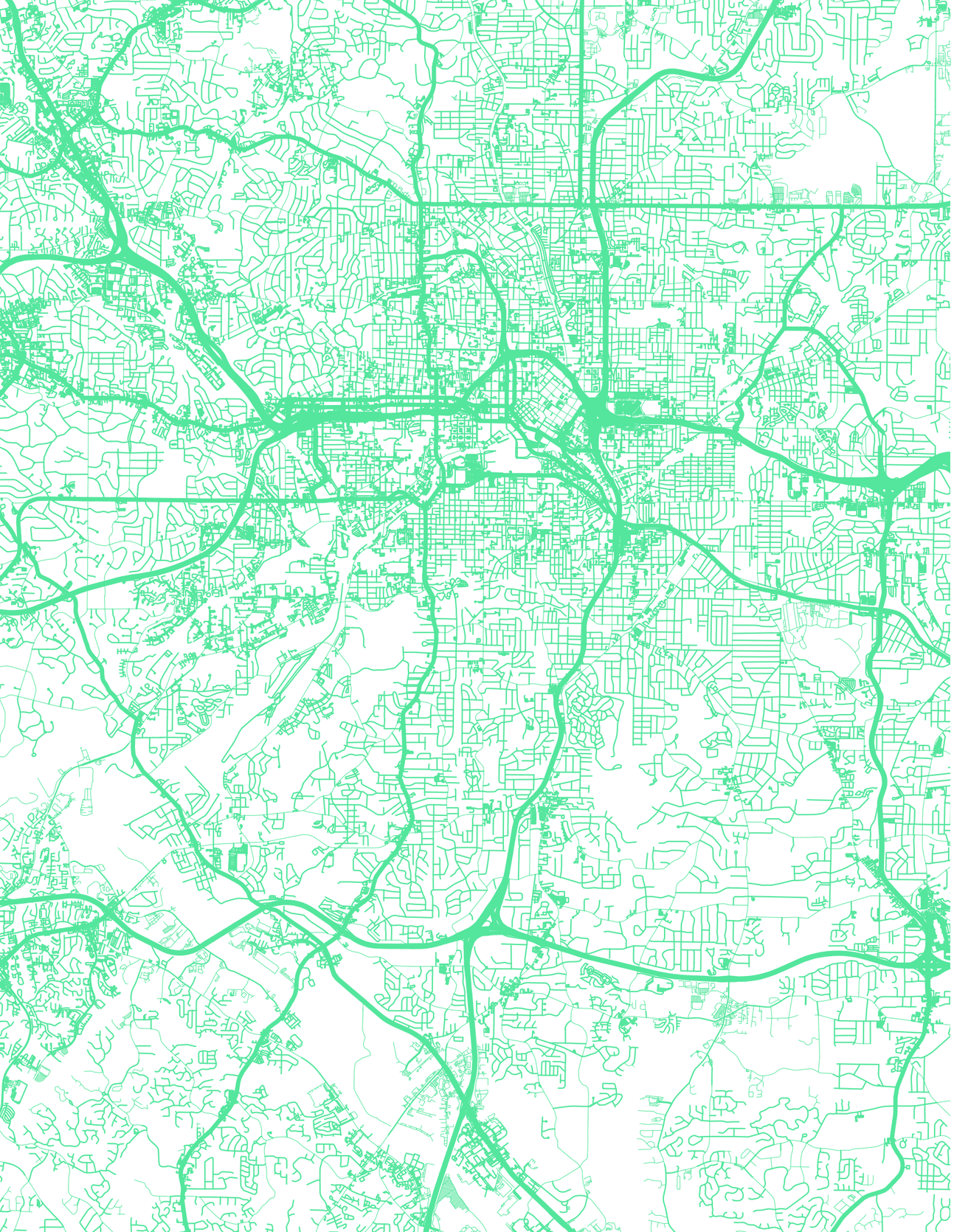
The quick e-Guide to

Smart Mobility Solutions

For transportation planners
and city officials

PTV GROUP
part of Umovity



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Introduction

Meeting urban mobility challenges with smart solutions

Despite huge technological advances, the age-old challenges of urban mobility persist. Cities around the world are grappling with issues that hinder their growth, sustainability, and quality of life:

Congestion: As urbanization continues, increased vehicle traffic leads to inefficient commutes, wasted time, and increased stress for residents.

Environmental toll: High emissions accelerate climate change, while the lack of safe, inclusive infrastructure for cyclists and pedestrians discourages greener, healthier travel options.

Many urban areas also face inadequate or non-existent public transportation systems, leaving significant portions of the population to rely on private vehicles, which in turn contributes to the above challenges.

Accessibility is a crucial concern, especially for vulnerable groups like the elderly, people with disabilities, and those in suburban or rural areas. Their needs must be considered when planning transportation measures and infrastructure. Diverse passenger groups, including commuters, tourists, families, and young people, also have varying mobility needs.

Road safety remains an ever-present concern, with preventable accidents and fatalities affecting communities worldwide.

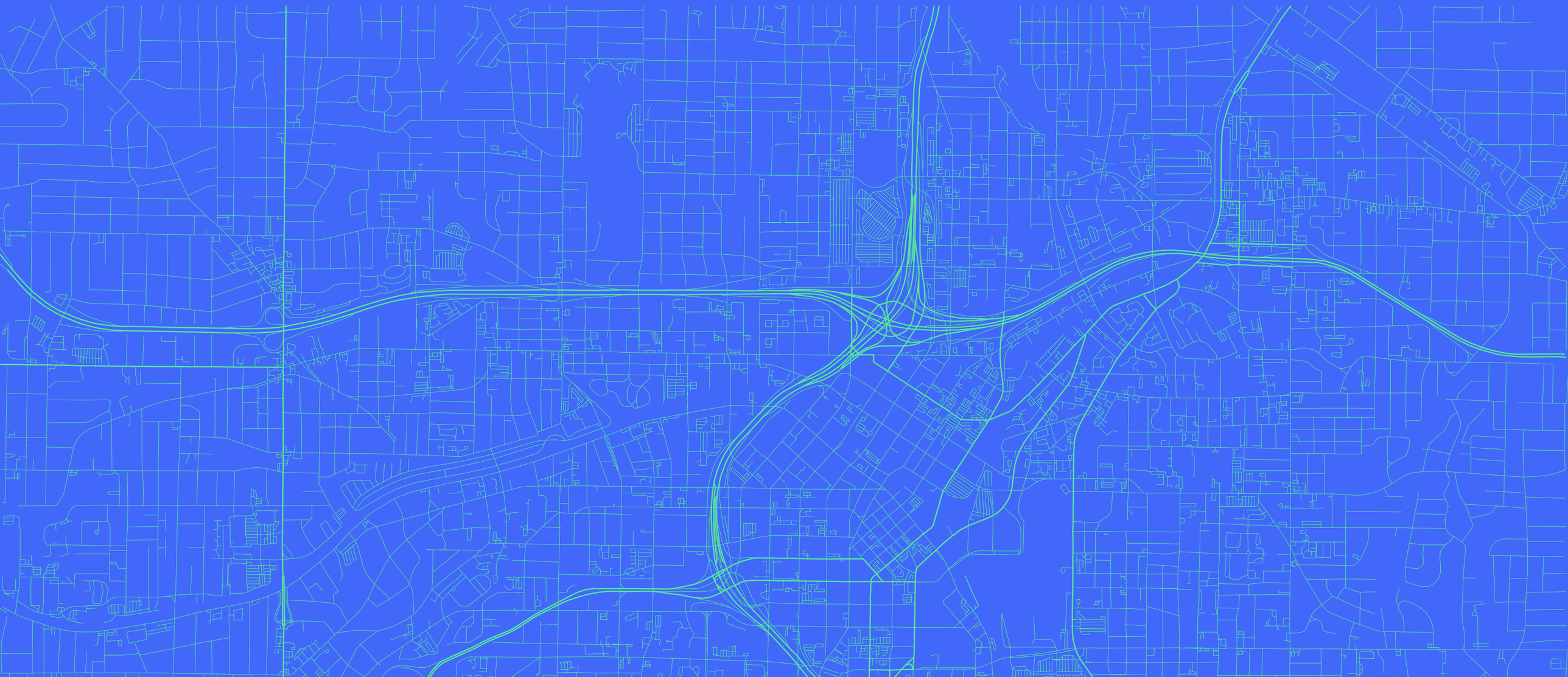
The good news is that smart technology solutions provide cities with powerful tools to address these persistent problems. Advanced technologies such as traffic modeling and simulation, AI-driven traffic management, and integrated mobility platforms empower city officials and planners to make data-driven decisions.

These mobility tools enable smarter approaches to reducing congestion, lowering emissions, improving accessibility, and enhancing road safety. By leveraging these innovations, city officials can design more inclusive infrastructure, optimize public transportation networks, and create sustainable, people-centered cities.

