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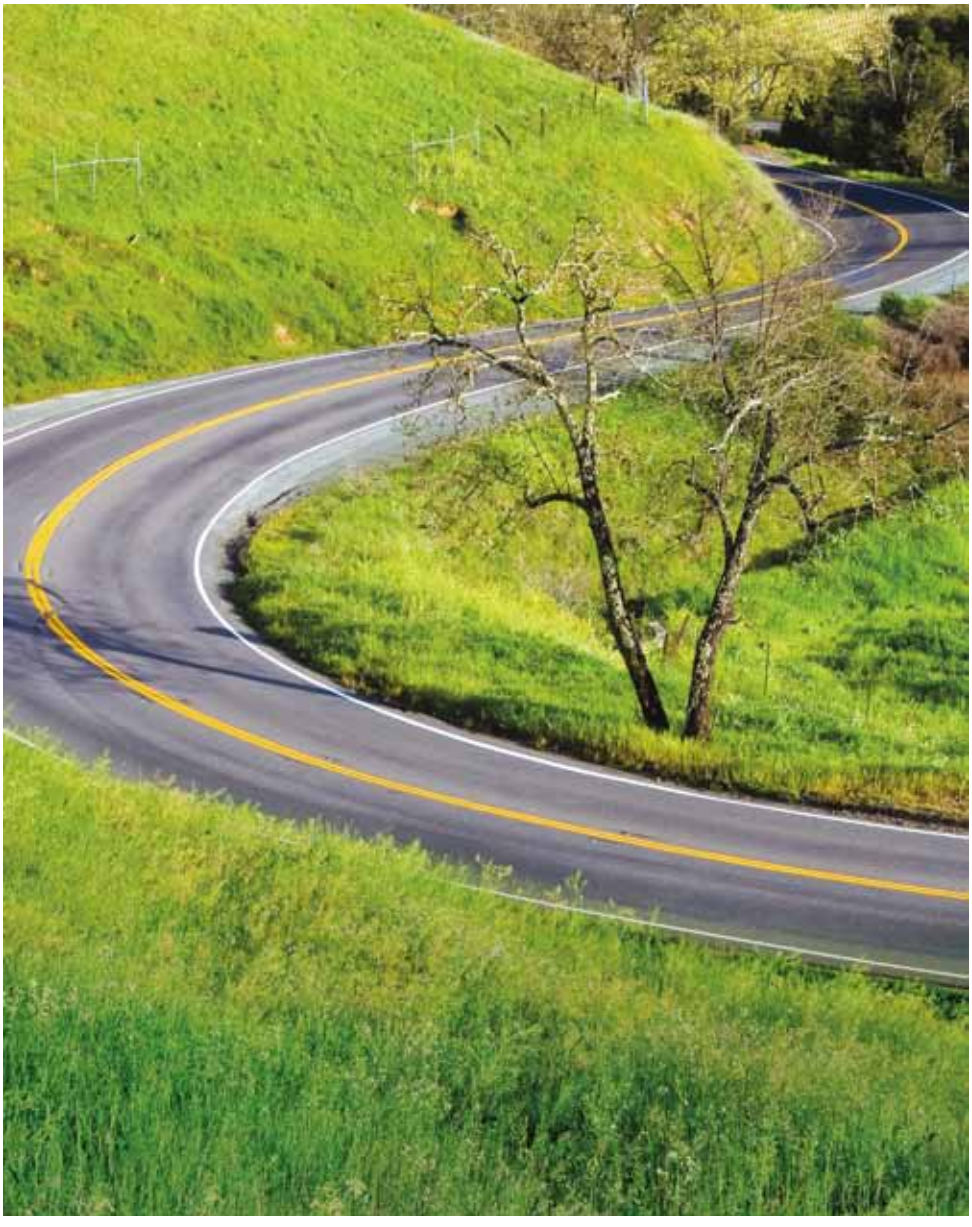
Kapsch Area.
The best of all worlds.



For all roads.
All ways and everywhere.
Smart and simple: the new Kapsch Area.

To meet the challenges posed by the European Electronic Toll Service and to offer a comprehensive solution, Kapsch TrafficCom introduces Kapsch Area, an integrated road-user charging system based on GPS/GNSS and GSM/GPRS and DSRC technologies.

Kapsch Area combines the benefits of DSRC microwave technology and satellite based vehicle positioning for toll collection applications, where the road network is extended from highways to the secondary road network, with limited possibilities for roadside infrastructure. Kapsch Area offers low-cost hybrid GPS/DSRC on-board units (OBU) with easy installation, low communications costs and very reliable and accurate performance. The benefits of GPS & GSM together provide a flexible system and the ability to add new toll roads or introduce toll zones fast and efficiently. Furthermore the system offers DSRC road operators a means to extend their services with add-on telematics applications derived from vehicle positioning data.

Cost effective for highways, expressways and rural roads.

