demand and operation with PTV Vision

To make the right decision at the right time is a challenge. To respond smoothly to fast changing conditions or issues surrounding future developments requires the support of reliable transportation information and accurate transportation forecast systems. At times, failing to respond efficiently to these transportation issues is the critical barrier between strategic planning and operations analysis.

All in One

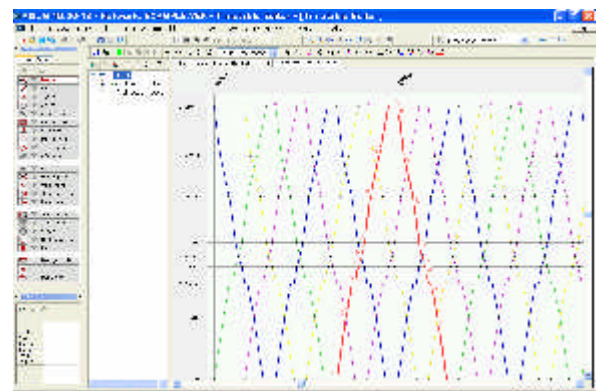
PTV Vision integrates operational data directly in the strategic planning process. It can analyze the operation resulting from daily updates (automatically!) in transportation demand without losing any time. And once you have identified problem areas, use the macro- and microsimulation analysis tools in

the PTV Vision suite to test possible solutions. No complicated system change is required. PTV Vision speeds up your ideas!

Develop a Comprehensive Information System

It does not matter if you are charged with extending transportation supply or identifying congestion reduction measures, the operational user can also benefit from the

integration of operational data in the planning process. Build a comprehensive platform for planning and operations analysis and develop comprehensive solutions rather than piecemeal ones. At the same time, PTV Vision enables users to forecast and evaluate demand changes resulting from their ideas. Take advantage of this power tool to analyze capacity, the redistribution of traffic, costs and revenues.



Visum graphical
timetable editor

PTV Vision – Complete Integration

Customized for You

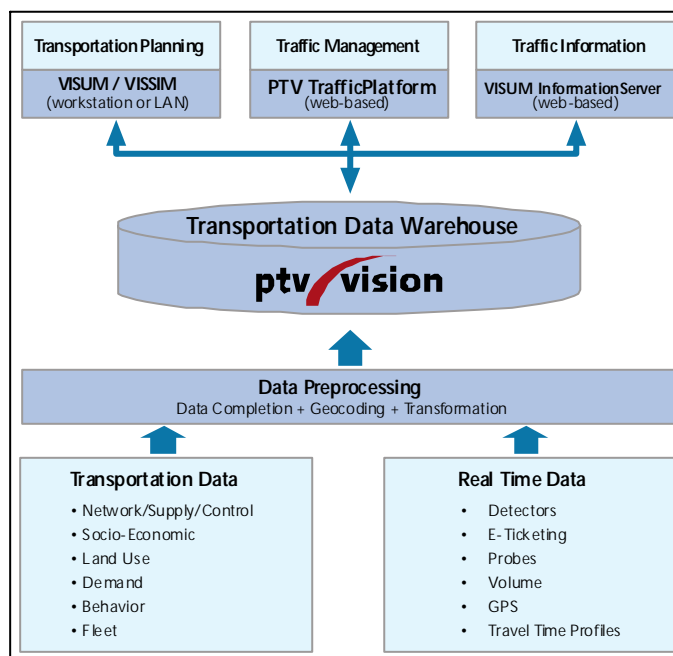
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Innovative Public Transport Features

PTV Vision is unmatched in the features available for transit planning. Passenger surveys can easily be entered in PTV Vision and then extrapolated to on/off ridership data for all transit stops throughout the transit system. Timetable and line network optimization routines are also available. The analysis can span the entire transit network or focus specifically on a single vehicle trip. The public transport operator also benefits from the operational public transport modules such as timetable planning, line costing calculation and vehicle blocking.