This white paper explores how smart mobility solutions are transforming transportation systems and helping cities prepare for a more resilient and connected future.

02

Smart Car Traffic



Smart Car Traffic

Understanding and managing traffic

Effectively addressing the challenges of vehicle traffic requires a deep understanding of how vehicles move through urban networks. Advanced modeling and simulation tools provide city planners and decision makers with the ability to analyze past, present, and future traffic scenarios.

These tools provide insights that enable cities to evaluate different transportation solutions to see their impact on urban mobility challenges. They can then make informed decisions to optimize road networks and improve mobility before committing financial resources to large-scale infrastructure projects.

Simulation and planning software

Transportation planning software tools, for example PTV Visum, help cities evaluate entire road networks and forecast traffic patterns by looking at a holistic, multimodal transportation system. Planners looking for detailed analyses at the microscopic level can use simulation software such as PTV Vissim. The latter model individual driver behavior and interactions with all modes of transportation for highly detailed analysis.

These tools enable cities to simulate and predict the impact of proposed interventions - whether adjusting traffic signals, redesigning intersections, or introducing new mobility solutions - to ensure that resources are used effectively.

Across the globe, cities are leveraging these tools to achieve remarkable results. In the following pages are some examples.

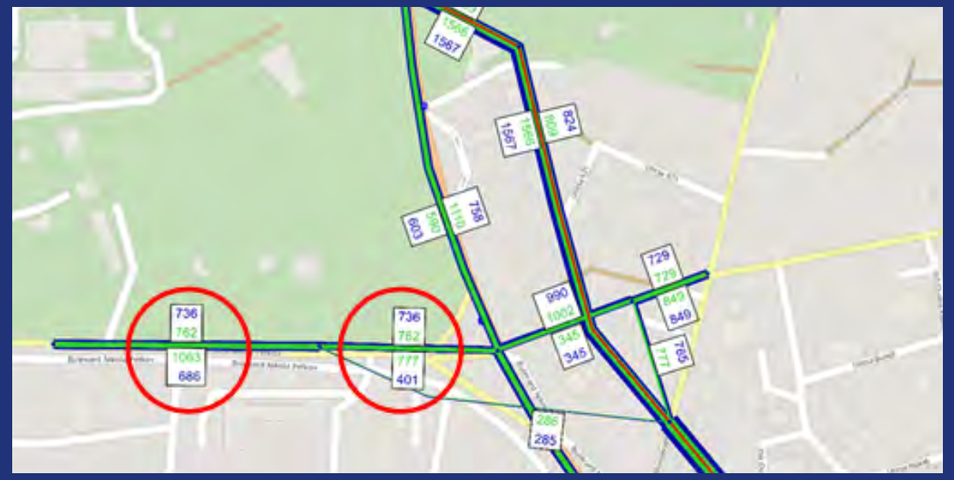
PTV Visum Expert 2025

CASE STUDY

Infrastructure design with PTV Visum: Optimizing Sofia’s ring road

Sofia, Bulgaria, faces traffic and urban growth challenges, necessitating updates to its road infrastructure. A key project, the Sofia Ring Road, aims to facilitate city and transit traffic. With 85% of the ring road completed, the Bulgarian Road Infrastructure Agency initiated feasibility studies for the final 8 kilometers. Infra City Consult Ltd., a Sofia-based consultancy, utilized PTV Visum, a leading transport modeling software, to guide design decisions.

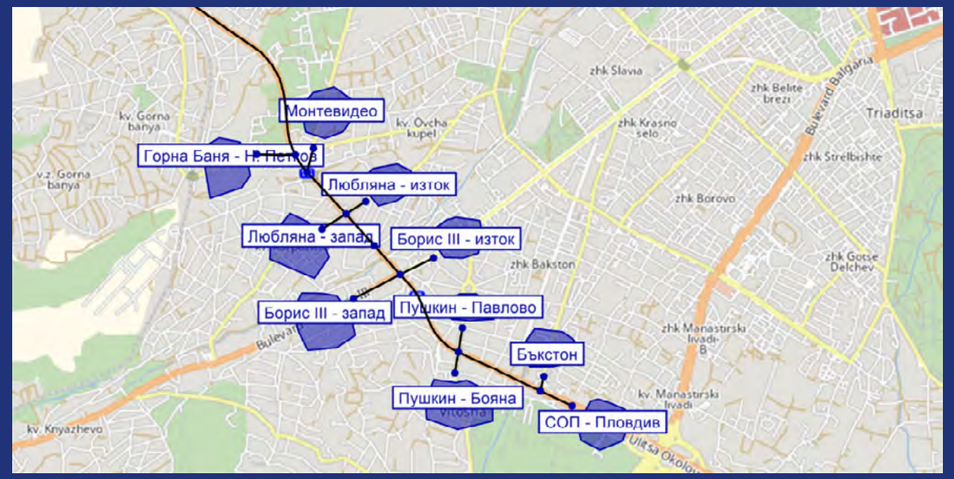
PTV Visum integrates traffic counts, socio-economic indicators, and video footage to simulate transportation scenarios. For Sofia, a transport model was created despite limited data. Traffic counts from 10 junctions and deep-learning-processed video footage formed a 15-zone origin-destination (OD) matrix. The software’s TFlowFuzzy module refined the matrix, ensuring accuracy. Model validation using a GEH statistic of 1.3 and an R^2 of 0.99 confirmed its reliability.



A model created with PTV Visum showing how traffic is affected when the road is completed

Forecasts extended to 2030, factoring in population growth and infrastructure plans. PTV Visum compared design scenarios, such as one-way links and varying volumes, helping the client select optimal configurations for traffic flow.

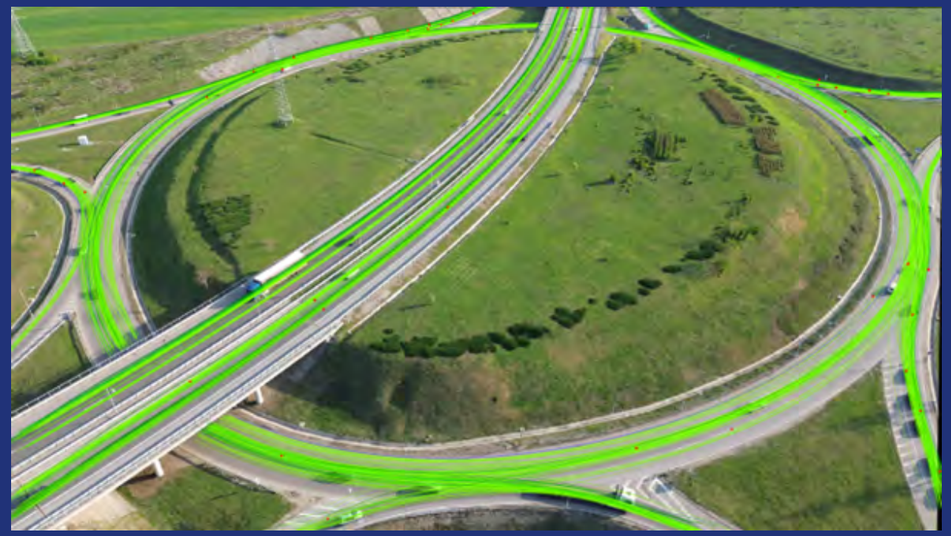
Key interchanges, like where the ring road meets the A3 highway, posed challenges. PTV Vissim, a microscopic traffic modeling tool, evaluated four design scenarios, including grade-separated links. These simulations revealed the best options for reducing congestion and enhancing safety.



The traffic analysis zones in PTV Visum

Despite challenges like limited traffic models, insufficient camera data, and budget constraints, PTV Visum enabled comprehensive analyses. The study provided insights into lane configurations, interchange designs, and traffic distribution. By optimizing the remaining section of the Sofia Ring Road, the project improved city connectivity and transit efficiency.

PTV Visum and Vissim's advanced modeling capabilities allowed the team to overcome data limitations, delivering a study with lasting impact. The project showcases PTV software's role in addressing urban mobility challenges, benefiting Sofia's residents and transit systems.



Movement trajectories at one of the counting locations

Konstantin Yovchev,
Managing Director at Infra City Consult, Bulgaria

"With accurate traffic forecasts, validated models, and scenario comparisons, the agency was able to plan road capacity, design efficient interchanges, and optimize traffic flow for years to come."

Infra City Consult

Modeling the Philippines' unique modes and energetic urban streets

The Philippines is renowned for its diverse transportation modes, which play a crucial role in connecting millions of Filipinos to social and economic opportunities. By leveraging tools like PTV Vissim, transportation planners can simulate these systems to analyze their impact on traffic flow and enhance mobility in the country's dynamic urban areas.

Accurately modeling these modes is essential for understanding their intricacies and crafting effective traffic solutions. By incorporating the unique characteristics of local transportation, planners can design efficient, inclusive, and sustainable systems, improving mobility in the country's bustling cities.

