



The German GNSS Toll System on Motorways and on Main Roads

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The German Motorway Toll Act for Heavy Commercial Trucks called for a System that...



Photo: E & L Verlag, "Highway Deutschland"

- Recognises a defined chargeable road network and collects the charges
- Takes into account emission class as well as the number of axles
- Is a "free-flow-system" - no need for toll gates
- Provides both automatic and manual booking
- Fulfils technical preconditions of interoperability with other road charging systems
- Is highly flexible:
 - ▶ Network of chargeable roads is expandable
 - ▶ Additional charge rate categories can easily be added
 - ▶ Promotes technological innovation

Toll Road Network in Germany

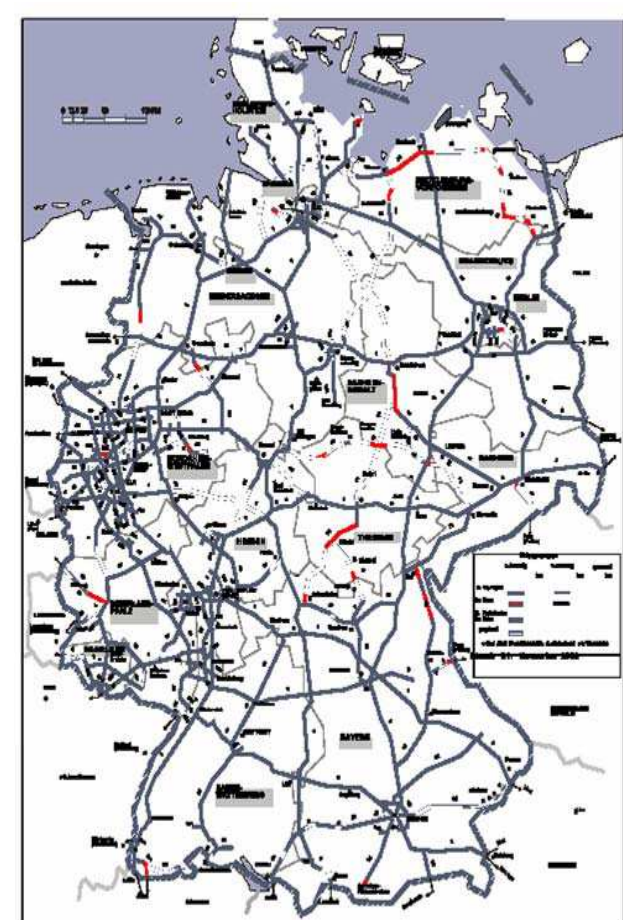
Toll Network

- Since January 1, 2005
 - ▶ 12,500 km federal motorways
 - ▶ 2,213 junctions and motorway interchanges
 - ▶ more than 5,200 sections (one direction) with an average length of 4.8 km

- Since January 1, 2007
 - ▶ 50 km federal main roads with an average length of 0.8 km

