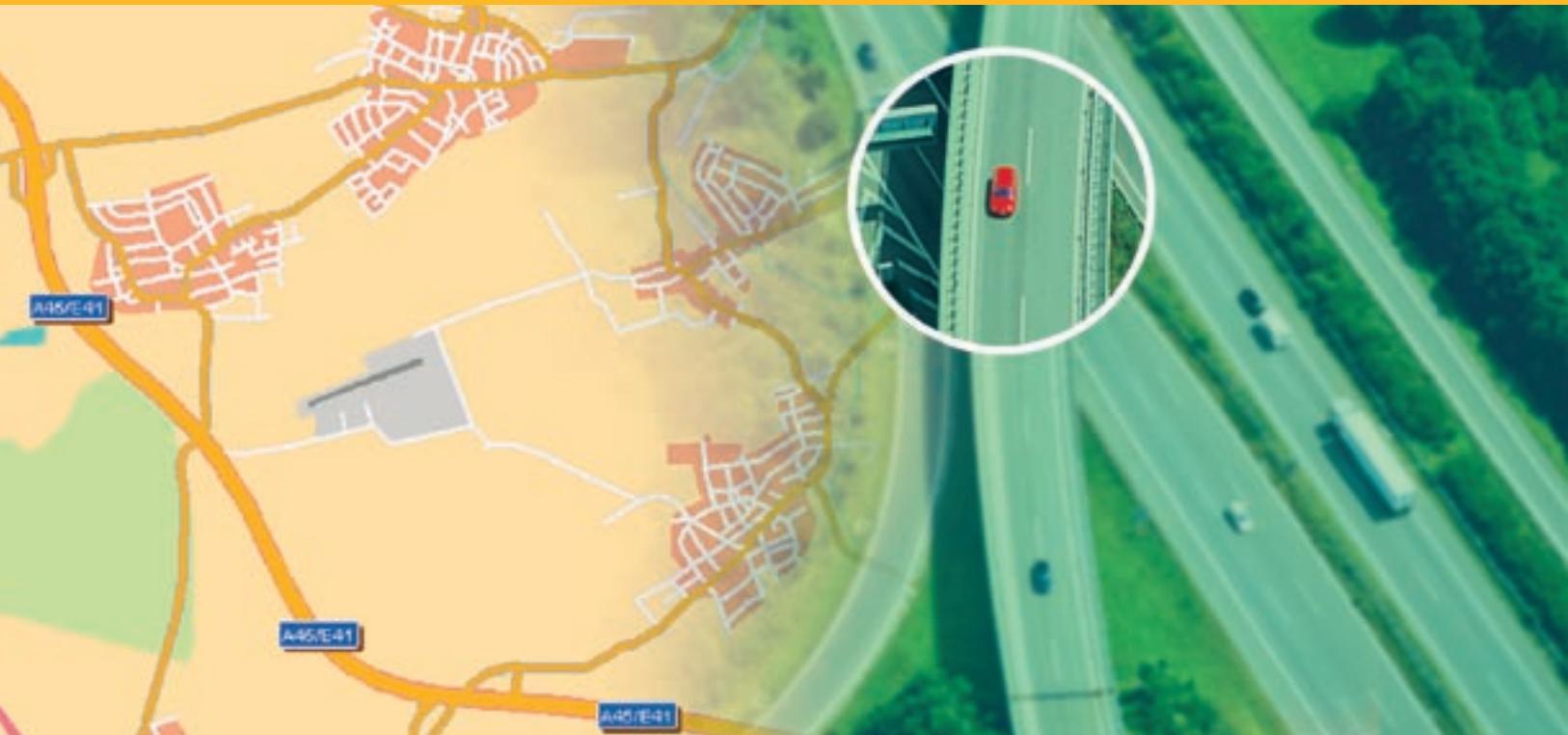


Driving Telematics

Telematics Solutions at a Glance –
An insight into PTV Software and Map Technology





Telematics is taking us into a new era of driving: it allows vehicles to communicate and network with service providers, other vehicles or roadside infrastructure.

This also means that new services and applications are now available: call centres offer travel assistance and increase the safety and comfort of passengers and drivers during the journey. Insurance companies provide personalised car insurance rates. Transport

infrastructure operators choose telematics solutions for road pricing and transportation management.

