

Tolling systems in Europe

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- 3) Tolling in Austria, Germany, Switzerland
- 4) Non-fix tolling world wide



Tolling and traffic management

- Congestion costs
- Road space fee
- Fee related to location, time and reliability
- Fairly-minded system – road user – road requirement

Society is ready to pay more for road usage in exchange for bigger road transport quality (safer, smarter, greener).

Fix tolling

- Time – infrastructure finance
- Performance – regulation tool
 - a) whole area
 - b) coridor
- Area – infrastructure finance, regulation tool

Non fix tolling

- In comparison with fix tolling it depending on density, time or other parameter
- Performance – primary aim is traffic regulation
 - a) whole area
 - b) coridor
- Area – finance, traffic regulation

Paper vignete /cupons

- Time tolling
- Low operational costs
- Low enforcement possibilities
- Zero utility functions (only fix tolling), traffic data
- Questionable manipulation



Camera systems – LPR

- Those who pays gives licence plate
- Licence plate is enforced in tooling area
- Questionable personal data protection
- Wheather dependent
- SoA – Hungary, London





PREPAID TOLLS ONLY



PAY TOLL

CASH LANES

STOP HERE PAY TOLL

RFID (UHF, DSRC) - Radio Frequency Identification

- “High” speed car identification
- RFID tag – chip, antenna, enclosed
- Pasive – wide spread, mostly for reading
- Active – own battery,
- Reader – stationary gate



UHF - Ultra High Frequency, (865 MHz – 956 MHz)

- Active - identifikation 0 – 100 km/h, California FASTTRACK
- Pasive - Identifikation up to 240 km/h, Argentina
- Relatively low range,
- Mostly in USA and Canada
- 902 – 956 MHz is not compatible with EU standards



CEN DSRC 5,8 GHz Dedicated Short Range Communications

- Two-way communication short or medium range,
- Protocols specified for road transport (not logistics)
- Applied in 20 countries for tolling
- DSRC gives potential for V2I, V2V
- Easy enforcement, high rate tolling achievement
- Necessary communication infrastructure – narrow flexibility for extension
- Relatively low data communication costs
- Traffic data collection
- User friendly OBU

GNNS/GPRS

- OBU record autonomy location based information
- Virtual gates
- Whole area tolling
- Flexibility of segment fee adjustment
- High communication cost – GSM
- Accuracy dependent on GNNS
- Dificult enforcement – enforcement gates
- Narrow traffic data for relatively high costs.

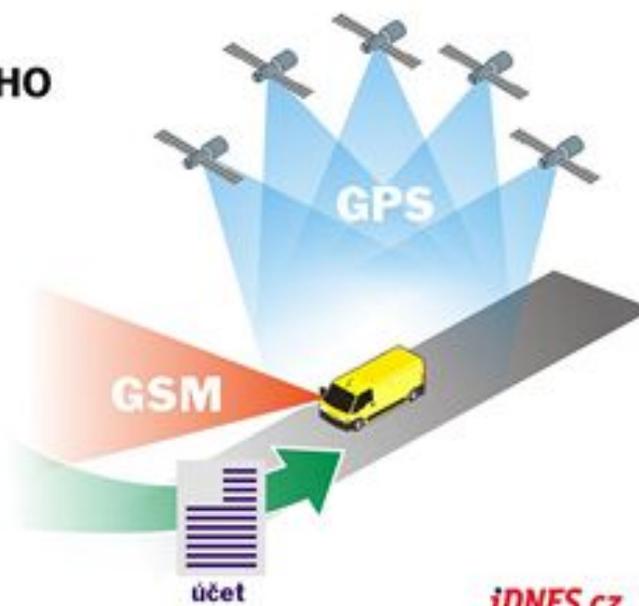
GNSS/GPRS



SCHÉMA SATELITNÍHO MÝTNÉHO



provozovatel



iDNES.cz

Austria

- CEN DSRC 5,8 GHz
- Above 3,5t
- 472 tolling gates – 2100km
- Start 1.1.2004. operation ASFINAG, integration KAPSCH
- Some tunnels – typical tolling gates
- internet payment possible, 200 distribution points (fuel stations)
- Brennen's highway has sliding fee - 0,67 to 1,41 Eur/Km
- revenue 2008 - 1,114 mld. Euro
- 99.6% - success identification

Category	2008
2 axles	0,158 Eur/Km
3 axle	0,2212 Eur/Km
4 a more axles	0,3318 Eur/Km

Germany

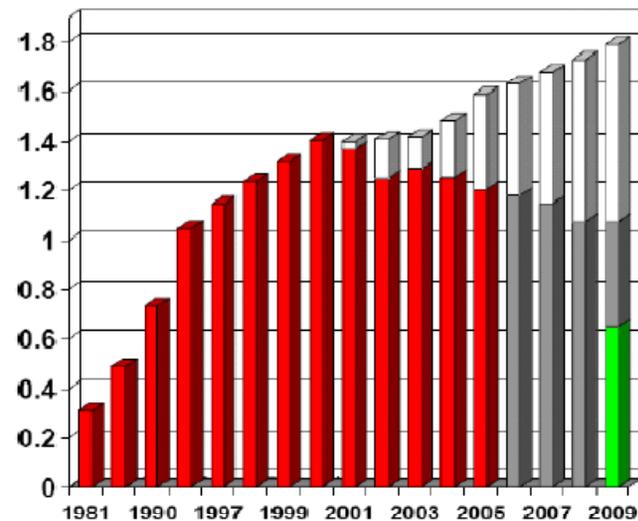
- Originally planned for 1.1. 2003. Start 1.1.2005
- GNSS/GPRS, each OBU include DSRC for enforcement
- above 12t (paper toll)
- 12 000 km of highways tolled
- 300 control gates +300 mobile patrol (540 employees)
- internet or terminal payment possible
- 1,5 mil. paying users
- Year revenue 2,4 milliard Euro
- Fee is related to number of axles and emission class
- average 12,4 €/km.
- Decrease of unloaded trucks -10%, Increase of container transport +17%

Svitzerland - LSVA

- Start 1.1.2001.- above 12 t.
- Alps protection
- Hybrid system
- Fee is related to Weight (tkm), distance and emission class
- Revenue for 2009 about 1,6 mld. CHF
- External heavy transport costs for year 2008 is about 1,512 mld. CHF
- Fleet adaptation

Svitzerland - LSVA

- Compensation of regions ,1/3 revenue for cantons, 2/3 for exchequer
- Regions could has difficulty to be reach by heavy transport – lower potential to increase productivity
- Reality ilustrate for difent regions heterogeneous infliction of new traffic concept



Pozn.: červeně – pozorovaná data, šedě – predikovaná data, zeleně – politický cíl

Zdroj: Meyrat (2007)

Conclusion

- Performance tolling has consequence in decrease of transport performance (car miles)
- Decrease of unloaded trucks
- Has no influence on heavy transport limitation
- Big companies align with tolling
- Appropriate set up of emission class lead to faster fleet renewal

Děkuji za pozornost



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