For example, **Jeepneys**, the colorful vehicles that are vital public utility vehicles (PUVs). Renowned for their flexibility, jeepneys pick up and drop off passengers along their route. While this spontaneity benefits riders, it often contributes to traffic congestion. Simulating jeepneys in PTV Vissim enables planners to analyze their behavior and explore strategies to improve efficiency. This includes optimizing routes, establishing designated stops, and minimizing disruptions to overall traffic flow.

Tricycles, three-wheeled motorcycles with sidecar attachments, are another prominent mode of transportation. These vehicles excel in short-distance travel and navigating narrow streets. In PTV Vissim, tricycles can be modeled as either private vehicles with end-to-end routes or public transport with designated stops, depending on their specific use in a locality.

Motorcycles are particularly adept at navigating the country's congested urban areas. Motorcycles utilize their small size and agility to practice lane filtering and splitting, where they weave between lanes of stationary or slow-moving traffic. PTV Vissim's flexible driving dynamics allow planners to simulate this behavior by removing lateral constraints within lanes and enabling overtaking within a single lane. This ensures accurate representation of motorcycles' movement patterns, essential for creating realistic traffic models in Philippine cities.

Improving **Traffic Management**: The Philippines' urban traffic is characterized by its diversity and complexity. PTV Vissim provides a powerful platform for modeling these interactions. By incorporating unique transportation modes like jeepneys, tricycles, and motorcycles, planners gain valuable insights into traffic flow patterns. This facilitates identifying bottlenecks, optimizing infrastructure, and developing tailored solutions to enhance mobility. These simulations also aid in developing sustainable traffic strategies that reduce congestion and improve urban connectivity.

Abigail Viray,
Civil Engineer and
Environmental Planner

"By modeling and integrating these distinctive modes and their behaviors within PTV Vissim, we can create realistic traffic simulations that acknowledge their significant impact on traffic flow and mobility."

SMDI Consultants, Inc.

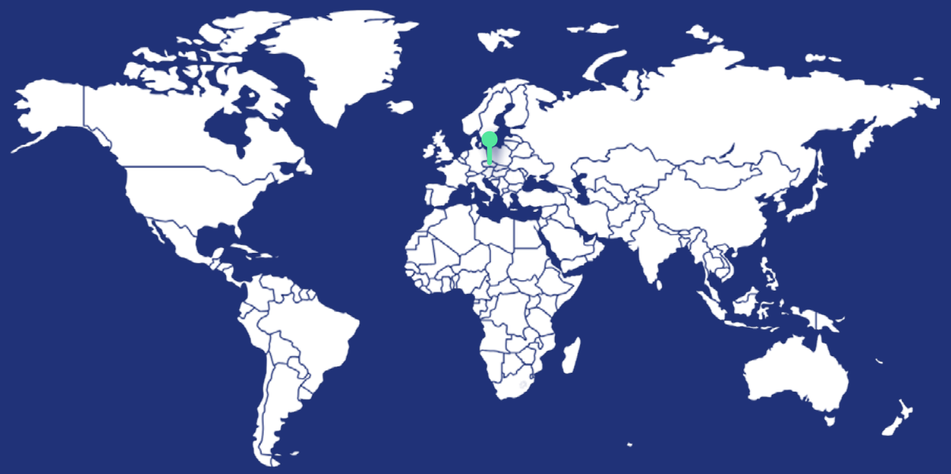
Traffic management software

For real-time traffic management and forecasting, software such as PTV Optima provide dynamic traffic forecasts, while simpler tools, like PTV Flows, help manage traffic without huge investments in infrastructure and training.

With these tools, smart traffic management is no longer reactive. By harnessing the power of predictive tools, cities can anticipate challenges, test solutions in a virtual environment, and create safer, more efficient roads for all users.

In the following pages are some examples of effective traffic management with software tools.

CASE STUDY



PTV Optima provides real-time speed calculation for entire Czech road network

The Road and Motorway Directorate of the Czech Republic (RSD CR) operates under the Ministry of Transportation and is tasked with maintaining the nation’s highways and first-class roads. In this project, the main challenge was to obtain real-time information about the traffic situation on all roads which belong to traffic message channel (TMC) segments. Another task was to calculate near real-time turn ratios at intersections.

RSD CR chose to rely on PTV Optima, the real-time traffic management software by PTV Group. In this project, its main function was to calculate speed and turn ratios by using raw floating car data (FCDs) that is received from fleets of private companies.

ŘSD ČR
ŘEDITELSTVÍ SILNIC A DÁLNIC ČR

PTV Optima was deployed in cooperation with traffic data provider Inrix, which collects FCDs from different sources; and with transportation solutions provider VARS, builder of the customer’s GUI, which is now fed with data calculated by PTV Optima.

This project was finalized and delivered in April 2019, as a module of the Czech National Traffic Information Center (NTIC). It is operating and maintained ever since.

PTV Optima was chosen for this project because it can process data from all sorts of providers. Data can be fed from any source - local company fleet, delivery fleet, intersection beacons, and even commercial providers like TomTom or HERE.

Another reason for choosing PTV Optima was its scalability and ability to be customized according to the customer´s requirements. Currently, the PTV Optima system processes FCDs from up to 150,000 vehicles in one-minute tact. The system can always be scaled up to process an even bigger amount of data.

The data provided by PTV Optima is now used by NTIC operators. It is a prerequisite for a real-time traffic forecasting model, which is intended to be the next extension of the NTIC.

CASE STUDY

York integrates UK's first city-wide real-time transport model with PTV Optima

PTV Optima, the software for predictive traffic modelling, has been successfully deployed in the City of York. This is the first real-time transport model to be used for live traffic management in Britain.

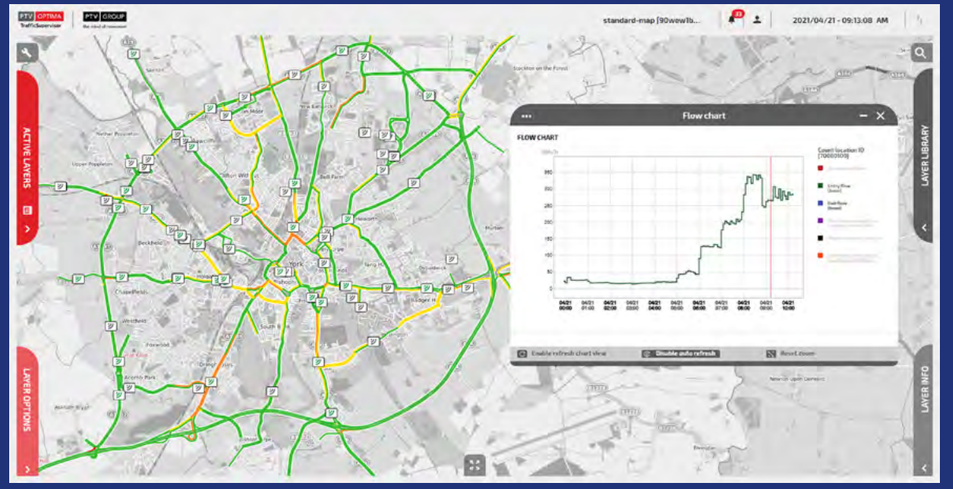
The project is part of York's government-funded Smarter Travel Evolution Program, or STEP. It is led by City of York Council and consultancy firm Wood Group, and in partnership with PTV Group and modelling experts RelativeGAP.

Historically, York managed its live transport network by staff monitoring CCTV and social media feeds, and manually implementing new plans and signal changes. With PTV Optima installed in the control room, operators now adopt a more pro-active approach in monitoring and influencing the network.

York's PTV Optima real-time model is a rolling live prediction of traffic conditions across the city. It combines offline dynamic transport models with live traffic data to provide the control room with a network-wide forecast of current and forecast congestion.

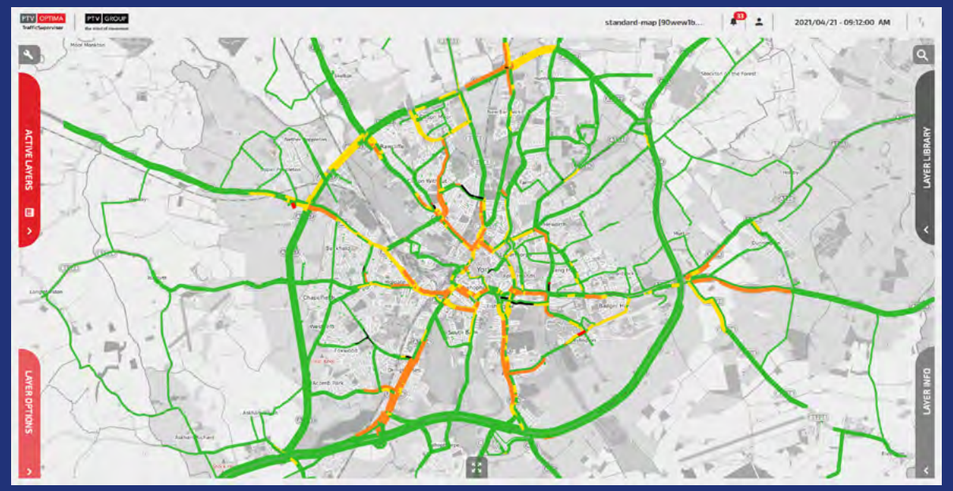
The model is integrated with over 100 live traffic flow sensors, 100+ live signal controllers, live speed data across the network provided by TomTom, and up-to-date information about roadworks and other network changes.