Horizontal Integration

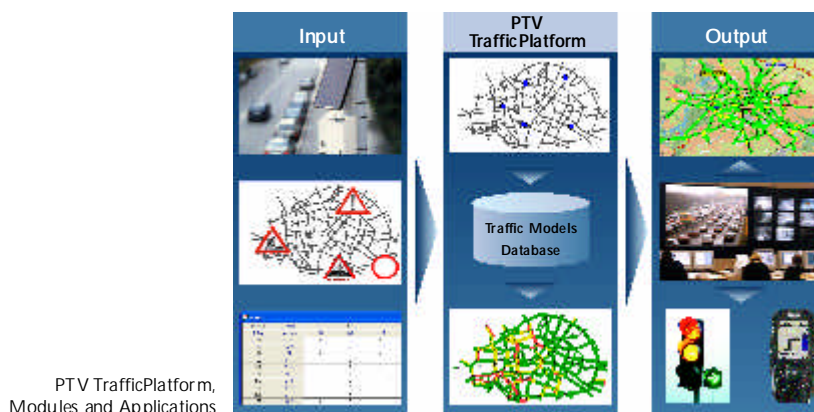
The integration of all transport modes in one unique planning and simulation system makes PTV Vision the right tool for multi-modal transportation studies at all levels of detail and storing and managing intermodal data. In addition, the VISUM InformationServer allows agencies to share transportation data, to remotely run predefined scenarios and to share analysis results both inside and outside of the agency via a web browser. VISUM InformationServer requires neither additional software installations nor training. PTV Vision uses the power of modern internet services to offer clients customized solutions.



Telematics Information and Control

The basis for all real-time traffic management services is PTV TrafficPlatform, also known as VISUM Online. It combines real-time traffic information with transport telematics. First, PTV TrafficPlatform collects real-time data such as detector values and FCD data in a dynamic database. The data is then validated with the help of model-based check routines. PTV TrafficPlatform then applies data completion algorithms to develop a complete picture of the transportation

system's current status. The operator can analyze various control strategies either online or offline to improve traffic flow. PTV TrafficPlatform also provides the ability to predict, in short time horizons (30 to 60 minutes), conditions within the transportation system. Therefore, operators can be proactive by developing, testing and implementing control strategies based on predicted conditions. PTV TrafficPlatform's scenario manager facilitates testing and comparing these strategies. Successful, real-time traffic management is guaranteed by PTV TrafficPlatform.



PTV TrafficPlatform, Modules and Applications

"What If..." – PTV Vision Provides the Answer



Microscopic Traffic Flow Simulation

What would happen if there was an additional turning lane? With PTV Vision, you will find an answer to this and similar questions without having to make any physical changes to the road. For many engineering disciplines, simulation has become an indispensable instrument for the optimization of complex technical systems. This is also true for transportation planning and traffic engineering, where simulation is an invaluable and cost-efficient instrument.

How do you display and visualize complex traffic flow in a clear graphical way? The answer is easy use: VISSIM, the microscopic traffic flow simulator. Within a short amount of time, multiple scenarios of either urban or regional (i.e., freeways, arterials) character can be simulated and visualized. Utilizing this simulation tool, current and future operations of every transportation mode (e.g. general-purpose traffic, HGV/ trucks, HOV, bus transit, light rail, heavy rail, rapid transit, bicyclists and pedestrians) can be modeled. VISSIM analyzes the multi-modal impacts of

physical and operational alternatives. As a result of its comprehensive system analysis, VISSIM allows for an optimal integration of transportation infrastructure design and operation which results in cost-effective expenditures.

Calibrate to Local Conditions and Import Data from VISUM

A simulation program is only as good as the accuracy of its models. With this in mind, VISSIM provides a number of user-accessible calibration parameters that allow for calibration to local conditions.

Desired speed behavior that reflects local conditions, vehicle parameters that represent the technical abilities of the vehicle types, and signal control logic that reflects local signalization, are only a few elements reflecting the complex cycle of cause and effect. All these elements are reproducible in a microscopic traffic simulator. Due to the international use of VISSIM, a rich dataset of calibrated parameters is available to users. In addition, data such as digital road and public transportation route networks as well as vehicle routing information can be imported directly from VISUM, significantly reducing the amount of data coding.