The system provides DSRC charging capability for highways, expressways and other main roads allowing frequent, occasional and transit users to be equipped with an easy-to-install OBU. For road-user charging on rural roads or other areas where roadside infrastructure possibilities are limited the system provides GPS/GPRS charging capability.
Users of these roads are equipped with a hybrid GPS / DSRC OBU which works in DSRC mode on DSRC-enabled roads while switching into GPS mode on other roads, saving communication costs for over the air data transfer.

Our formula in brief: **GPS/GNSS + GSM/GPRS + DSRC.**

Thin Client: The GPS/DSRC hybrid OBU is a sophisticated device designed for both DSRC as well as GPS/GPRS charging. The OBU automatically switches between the two modes depending on whether the vehicle is driving in a DSRC equipped road sector or by GPS/GPRS supported area.

In line with the Kapsch TrafficCom product philosophy the GPS/DSRC hybrid OBU is an end user device which is simple, affordable and easy to use and install. Due to its GPS capability the hybrid OBU is a perfect basis for secondary telematics applications such as vehicle tracking or floating car data. Working in GPS/GPRS mode, the on board unit records GPS location points depending on speed of the vehicle, and transfers the data packages to the central system via the GSM/GPRS air interface.

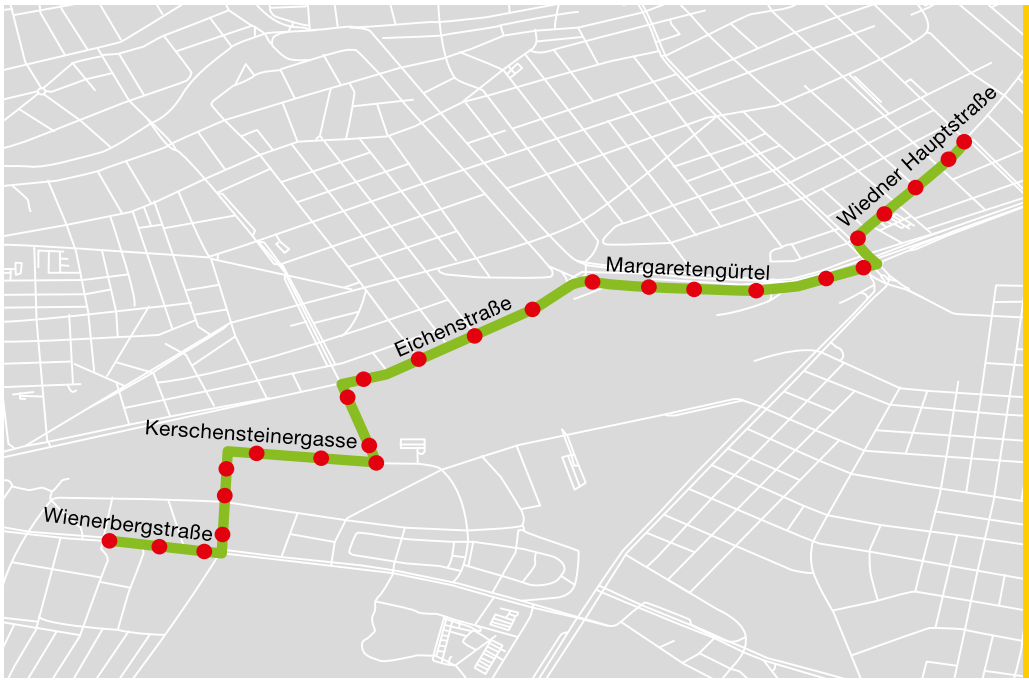
The transfer rate is configured dynamically and at intervals depending on the type of application. The communication between the OBU and the central system is bidirectional. Software updates, changing configuration settings or personalization of the OBU can be handled via the air interface, convenient for the end user and the road operator. To ensure high security, all data transferred is encrypted.

Kapsch TS-3209 Hybrid OBU

System Highlights:	
■ High flexibility: hybrid system supporting GPS and DSRC.	■ High security: encryption of all transferred data.
■ Optimised communication costs: where possible usage of DSRC, optimised GPRS data transfer.	■ High enforcement rate: multiple enforcement options (mobile, portable, stationary).
■ Affordable and easy-to-install on board unit: thin-client OBU, windscreen mounting by the driver.	■ Interoperability: EU directive 2004/52/CE recommends both GNSS as well as DSRC.
■ High performance and high scalability: central system is capable of handling large user numbers.	■ Additional telematics applications: telematics platform with out-of-the-box applications for vehicle tracking, floating car data, statistics etc.
■ High accuracy: optimised map matching algorithm.	■ Telematics interface: OBU provides interface for connecting 3rd-party telematics devices.
■ Easy system maintenance: centralized map and tariff changes, no over-the-air OBU software updates.	