The live model combines all this data into a single view and a single ground truth. The control room uses this information to see in good detail what is happening across the whole network, and not only in those locations with sensors or CCTV.



PTV Optima also allows the control room to test alternative scenarios for the next hour ahead, next day, or weeks in the future. The city therefore has an operational road modelling asset for monitoring current conditions, planning for the near future, observing how plans play out, and using this knowledge to improve future strategies.

The new strategy and real-time transport model will be actively maintained for at least the next six years – with many possibilities of expansion.



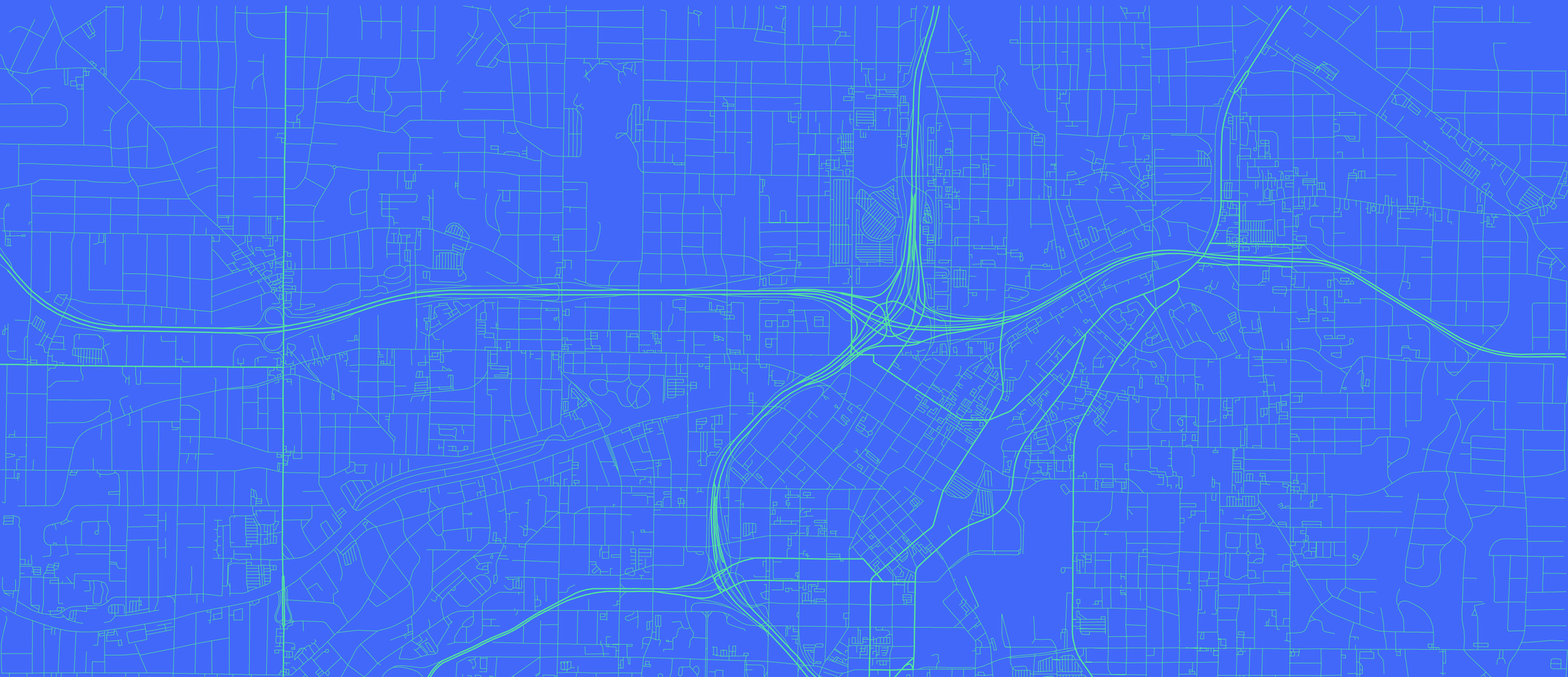
"We're able to predict future traffic levels based on our live traffic behavior and manage the flow of traffic better in busy periods by adjusting traffic lights to best suit traffic conditions."

James Guilliatt,
Transport Project Manager,
City of York Council

CITY OF YORK COUNCIL

03

Smart Public Transport



Smart Public Transport

Planning and optimizing public transportation with smart tools

Efficient public transportation is the backbone of sustainable urban mobility, helping cities reduce congestion, cut emissions, and ensure equitable access to opportunities. However, planning and optimizing these systems is a complex and often costly challenge. Smart software tools can support cities in designing effective networks, predicting demand, and seamlessly integrating different modes of transport.

The quality and attractiveness of public transport rely on incremental improvements: enhanced passenger comfort compared to driving, shorter transfer times, and government subsidies to mitigate rising energy costs. Operators can identify these improvements by using software to analyze various scenarios.

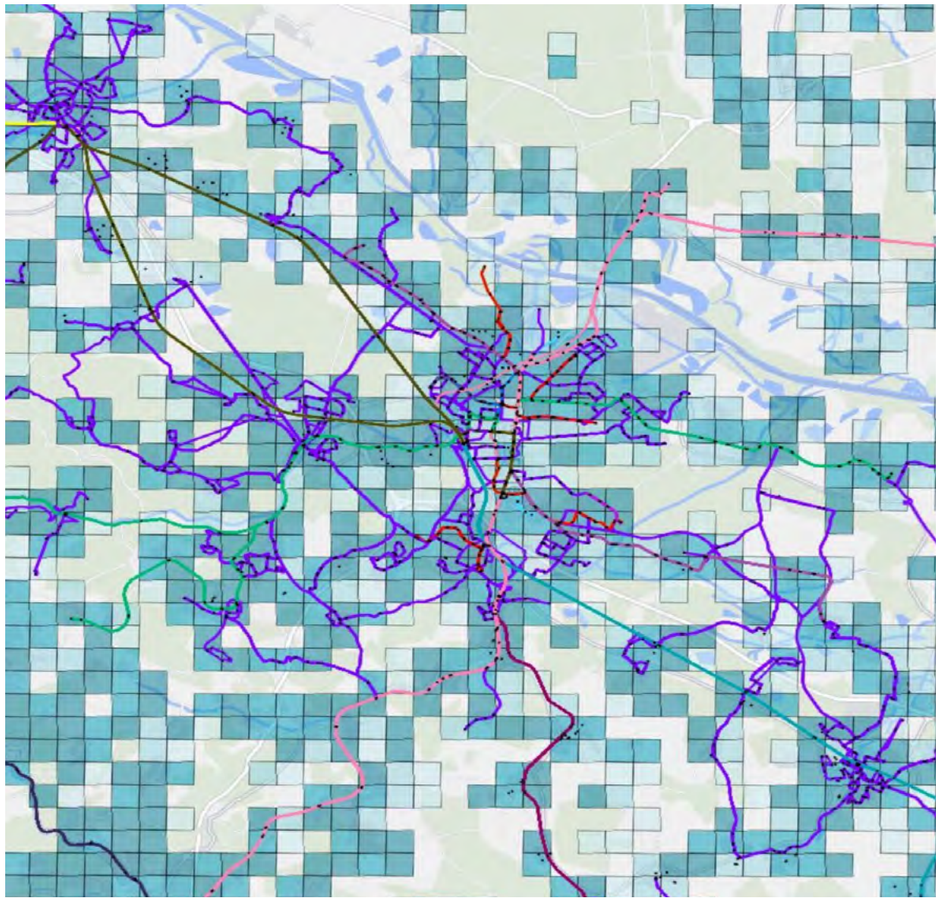
Such tools enable cities to make informed, data-driven decisions. Whether introducing new transit lines, reallocating resources, or integrating alternative modes like Bus Rapid Transit (BRT) or on-demand shuttles, decision-makers can simulate changes and evaluate their impact before implementation.

As urban areas grow and mobility demands evolve, smart public transportation planning ensures investments align with long-term goals, fostering systems that are efficient, accessible, and environmentally friendly. Additionally, these tools enhance communication with stakeholders, using data visualization to clearly present the pros and cons of different approaches, thereby reducing tensions and building consensus.