Easy Handling

The graphical network editor allows efficient and realistic model creation or modification. Network objects such as routes, public transportation stops, signal heads, yield conditions, stop signs and detectors are placed true to scale using base maps or aerial photos. It makes no difference whether modeling freeways, freeway interchanges, toll plazas, urban streets, unsignalized intersections, signal controlled intersections or roundabouts.



3D Simulation with VISSIM

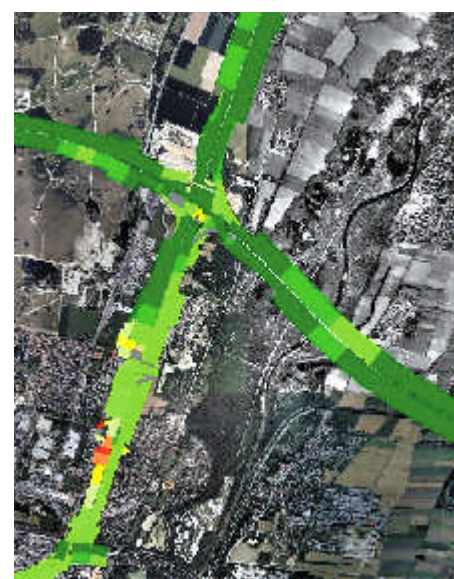


Simulation and 3D Visualization

The simulation generates a wide range of measures of effectiveness including travel time, delay and queue lengths, number of stops, and green time distribution for vehicle-actuated signal control. By comparing measures of effectiveness, a traffic engineer or transportation planner can determine the most appropriate alternative. The two or three-dimensional modeling of traffic flow makes VISSIM an ideal tool for presentations to all types of audiences including, technical staff, non-technical groups and decision makers.

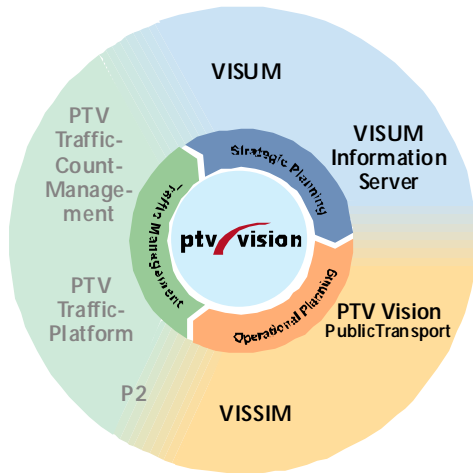
Signal Control with P2

The computer-aided software of PTV Vision will help with this task. P2, the signal timing design program, allows you, with the help of graphical tools, to optimize signal phasing and timing, regardless of your signal controller type, or what control philosophy you have adopted. In addition, P2 is the perfect tool for developing phasing/staging diagrams, phase/stage transitions, subjunction control and coordinated timespace-diagrams. You can even use P2 and its user-friendly and efficient database for large agency data management with thousands of traffic signals.



Traffic densities in Munic, Germany

ptv vision – The Components



Strategic Planning

VISUM is a comprehensive, flexible software system for transportation planning, travel demand modeling and network data management. The system is used on all continents for metropolitan, regional, statewide and national planning applications. Designed for multimodal analysis, VISUM integrates all relevant modes of transportation (i.e., car, car passenger, truck, bus, train, pedestrians and bicyclists) into one consistent network model. The solution provides a variety of assignment procedures and 4-stage modeling components which include trip-end based as well as activity based approaches.

VISUM InformationServer enables users to share the model data and evaluations over an organizational intranet or the internet. The access to modeled data requires only an internet browser. VISUM InformationServer can be configured to provide different levels of access for different types of users. Sharing common data between organizations will increase the benefit of transportation models.

Operational Planning

PTV Vision Public Transport completes the circle. Coordination of long-, medium and short-term service and operational planning as well as the return transfer of data and actual arrival and departure times from the operational process: PTV Vision Public Transport provides a unique level of integration and unprecedented array of display, analysis and planning options. The solution enables transportation professionals to make appropriate and transparent decisions, it ensures effective use of financial resources and supports public relations, providing a basis for both agencies and public transport operators.

VISSIM is a microscopic simulation model. It is the most powerful tool available for microscopically simulating multi-modal traffic flows, including cars, trucks, buses, heavy rail, LRT, bicyclists and pedestrians. Its flexible network structure provides the user with the confidence to know they can model nearly any type of geometric configuration or unique operational/driver behavior encountered within the transportation system.