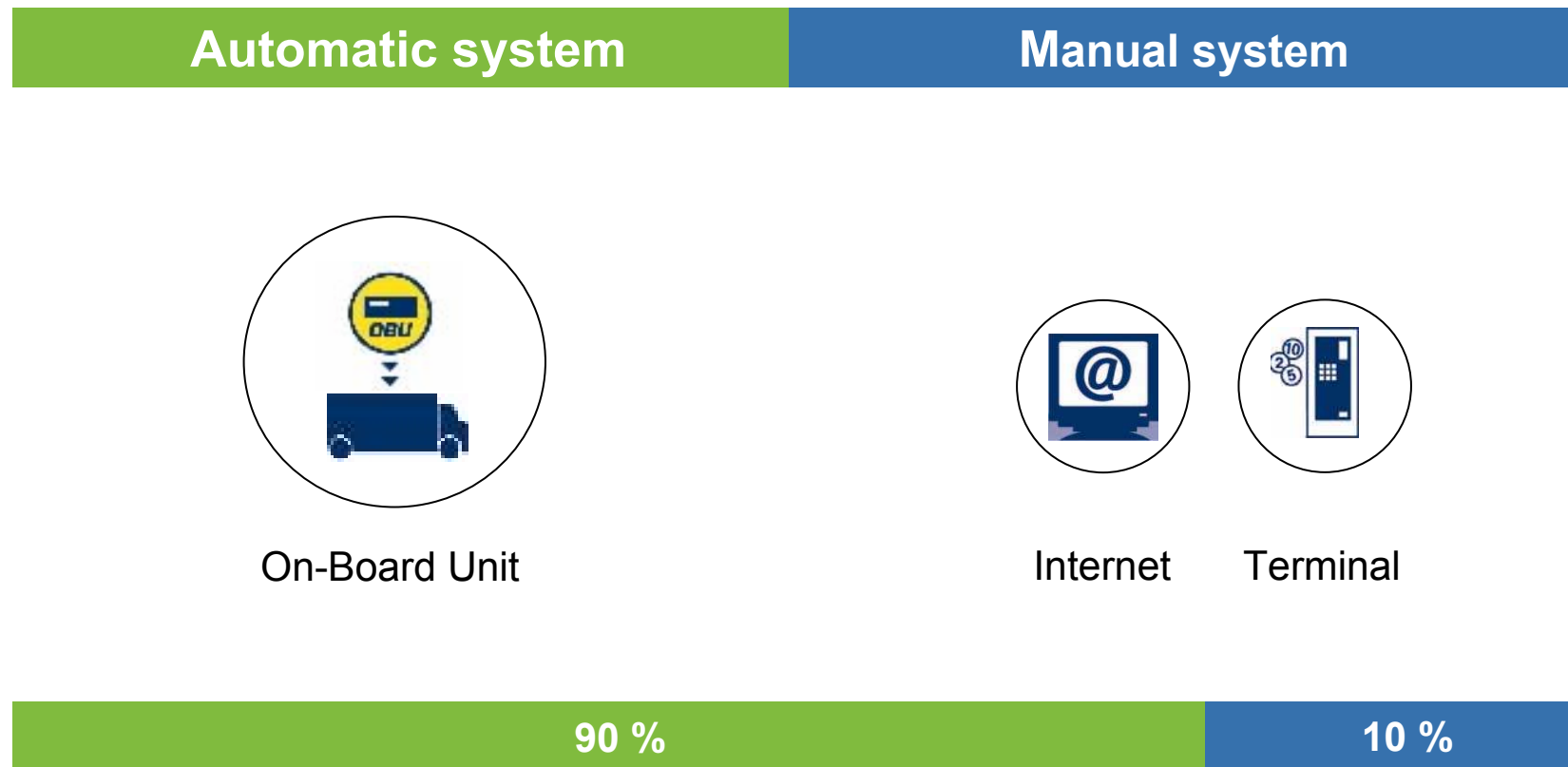
Toll Paying Trucks

- ▶ $\geq 12t$
- ▶ 35% non German trucks
- ▶ 25.8 billion kilometers driven in 2006