Macroscopic simulations

The way to address these challenges is often with comprehensive planning tools that enable cities to model entire transportation networks, including public transit. With tools like PTV Visum, experts can analyze their performance and test scenarios to improve operations. With the ability to forecast demand and simulate passenger flows, planners can identify service gaps and optimize routes, schedules and frequencies.

Let’s review some examples from around the world.



Bus service plan in PTV Lines

Modeling a walk-friendly hub station for Tel Aviv metro

The Yoseftal Holon hub station, part of Tel Aviv's future metro project, serves as a focal point for improving pedestrian flow and safety. This metro system, spanning 150 kilometers with 109 stations, is among the world's largest infrastructure projects. The M3 line will intersect with the M1 line at Yoseftal, where 15,600 passengers are expected during peak morning hours. To optimize pedestrian movement, Mahod Engineering Ltd. and partners developed a detailed model using PTV Vissim/Viswalk.

Elements of the Vissim model as built, juxtaposed to the DWG file

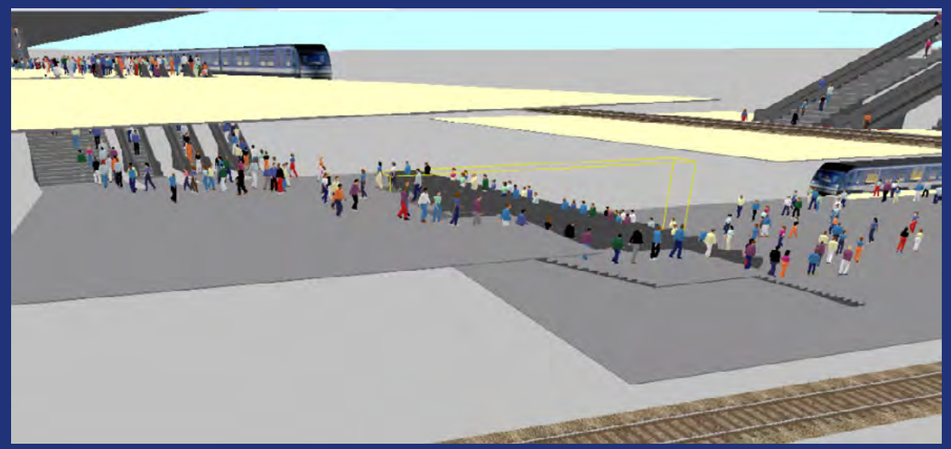
The simulation focuses on managing passenger distribution: 5,400 passengers entering from street-level and 10,200 alighting from trains. These passengers either exit the station or transfer to another platform. The modeling process leveraged BIM 3D representations to construct the station's multi-level layout and refine flow paths. Micro-simulation pinpointed bottlenecks and guided improvements, ensuring efficient escalator usage and optimal wayfinding signal placement.

3D representation of the Yoseftal Holon station made with BIM

To simulate realistic pedestrian behavior, designers employed innovative techniques such as invisible routing areas and strategically placed obstacles - like kiosks or plant vases - to prevent undesired shortcuts. Simulations ran 140 iterations, analyzing specific elements like escalators, staircases, and gates. The findings revealed that groups of three parallel staircases work best when two ascend and one descends. Placement and direction of staircases and escalators were further optimized to reduce conflicts.

Results demonstrated the importance of even minor adjustments to enhance usability and safety. By aligning carriages with access points and deploying dynamic digital signals, the station can guide passengers efficiently during peak hours. This integrated approach improves navigation, reduces congestion, and enhances the travel experience. Ultimately, the project underscores how early-stage modeling and precise refinements can transform complex transit hubs into user-friendly, walkable spaces.

The two pictures above show a common pedestrian (mis)behavior, and how the obstacles help to avoid it on Viswalk. In real life, these added obstacles could become kiosks, handrails, stanchions and plant vases



The shortest path between both platforms: in these cases, the passengers on relevant routes could be instructed to use the wagons at the edges of the trains in order to shorten their walk.

“In a modeling project, we analyzed pedestrian flows throughout the station to improve overall usability and safety.”

Noam Goldstein, Transportation Planner and Modeler, Mahod Engineering Ltd.

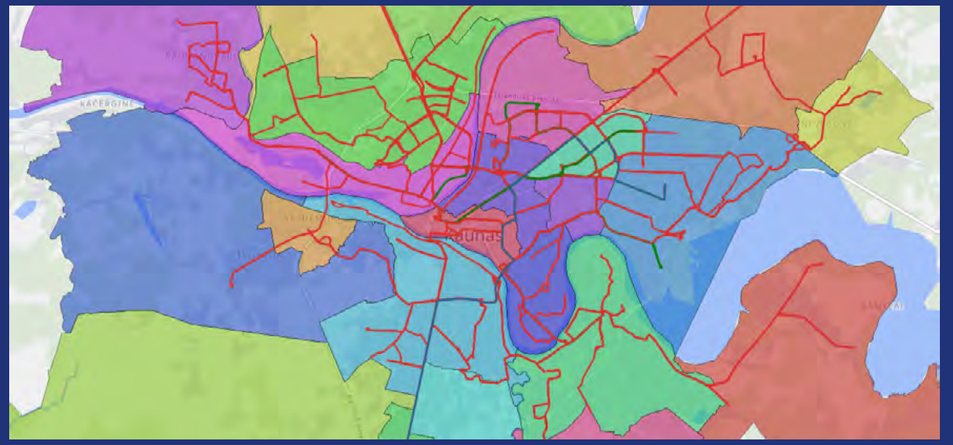
MAHOD ENGINEERING LTD

CASE STUDY

Smart solutions to increase public transport usage

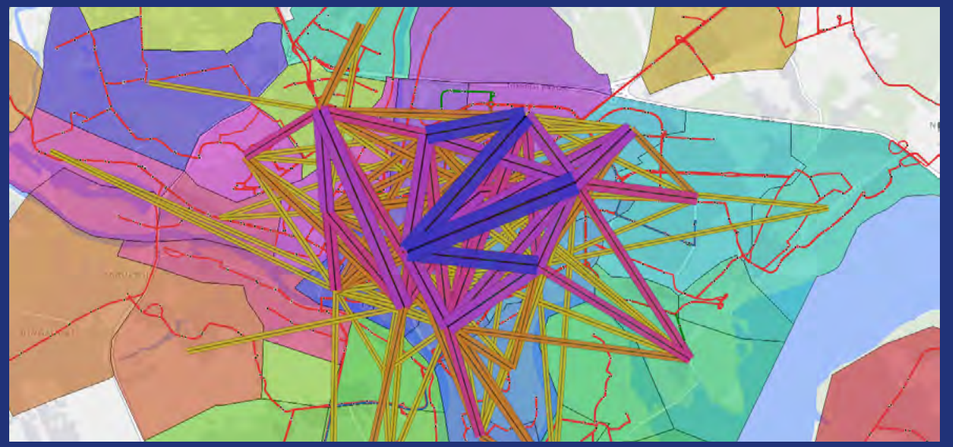
Some cities and transit agencies lack the resources for comprehensive transportation planning tools. Lighter software solutions designed for specific use cases can help. PTV Lines, for example, supports the design and refinement of public transport routes and schedules without costly investments in infrastructure and staff training. This tool helps operators analyze cost-effectiveness and balance service quality with financial sustainability.

Take for example Kaunas, Lithuania's second-largest city. It faces significant public transport challenges due to changing demographics and increased car usage, causing congestion and reduced public transit ridership. The city's operator, Kauno Autobusai, sought to revitalize public transport and address environmental concerns by utilizing PTV Lines, a cloud-based public transport planning software.