Location-based information is essential for all telematics applications. What is the vehicle's current location? Where is the next service provider? Which routes did a driver take and when? PTV software solutions and map technologies are designed to address these and many other issues in the field of telematics.

Call centre services: Enjoying the journey in comfort and safety

Every driver has experienced problems that result in journeys being unnecessarily prolonged or interrupted, such as sudden traffic jams, difficulties in finding a hotel, a car accident or breakdown. Assistance providers, motoring organisations, automobile OEMs or insurance companies and their call centres help people to quickly solve these problems, or even better to avoid them.

Roadside assistance

Whether it's a flat tyre, an electronic fault or an accident on a lonely country road: for drivers it's always good to know that they just have to call a service centre to get immediate and professional help.

The call centre agent locates the driver, either based on the details provided by the caller or

via GPS or radio cell tracking, and then coordinates the immediate assistance that is needed. In the event of a vehicle breakdown, the agent will contact the appropriate breakdown service and notify the driver of the next steps.

PTV solutions optimise call centre processes with intelligent mapping, routing and proximity features, further enhanced with automated interfaces to CRM and claims management systems and with dynamic location of the nearest mobile assistance unit.

Calling for assistance. Some car manufacturers enable emergency connection to their call centre through a single button push.





PTV software for call centres

PTV offers flexible solutions which can be adapted to fit existing system architectures and company processes. Key features include fast localisation, proximity search and route calculation. All information can be displayed on interactive digital maps.

Optimized databases are of particular importance to call centres. PTV software allows them to easily integrate, process and manage all data records.

More details at www.ptvag.com/callcenter

The benefits of PTV software:

- ▶ World-wide map display, with detailed information directly displayed on the map by mouse click.
- ▶ Simple import of address data (e.g. spreadsheet) or dynamic connection to a company database using different formats (e.g. SQL, Access, Oracle)
- ▶ Automated area planning based on your address data (according to direct distance, road distance, time or postcode).
- ▶ Live tracking via GPS, radio cells or according to the details provided by the caller.
- ▶ Additional POI data, such as petrol stations, parking spaces, railway stations, toll terminals
- ▶ Service provider locator and proximity search options according to configurable search criteria (direct distance, driving time, road distance, areas, skills, etc.)
- ▶ Detailed address information can be displayed on the map by mouse click.
- ▶ Professional route planning based on different parameters (type of vehicle, fastest/shortest route, time slot, etc.) with detailed route description and calculation of alternative routes and optimised sequences
- ▶ Traffic information covering many countries
- ▶ Interfaces for data transfer to ERP, CRM and Call Management systems.

Travel assistance

Not only do call centre agents help travellers in emergency situations, but they also increase travel comfort by providing concierge services. They book a hotel room at the destination, find a nearby Chinese restaurant, the next cash point (ATM) or petrol station, or provide driving directions and traffic information - which can all be directly transmitted to the traveller's navigation device or mobile phone.

Many call centres offer additional Assistance services, such as tracking of stolen vehicles or

last mile navigation. PTV software provides you with solutions tailored to your needs, whatever the service required.

All important data and information instantly available on the call centre agent's screen thanks to PTV software.



Automatic tracking and tracing via GPS

The automatic emergency call system "eCall"

Each year over 40,000 people die as a result of traffic accidents in Europe. Up to 2,500 lives could be saved with improved emergency response times. Some car manufacturers therefore started providing satellite-based emergency call systems as an in-vehicle option. In the event of an accident, the system automatically sends an emergency call with GPS co-ordinates to the nearest

emergency centre, allowing the rescue team to provide immediate help. The European Commission wants to introduce the so-called eCall system as a standard option for all new cars in 2010.

Car manufacturers, assistance providers, system integrators and other stakeholders are currently developing different technical solutions for eCall. PTV often delivers software solutions for GPS vehicle tracking for these applications.



eCall accelerates rescue thanks to GPS tracking.

For further information about eCall, visit www.ptvag.com/ecall. Find out more about different technical models and the location server which PTV developed for the Björn Steiger Foundation.

Geofencing – Mobile objects protected against theft

GPS-based geofencing allows users to monitor vehicles and mobile assets. Rental fleet operators, for example, use geofencing to restrict the use of their vehicles to certain countries. Building and construction companies protect machinery and equipment, or transport companies protect valuable assets against theft by defining a „digital fence“ around construction sites or routes.