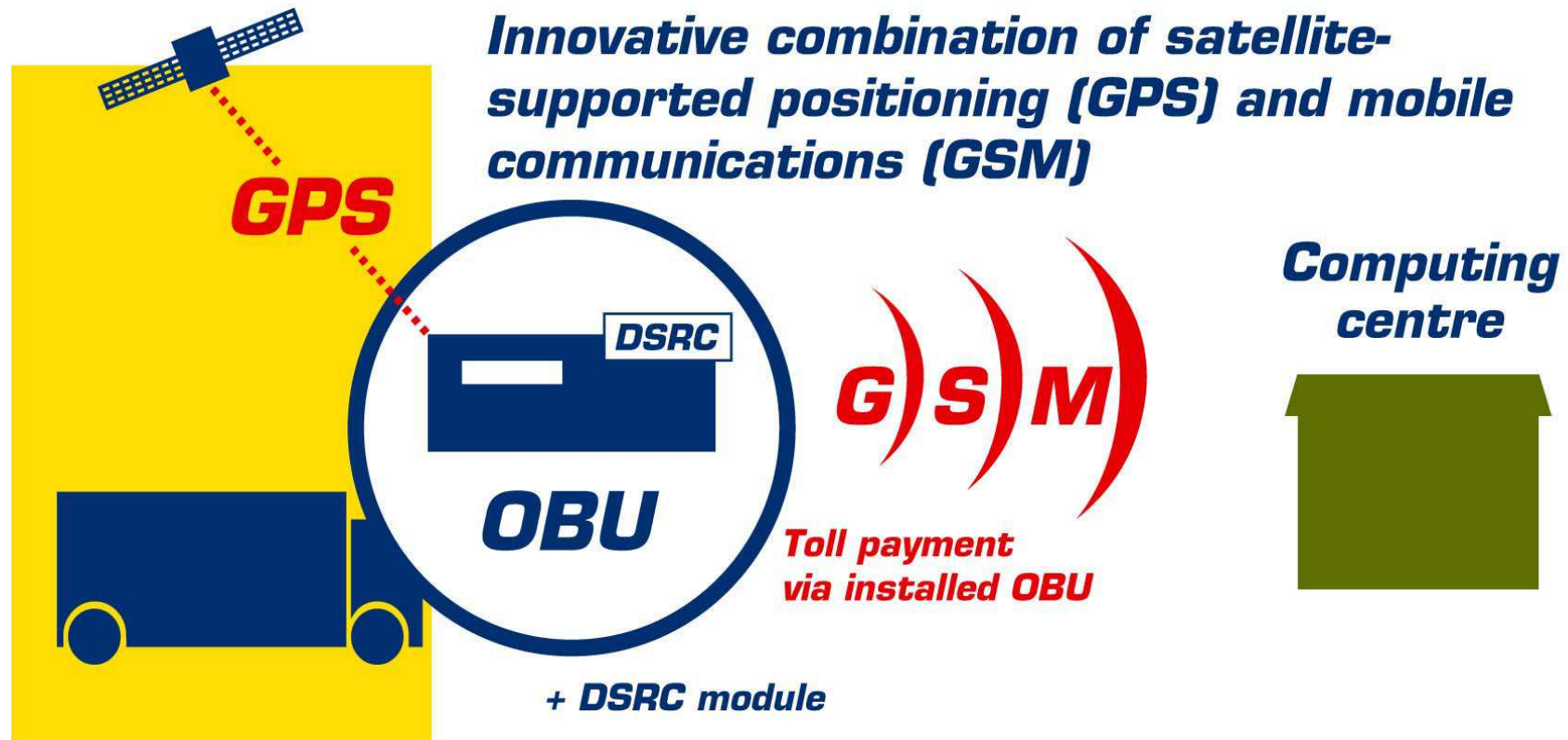


The Reservation Modes

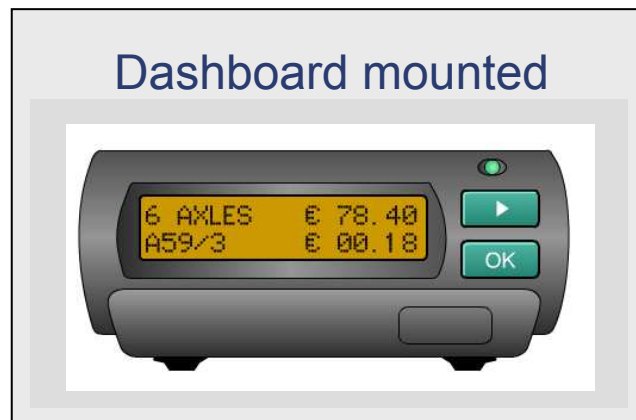
The automatic reservation mode is the most convenient way to pay the toll and it is widely accepted by the users



The German GNSS Toll System combines GPS and GSM



On-Board Unit enables automatic Toll Collection on any Class of Road



- Based on proven key technologies (GPS, GSM)
- On-Board Unit calculates toll dependent on emission class and number of axles
- Transmission of charged road segments to data centre via GSM (SMS message)
- Updates of chargeable new road segments or toll rates are achieved wirelessly via GSM
- Platform for future added-value services
- Ready for future interoperability with other European road user charging systems