A simplified map of bus and trolley lines serving Kaunas

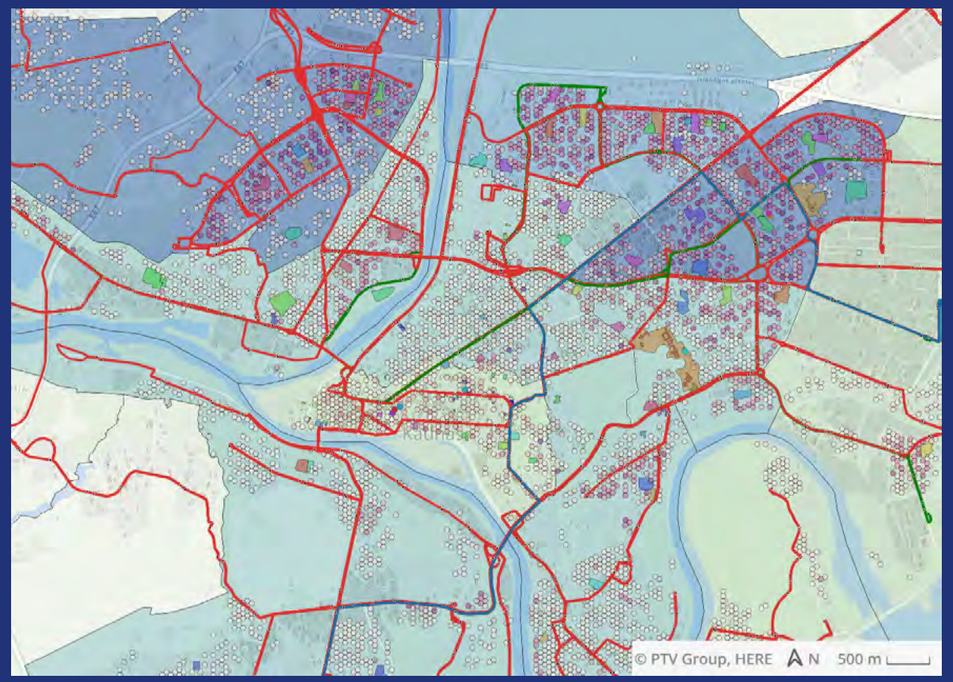
Kaunas's population decreased from 420,000 to 320,000 over three decades, while suburban areas grew significantly. This shift disrupted the city's transportation dynamics, exacerbating congestion and making public transport less appealing. Despite modernizing its bus and trolleybus fleet, the city struggled to attract residents back to public transport.



An OD Matrix of Kaunas, created with PTV Lines software

PTV Lines enabled Kauno Autobusai to digitally model the public transport network, analyze commuter data, and understand the origin-destination (OD) matrix to optimize routes and services. The software helped identify inefficiencies, such as overlapping routes in the city center, where up to 20 lines converge, causing inconsistent service frequencies. This issue was mitigated by tracking and addressing these overlaps with PTV Lines.

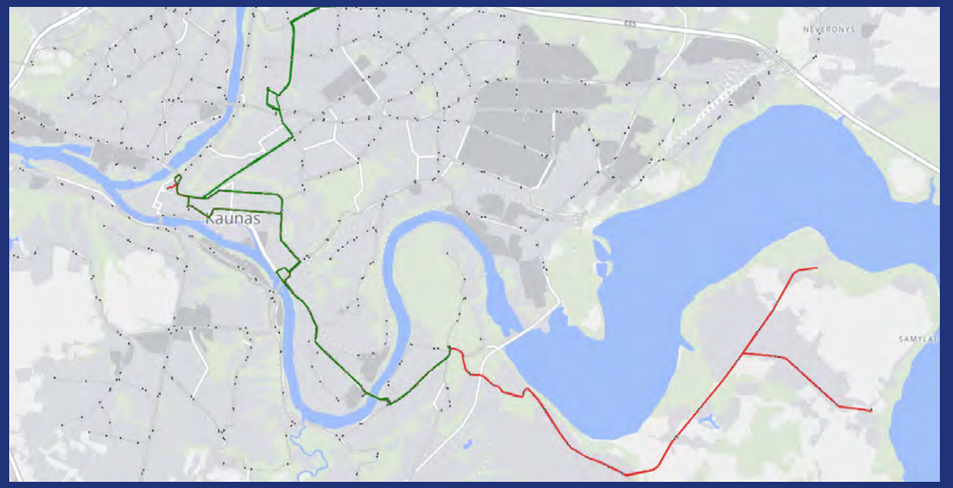
A case study involving trolleybus line 1 and bus line 46 exemplifies the tool's utility. Both routes overlapped significantly, leading to redundancy. PTV Lines allowed planners to simulate alternative scenarios and choose a solution that minimized overlap, improved service efficiency, and optimized resources. Line 46 was rerouted to reduce duplication, and its savings were used to adjust line 1's timetable, offering better service to passengers.



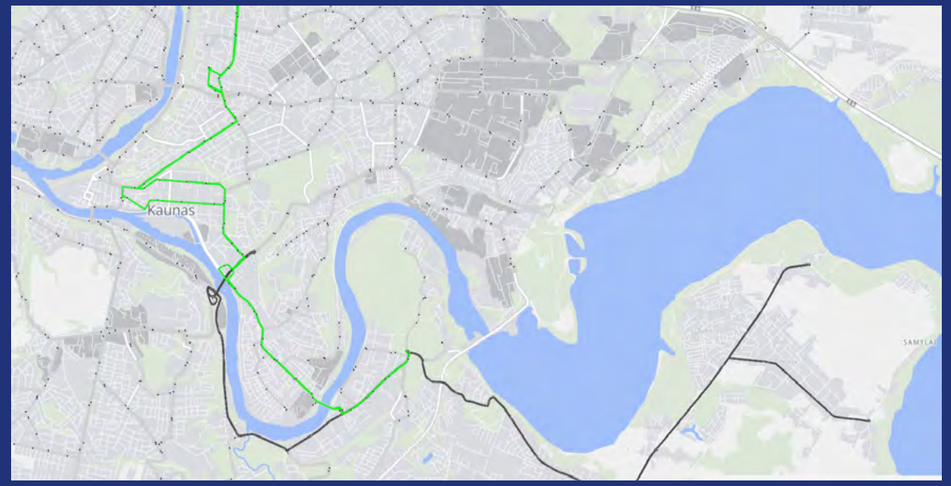
Overlapping bus routes in the center of Kaunas

A case study involving trolleybus line 1 and bus line 46 exemplifies the tool's utility. Both routes overlapped significantly, leading to redundancy. PTV Lines allowed planners to simulate alternative scenarios and choose a solution that minimized overlap, improved service efficiency, and optimized resources. Line 46 was rerouted to reduce duplication, and its savings were used to adjust line 1's timetable, offering better service to passengers.

The previous routes of line 46 passing through Panemune and the city center



The previous routes of line 46 and 1 demonstrating how they overlap



The new routes of line 1 and 46, after PTV Lines was used

Currently, Kaunas is in an adjustment phase, with infrastructure planning in the Panemunė district and ongoing efforts to refine the city's route scheme. The success of PTV Lines demonstrates how advanced planning tools can revitalize urban transit systems, offering actionable insights and efficient solutions to attract more riders.

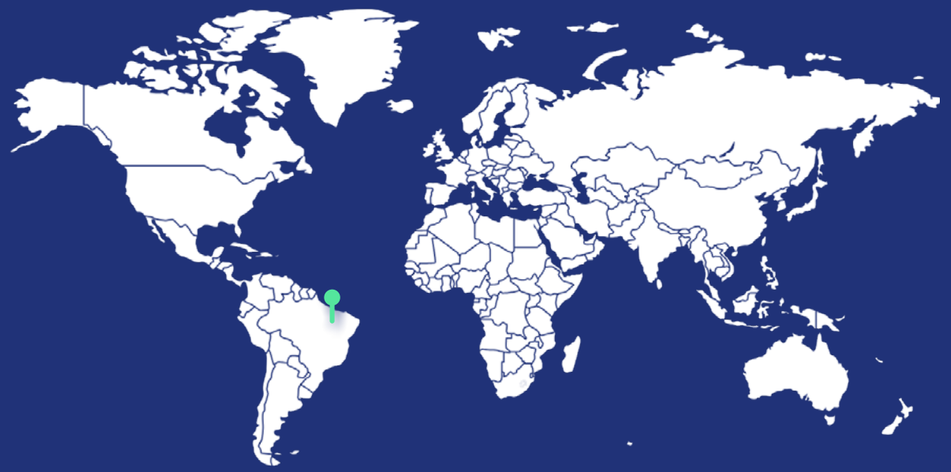
PTV Lines has proven to be a powerful tool for addressing declining ridership, supporting data-driven decisions, and fostering a more commuter-friendly transport network. This project highlights the potential of integrating technology into urban transport planning to enhance efficiency and sustainability.

Simonas Čižauskas,
Public Transport Data
Analyst, Kauno Autobusai

"This example illustrates how quickly we can simulate multiple scenarios with PTV Lines and get an accurate mileage calculation."

KAUNO AUTOBUSAI

CASE STUDY



Microscopic simulations

For micro-modeling of specific public transport locations, tools such as PTV Vissim can be used. Here's an example from Brasilia's Plano Piloto Bus Terminal. The terminal, a key multimodal transportation hub, underwent a comprehensive simulation-driven optimization led by Engimind, a Portuguese-Brazilian consultancy. Using PTV Vissim software, the project aimed to enhance the terminal's operations, focusing on its geometry, pedestrian flows, and vehicle movements to better accommodate the city's BRT (Bus Rapid Transit) system.

Screenshot from PTV Vissim model: Rodoviaria do Plano Piloto interface - East view

Launched in 2014, the BRT system connects Brasilia's central region to outlying administrative areas like Gama and Santa Maria. Its integration into the Plano Piloto terminal necessitated a re-evaluation of infrastructure and operational layouts to efficiently serve increased passenger volumes.