P2 which provides design of signal control settings for isolated and coordinated operation rounds out PTV control to a powerful traffic engineering tool.

Traffic Management

You will find more information on PTV's Traffic Management solutions at www.ptvag.com.

Service

User group meetings

User group meetings are organized regularly, during which new features are discussed and plans for future development are presented.

Training courses

Modern training rooms are at your disposal to get rapidly and efficiently acquainted with our software products. At in-house courses, training content can be adapted to your customer-specific requirements.

Customer magazines and newsletter

We are delivering free of charge the magazine PTV Compass and PTV Vision Newsletter including reports about the development and application of PTV Vision.

Hotline/software-maintenance

For application questions, a personal hotline is available. Our service also includes software maintenance contracts.

Further information:

You will find news regarding our products and services on the Internet at www.ptv-vision.com

PTV Planung Transport Verkehr AG

The PTV Group provides cutting-edge software technology and consulting to enable customers to meet their mobility needs. We help people plan and manage traffic and transportation, provide them with the latest traffic reports and assist them in optimising their long-term resource allocation. Since 1979, our independent corporate group has been a leading provider of products and solutions for travel, traffic and transportation planning.

Strong international demand has fuelled dynamic growth:

We currently have over 700 employees worldwide crafting innovative solutions for our customers. Our Karlsruhe headquarters acts as a development and innovation centre with tight links to research and educational institutions. We additionally maintain shareholdings and subsidiaries in Germany, Europe and every continent in the world.

In the Traffic, Mobility and Logistics business fields, our PTV technology forms the foundation of a host of brand-name products and our own leading map&guide and PTV Vision product lines.

The Traffic business field focuses on optimising our road and rail transportation systems. PTV offers high-quality services to public transit authorities, transportation services and associations and private and public operating companies. Our customers include planning offices and transport companies all over the world. Over 1500 organisations optimally plan and utilise traffic infrastructures with minimal environmental impact thanks to the world's leading software solution: PTV Vision and its VISUM module for traffic planning and VISSIM for traffic simulation.

Innovative software solutions and map technologies are the Mobility business field's stock-in-trade. Its know-how drives a wide range of GPS-based telematics applications, geographic Internet applications and route planning tools. And its extensive experience in onboard and online navigation is second to none in the field.

The Logistics business field specialises in software products and components for the entire logistics chain. Its product portfolio ranges from structural territory analysis and route planning to fleet management and controlling. Its professional route planning software products for transport businesses are developed and sold throughout Europe under the map&guide brand name. This extensive range of logistics solutions also includes geomangement systems for sales management and sales force control.



With Compliments

Benefit from PTV Vision®

Benefit from PTV Vision®, the worldwide leading software suite for transportation planning and traffic engineering. The high level of integration within the overall transportation planning process and, in particular, between strategic planning, transport operations and traffic engineering will convince you of the benefits.

Discover:

- ▶ Scalable and automated solutions, which grow with the requirements.
- ▶ A sound, documented data model and proven calculation methods result in a comprehensive multi-modal approach.

- ▶ Open interfaces for integration with other systems, to databases, popular GIS programs reports and open source software
- ▶ A user-friendly map based interface with flexible, efficient dialogues
- ▶ Seamless transition from macroscopic to microscopic simulation as well as from strategic to operational planning
- ▶ A GIS-based system where the geometry is always present
- ▶ New algorithms thanks to the close relationship with renowned academic and research institutions

- ▶ The useful connection to traffic management and other navigation and logistics applications
- ▶ A strong development team, which guarantees powerful software now and into the future!
- ▶ All from one source

Our aim is your success – you can rely on us. We are in a continuous dialogue with over 1,500 clients in more than 80 countries regarding the further development of our software.

Do not hesitate to contact us. We look forward to working with you!



PTV AG
Business field Traffic
Stumpfstr. 1
76131 Karlsruhe
Germany

Phone: +49 721 9651-300
Fax: +49 721 9651-562
E-mail: info.vision@ptv.de
www.ptv-vision.com
www.ptvag.com