As soon as the vehicle crosses the digital fence, an alert is triggered.

PTV's map applications allow the users to define the size of the fenced-in area according to their needs: as a radius around a given point, as polygon or along a route. PTV software, which runs on a central locating server or an onboard unit, continuously matches the vehicle's current GPS position with the specified area and triggers an alert if the vehicle crosses the defined boundary.

More information at www.ptvag.com/geofencing



PAYD – young drivers can save money if they drive sensibly.

“Pay As You Drive” – the personalised car insurance concept

“Pay As You Drive” is a route-based car insurance concept which calculates the insurance premium according to the motorist’s driving habits. Customers who drive less will pay less. Drivers who avoid using hazardous times and road types, can save even more. But the insurance companies also benefit from this pricing model.

The personalised Pay As You Drive insurance model provides insurance companies with a strategic option which gives them a big edge in this highly competitive market.

“Pay As You Drive” allows insurance companies to reach new target groups and increase customer loyalty. Pilot projects have also shown that personalised car insurance rates motivate motorists to drive more carefully, leading to reduced repair costs and increased road safety.

Satellite-based collection and evaluation of the route data are the basis for individual insurance pricing.



Evaluation at the data centre ...

A telematics box including a GPS module is fitted inside the car to collect data about the vehicle’s route. It records the GPS data during the journey (1) and sends it to the data centre (2) for evaluation (3). The results are transmitted to the insurance company (4) which sends the insurance bill to the policyholder (5).

... or inside the vehicle

It is also possible to evaluate a car’s route directly in the telematics box. Only the evaluation results are then transmitted from the vehicle to the data centre. The GPS data are deleted from the box.

The right technology for every application: PTV software

Whether data has to be evaluated at a data centre or inside the vehicle, PTV provides solutions for both types of data evaluation. Insurance companies can analyse the data at different levels of detail:

- ▶ counting road kilometres only
- ▶ zone-based evaluation (e.g. inside or outside of city regions)
- ▶ detailed evaluation of street or time categories with different risk factors by using the so-called Map Matching method
- ▶ considering driving speed

More information at www.ptvag.com/payd



No toll plazas, no toll bridges: satellite-based toll collection
– the future for road-user charging

Traffic telematics and infrastructure

Satellite-based toll collection

More and more road pricing concepts are being implemented world-wide in order to finance national traffic and transportation infrastructure. Many countries have placed a special focus on satellite-based toll systems: an onboard unit records a car's route by using GPS and simultaneously calculates the road toll for this route. The data is transmitted to the data centre via mobile communication for billing purposes.

Satellite-based toll systems offer many advantages compared to conventional systems: The exact distance travelled can easily be calculated, eliminating the need for the vehicle to stop, and thus ensuring smoother traffic flow.

A major advantage is the system's flexibility and its future-orientated approach. The toll operator can always introduce new toll rates (e.g. according to the number of axles or the pollutant category), change toll fees and

expand the network of toll roads. There are no roadside infrastructure costs compared to road toll collected at toll stations.

All map data and attributes are updated by means of the onboard unit. PTV software supports the entire data processing chain: from central map data editing to the unique process of incremental up-dating of the onboard data and onboard evaluation of the distance travelled.

Simply unique: Incremental map update with PTV technology

1. Central data editing

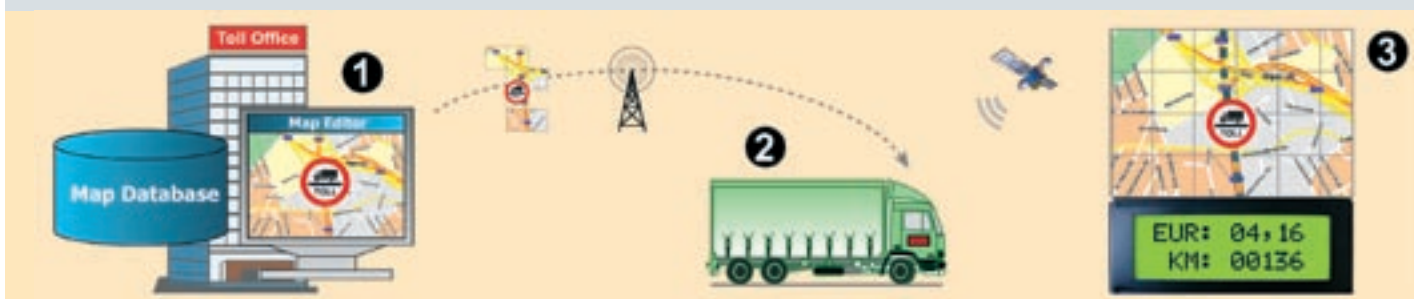
PTV provides tools which allow toll operators to edit the road network, to allocate attributes to network sections or to change them, if for example new roads are included in the network or toll rates are changed.