Engimind utilized PTV Vissim's advanced tools, including its public transport module and the pedestrian simulation feature, PTV Viswalk. These enabled precise analysis of pedestrian and vehicle dynamics, highlighting bottlenecks and inefficiencies. Simulations examined circulation areas, access points, and waiting zones to recommend improvements that optimized geometry and enhanced overall system functionality.

Screenshot from PTV Vissim model: Rodoviaria do Plano Piloto interface – South view

The simulation outcomes directly informed key design changes, such as reallocating terminal areas for BRT operations, ensuring sufficient space for pedestrian flow and waiting, and reconfiguring boarding and alighting zones for safety and efficiency. These measures significantly improved traffic management and enhanced the passenger experience.

PTV Vissim also facilitated exploration of hypothetical scenarios and alternative designs, empowering planners to test solutions before implementation. The project demonstrated the software's capability to replicate real-world conditions while anticipating future challenges.

This case underscores the transformative potential of simulation tools like PTV Vissim in urban mobility projects. From improving bus terminals to redesigning intersections and expanding transit networks, such software equips urban planners with data-driven insights to create safer, more efficient transportation systems that adapt to evolving demands. The success of Brasilia's BRT terminal optimization exemplifies the pivotal role of simulation in driving impactful changes in public transport infrastructure.

Color scheme map: average speed for links

André Remédio,
Manager and Owner,
Engimind Consultores

"By harnessing the power of data-driven insights and predictive modeling, we can build transportation systems that meet today's needs – and anticipate tomorrow's challenges."

ENGIMIND
Mobility and Transport Consultants

04

Mobility Planning for better Accessibility

Mobility planning for better accessibility

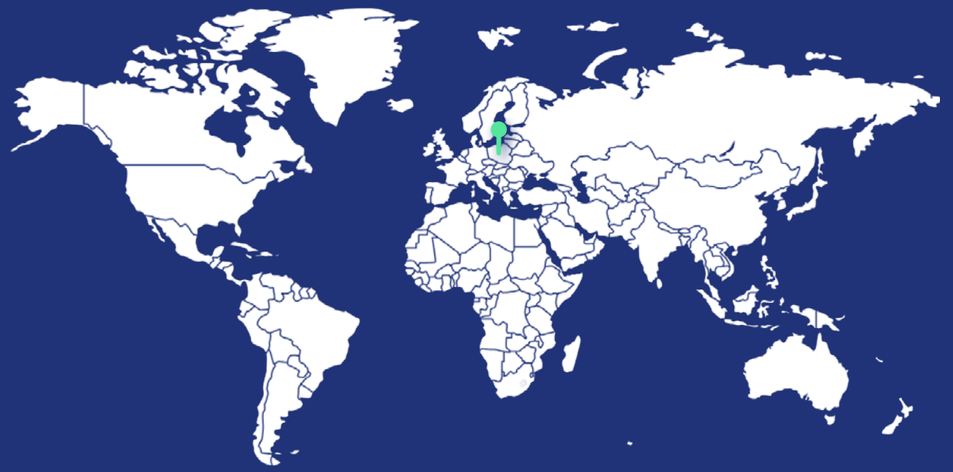
Unlocking tools for smarter planning

Mobility planning today extends beyond merely improving traffic flow; instead, it focuses on creating cities that are safer, greener, and more livable. With the global emphasis on sustainability, there is a strong focus on reducing emissions, promoting active transport modes like walking and cycling, and ensuring the safety of all road users.

To achieve these goals, planners must adopt a balanced approach to the triple bottom line, which involves maximizing social, environmental, and economic benefits for citizens. This often requires a deep understanding of complex data alongside the use of advanced transport modeling tools that support informed decision-making.

In this context, cities have significant opportunities to become more sustainable and livable. For example, by expanding public transport networks, transitioning to electric vehicle fleets, and creating integrated, multimodal, and demand-responsive systems, they can address various urban challenges. Advanced modeling tools play a pivotal role in this process by helping planners and operators make strategic decisions about critical elements such as fleet management, hub placement, regulatory frameworks, and operational efficiency.

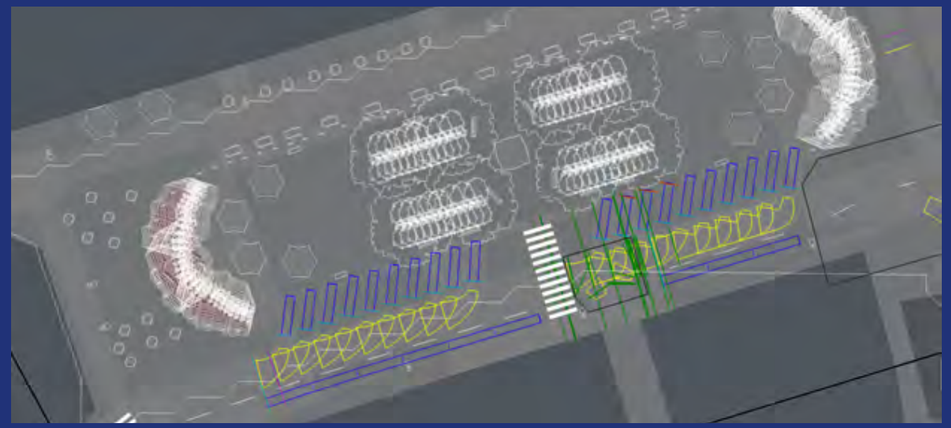
CASE STUDY



Traffic simulations help revive historic city center

Nakło nad Notecią, a historic town in northern Poland, faced persistent traffic congestion in its city center despite the introduction of a bypass in 2015. This congestion adversely impacted residents' quality of life and the town's appeal as a tourist destination. To address these issues, Nakło leveraged PTV Vissim software for advanced microsimulation as part of its 2021 Sustainable Urban Mobility Plan (SUMP), aimed at enhancing urban mobility and preserving the town's heritage.

Map of Nakło, including the town center and southeast bypass section.



A wireframe view of the historical square area, created in PTV Vissim

The project involved collaboration among Nakło's municipality, consulting firms TOR and Modelab, and PTV Group. Consultants developed strategic frameworks, while PTV Vissim and complementary tools like PTV Viswalk provided technical expertise for scenario analysis and pedestrian behavior modeling. Two scenarios were tested for 2035: maintaining the status quo (Do-Nothing) and implementing traffic-calming measures (Do-Something). The latter included changes such as introducing one-way streets, woonerf areas, speed limits, and relocating parking facilities outside the historic center.

Vissim visualization of the Do-Something scenario of the project

PTV Vissim simulations, combined with strategic data from PTV Visum, demonstrated the potential of traffic-calming measures to reduce vehicle volumes, alleviate delays, and enhance pedestrian-friendly environments in the city center. The Do-Something scenario showed notable benefits, including reduced car speeds and delays, increased pedestrian safety, and revitalization of local businesses. Importantly, the bypass remained efficient, ensuring regional traffic flow was not disrupted.

Krystian Siwek, Customer Success Manager, PTV Group

"The case of Nakło serves as a fascinating example of the use of simulation technology to address congestion in historic city centers, and to better plan traffic calming measures".

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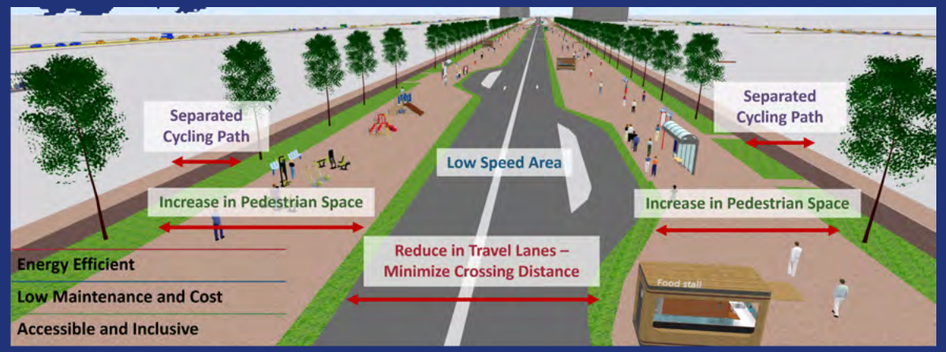
CASE STUDY

Modeling a car-lite district with simulations

To address the complexity of modern mobility needs, urban planners increasingly rely on advanced tools for analysis, simulation, and strategy implementation. Transport modeling software enables planners to assess the impact of new cycling infrastructure, such as dedicated bike lanes or shared spaces, on traffic efficiency and safety. By simulating changes to road layouts, planners can anticipate how these adjustments will affect drivers, cyclists, and pedestrians, thereby making informed decisions that prioritize vulnerable road users.

Beyond enhancing safety, these modern tools play a crucial role in addressing transport-related emissions. They allow cities to calculate emissions, test mitigation strategies, and model scenarios such as shifting trips to public transport or active modes of travel. This enables the design of targeted solutions to meet climate goals and reduce greenhouse gas emissions.