Off-board **Map Matching.**

In the central system, incoming OBU data are matched to a digitalized map of the road network by a high performance map matching service which is capable of handling very high numbers of road-users in parallel. The map matching service saves all incoming data. Scalability and high availability is ensured by a system architecture allowing several matching applications work in parallel. The map matching service handles digital geography from all leading map vendors plus customer specific maps and supports various charging schemes (distance based, segment based, zone based etc.) as well as a combination of schemes. For all schemes tariffs can be chosen flexibly depending on type of road, time of day and/or type of vehicle (e.g. number of axels, emission class etc.).
The actual map matching algorithm is epitomised for charging environments and determines the map segments a vehicle has driven on taking into account several GPS location points as well as road network relations (e.g. one way streets). In addition to GPS location information, the algorithm is capable of taking into account data coming from DSRC support transceivers which can be installed in case of weak or no GPS coverage (e.g. tunnels).



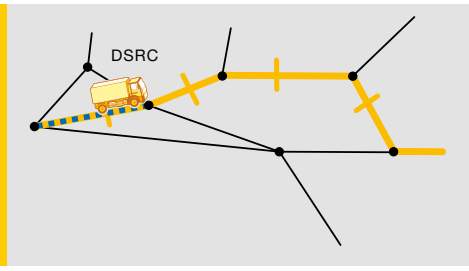
Result of the map matching process

- red dots = GPS location points
- green line = map matching result

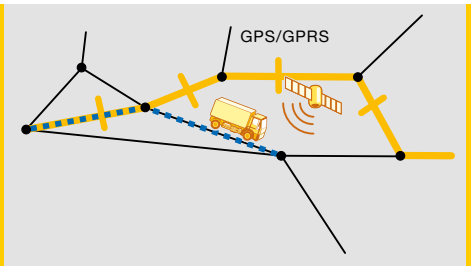
One excels here, one excels there. Why not make the best of all? **One system. Central System.**

The central back office system of the Kapsch Area System provides all functionality needed to process data from the DSRC tolling stations and GPS position data captured by the hybrid GPS/DSRC on GPS/GPRS OBUs as well as data coming from the various enforcement means. Incoming data from the DSRC or the GPS/GPRS is unified in the central system so that the information can be handled in the same manner independent of its origin, streamlining the back office processes.

Retaining the map matching functionality in the central system enables updates to the road network, modification to tariffs, etc. to be handled efficiently and system wide without unnecessary burden to the OBUs. User privacy – a key requirement in electronic tolling – is being ensured by processes strictly separating personal data from location and time.



Kapsch Area working in DSRC mode.



Kapsch Area working in GPS/GPRS mode.

Secondary **telematics applications.**

Kapsch Area provides an ideal infrastructure for implementing a broad spectrum of additional telematics applications. This includes capturing traffic data for traffic management, information and planning, safety and security applications such as hazardous goods transport tracking, OBU-based access and payment applications, and industry solutions like fleet tracking or pay-as-you-drive car insurance systems. Utilizing the electronic charging system as the basis for secondary telematics applications allows saving cost, and increasing the acceptance for road user charges through optimised traffic flow, improved safety and security, and better service.

Turn key **solutions.**

Kapsch Area has been developed based on the experience from many road-user charging projects including several nation-wide road user charging systems. The system reflects the need for a state-of-the-art all purpose system combining the benefits of the various base technologies in a single fully integrated solution that can be used for electronic tolling on highways as well as rural roads.

The system has been designed in a coherent, comprehensive end-to-end approach and is being delivered by Kapsch as a turn key solution. Besides the technology Kapsch offers the full spectrum of services (system concept, planning & roll out, system integration and testing, technical and commercial system operations) ensuring successful projects in time.

Kapsch Area: matching the technology best suited to meet your requirements.

Kapsch TrafficCom.
We make your traffic flow.

Kapsch TrafficCom is an international supplier of innovative road traffic telematics solutions. Its principle business is the development and supply of electronic toll collection (ETC) systems, in particular for the Open Road Tolling (ORT), and the operation of such systems. Kapsch TrafficCom also supplies traffic management systems, with a focus on road safety and traffic control, and electronic access systems and parking management. With more than 230 references in 39 countries on all five continents, and with more than 18 million delivered on-board units (OBUs) and over 12,800 equipped lanes, Kapsch TrafficCom is one of the leading suppliers of ETC systems worldwide. Kapsch TrafficCom is headquartered in Vienna, Austria, operates six engineering competence centres on four continents, and has subsidiaries and representative offices in 23 countries.

Kapsch Group.

Kapsch is one of Austria´s leading technology corporations, specialised in the future-oriented market segments of Intelligent Transportation Systems (ITS) and Information and Communication Technology (ICT). Kapsch, headquartered in Vienna, is organised as a group company with the entities Kapsch TrafficCom, Kapsch CarrierCom and Kapsch BusinessCom. The Kapsch Group companies employ a total global workforce of over 3,000, with subsidiaries, branch offices and representatives around the globe. Kapsch. Always one step ahead.

www.kapsch.net

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