2. Data transmission via mobile communication

PTV's unique Scalable Map Architecture provides maps that are divided into small tiles. Incremental up-dating means that only the up-dated tiles will be sent to the onboard unit (OBU). This reduced amount of data can easily be transmitted via mobile communication (e.g. GPRS or UMTS).

3. Integrating new data into the OBU

PTV software integrates the new tiles into the existing database stored in the onboard unit. It uses the so-called Map Matching method to match the GPS data to the road network on the map and instantly computes the corresponding toll fee.



Traffic telematics improves safety

Numerous driver assistance features and strategic traffic management systems make the driving experience more comfortable and enjoyable. Innovative traffic telematics solutions help to achieve different goals: they make road traffic safer, improve traffic flow and reduce environmental pollution.

Future-orientated traffic management solutions have been implemented in different

regions and new concepts and developments are being tested within research projects.

Real-time traffic information helps motorists to avoid traffic jams or to choose alternative routes. Complex networks enable strategic management of signal controls, and variable traffic and direction signs.

In the future, the vehicle itself will help to collect data about traffic and weather conditions. In the event of black ice or traffic

congestion, the drivers notify a service centre, or automated alerts are sent to other vehicles and traffic infrastructure systems.

Thanks to PTV's software and expertise, this information can be combined with data from other sources, such as public authorities and stationary sensors, in order to provide accurate traffic updates and forecasts.

To find out more about the research projects PTV is involved in, go to www.ptvag.com/mobility/research



Co-operative systems

Co-operative vehicle-infrastructure systems allow vehicles to exchange traffic-relevant data with other vehicles and with roadside infrastructure. Driver assistance and traffic management systems use this information for a wide range of services, such as safety features, real-time traffic information, route planning or traffic management services that are based on the current traffic situation.

PTV is involved in the development of

- ▶ a method for collecting traffic information from different sources
- ▶ a method for using co-operative systems for the above services

Co-operative systems: Vehicles communicate with the roadside infrastructure and other vehicles.



PTV software for telematics solutions

▶ PTV xServers

PTV xServers are powerful, scalable basic components for key features, such as geocoding, routing, mapping or map matching. They are Unicode-enabled and support both Windows and Linux. Standard Web Services interfaces ensure easy integration of existing applications and system architectures.

www.ptvag.com/xservers

▶ PTV MobilityPlatform

PTV's central geospatial platform is based on PTV xServers and consists of ready-made applications, allowing the user to

quickly and easily develop applications. It supports both Windows and Linux. Interfaces to numerous external systems allow easy integration and intelligent administration of customer-specific data.

On request, PTV hosts its MobilityPlatform services at its own data centre.

www.ptvag.com/mobilityplatform

▶ PTV RoadRunner

PTV's client software provides powerful components for mapping, GPS tracking, map matching, routing and navigation. The SDK has been designed to be

embedded on in-vehicle units and runs on Windows, Windows CE, Linux and QNX. PTV RoadRunner supports PTV's revolutionary incremental map updating technology (cf. page 5).

www.ptvag.com/roadrunner

▶ PTV CallCenter Solutions

These PTV solutions are designed to meet the needs of call centre organisations.

They provide all features for mapping, routing, localisation and radius search.

Intelligent data management and interfaces to external systems operations.

www.ptvag.com/callcenter

Telematics highlights

Telematics is booming. PTV software and map technologies are used for many different applications: for call centres or location servers, for onboard units or data centres, as standard products or as basic technology for major global projects.

Find out more about telematics applications using PTV technology:

- ▶ at call centres: roadside assistance, emergency calls, travel assistance, concierge services, stolen vehicle tracking, etc.
- ▶ GPS tracking and tracing (eCall, geofencing, etc.)
- ▶ "Pay as you drive" car insurance models
- ▶ Satellite-based toll collection
- ▶ Traffic telematics and co-operative systems