An example of this approach can be found in Singapore. The East Coast Extension, encompassing 10 neighborhoods, 40,000 residential units, and 360,000 square meters of commercial space, is set to become a bustling urban hub. With anticipated population growth and the upcoming “Long Island” development, urban planners face the dual challenge of ensuring mobility and fostering a sustainable, pedestrian-friendly environment.

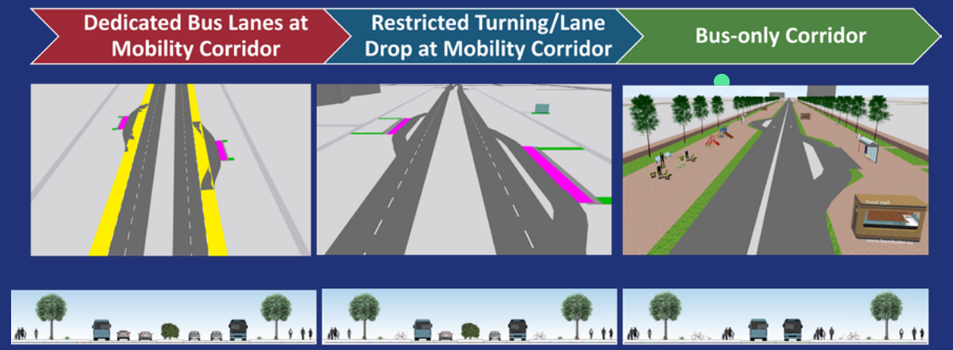


PTV Vissim: Modeling a car-light district in Singapor

To address these challenges, a team from the National University of Singapore developed a car-lite vision for the district using PTV Vissim modeling software. Inspired by Barcelona’s superblocks concept, the project aimed to prioritize pedestrians and cyclists by restricting vehicular access and promoting public and active transportation.

The inspiration: Barcelona’s “superblocks” that prioritize residents and pedestrians

The project introduced several key elements, including a progressive mobility corridor with restricted turning movements, dedicated bus lanes, and narrower roadways. Various scenarios were modeled to evaluate the effectiveness of these designs, ensuring the proposed changes would mitigate traffic congestion and enhance safety.



The Vissim model showed how to improve traffic flow and active mobility along the corridor

The outcomes of the project were significant:

- Improved Traffic Flow: Simulations using PTV Vissim demonstrated a substantial reduction in congestion along the mobility corridor. Measures such as turning restrictions and lane reductions streamlined vehicle movement, aligning with the district's car-lite objectives.

- Enhanced Public Transit: Dedicated bus lanes and a long-term vision of a bus-only corridor improved the reliability and efficiency of public buses, reducing delays and enhancing service levels.

- Safer Spaces for Pedestrians and Cyclists: Narrower roads, shorter crossing distances, and designated bike lanes increased safety and accessibility for active transportation users.

This project underscored the pivotal role of PTV Vissim in data-driven urban planning. By enabling the simulation and optimization of mobility solutions tailored to evolving urban landscapes, the software facilitated the integration of sustainable transport principles. The proposed design promotes community well-being, safety, and accessibility while addressing the challenges of transitioning from car-centric to car-lite urban development.

"This project serves as a demonstration of the practical implications of public transportation optimization for the community and commuters."

Chloe Tie Ching Chin,
Traffic Engineer and
Transportation Planner,
Singapore

NUS National University of Singapore

V2I Communication Technology

Furthermore, some of the most advanced mobility planning tools integrate strategic transport modeling, detailed traffic simulation, and pedestrian behavior analysis. These comprehensive technologies allow planners to visualize long-term impacts, incorporate sustainable practices, and enhance urban safety. With their support, cities can promote active mobility, reduce emissions, improve road safety, and optimize urban spaces and resources.

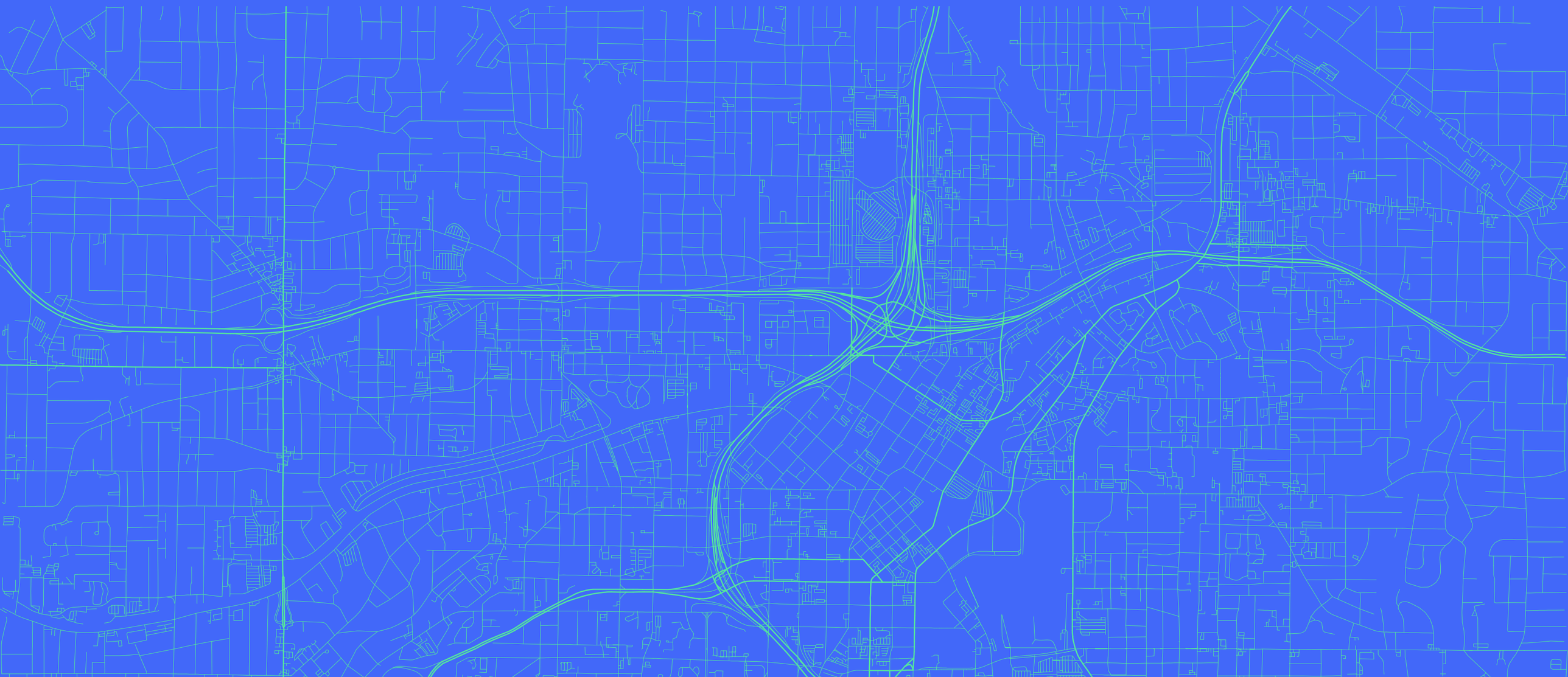
This progress also includes the implementation of fledgling Vehicle-to-Infrastructure (V2I) communication technology.

For example, **Charlotte, North Carolina**, has implemented an innovative project to improve emergency response times by integrating connected vehicles and intersections. The city enables seamless V2I communication by connecting over 900 intersections to emergency and transit vehicles. This is achieved through the Centracs Priority and SCP systems. Importantly, this software-based solution was deployed remotely without requiring additional field equipment. As a result, emergency response times have been reduced by an average of 22 seconds—a 10.3% improvement. Furthermore, the system integrates advanced signal strategies, such as flashing yellow arrows and leading pedestrian intervals, which enhance overall safety and efficiency. Thus, this collaborative approach exemplifies the goals of V2I technology, including improving traffic flow and prioritizing public safety.

Advanced Traffic Management System (ATMS) and Route-Based Priority Deployment

05

Smart Mobility Solutions for Cities



Our smart mobility solutions for cities

Modeling and planning

PTV Visum | Multimodal transport planning

Model future demand and developments of entire networks

PTV Vissim | Multimodal traffic simulation

Simulate ideas before implementing them

PTV Viswalk | Pedestrian simulation

Enhance pedestrian movements in public spaces and buildings

PTV Lines | Public transport planning

Improve network, service, and cost-efficiency

Traffic management and prediction

PTV Optima | Real-time multimodal traffic management

Monitor, predict and optimize every traffic scenario

PTV Flows | Real-time traffic monitoring & prediction

Cost-effective and hassle-free prediction solution

Want to transform your transportation modeling?
Contact the PTV expert team!

Contact us