Manual System

Internet reservation

- Prerequisite: registration with Toll Collect
- Users receive a user ID and password
- Secure data transfer

Toll Station Terminal

- More than 3,500 toll station terminals in Germany and abroad (at rest stops, border crossings and service stations).
- Entry of vehicle information, route, starting time
- Printing of log-on receipt

In both cases

- Routes can be booked three days in advance
- Before journey starts: cancellation of complete route possible
- After journey starts: partial cancellation of unused route possible
- Operation in four languages (D, GB, F, PL)
- Telephone support for reservations



Enforcement

- Toll regulations are enforced by the BAG
- Automatic enforcement: 300 automatic control gantries are provided (comparable with bridges for multi-lane electronic tolling)
- Stationary enforcement: BAG officers stop vehicle after it passes control gantry
- Mobile enforcement: 278 BAG enforcement vehicles (T5) are provided
 - ▶ Automatic log-on is checked via communication with On-Board Units
 - ▶ Manual log-on is checked by scanning vehicle licence plates and communication with the Toll Collect computing centre
 - ▶ Suspected toll violators are stopped by BAG officers
- Additional enforcement: on-site inspections



Operational Status as of May 2007

- 7,26 billion € toll has been charged since January 1, 2005
- 2.5 million invoices were sent to customers
- the amount of installed OBU raised from 320,000 (January 2005) up to 576,000

	2005 as of 31.12.2005	2006 as of 31.12.2006	2007 as of 31.05.2007
registered users in thousands /end of period	109.1	118.2	114.8
registered vehicles in thousands/end of period	736.3	846.5	870.2
mounted OBU in thousands / end of period	482.3	546.0	576.1
availability / accuracy level of automatic system	99%	99.75%	99.75%
toll income in billion €	2.87	3.08	1.31
toll kilometres in billion	23.9	25.8	10.8
quota automatic system	86%	90%	90%
quota manual system	14%	10%	10%
sent invoices to customers in thousands	1,004.5	1,043.2	449.8
amount credit notes in thousand €	86.9	108.1	42.0
controlled vehicles BAG+TC in million	17.6	18.2	7.2
Level of potential Fraud	< 2%	< 2%	< 2%

German specific Feature: Flexibility for tolling Main Roads

Due to the tolling of the motorways, some trucks diverted to free main roads to avoid paying the toll, causing a nuisance to neighbours (safety, pollution, noise)

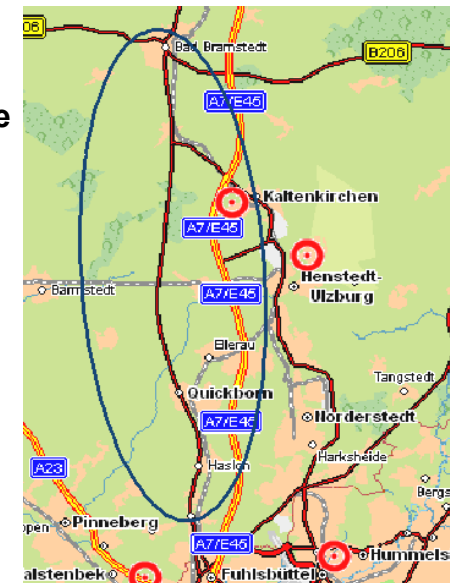
In order for the trucks to return to the motorways the Bundesrat voted in October 2006 for the tolling of three main roads from January 01, 2007 onwards

It was possible to implement this so quickly only with satellite technology, not requiring any ground infrastructure



A tolled main road

Traffic deviation from the A7 motorway to the B4 main road



System serves as a Tool for the Financing and the Management of modern Traffic Infrastructure



Building and
Maintenance of Roads



Environmental
Protection



Traffic Management

Interoperability – Today...



Interoperability - The Vision



One Onboard-Unit, one contract

Back up

Toll Collect is set up as a Public Private Partnership

