

IRF International Road Congress: Innovation in Road Infrastructure

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„Pay as you use“ – A Principle as Chance for Sustainable and Fair Pricing of Russian Road Infrastructure.

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Kapsch TrafficCom.

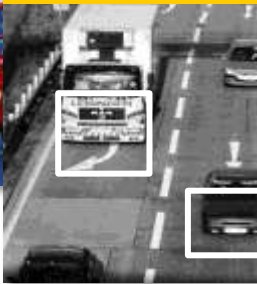




Urban Access Management



Safety & Security



Road User Charging



260	Projects in 41 countries
80%	Of Multi Lane Free Flow (MLFF) Systems worldwide are supplied by Kapsch TrafficCom
100	Cars per second are passing through Kapsch TrafficCom's MLFF tolling points
44	Million drivers that use our OBUs (On Board Units) as a means of payment
3 of 5	National truck tolling schemes in Europe use Kapsch TrafficCom's technology and services
12	Months (average) to deliver complete national truck tolling schemes (for the Czech Republic and Austria)

The user pays principle in transport.



Effects and objectives of usage based RUC.

Traffic Control / Demand Management



- Reduce congestion
- Guarantee level-of-service

Environmental Protection / Quality of Life



- Reduce air pollution (PM₁₀, CO₂, NO_x)
- Noise protection

- Effects on road traffic:**
- Decreasing traffic volume
 - Better geographical distribution of traffic

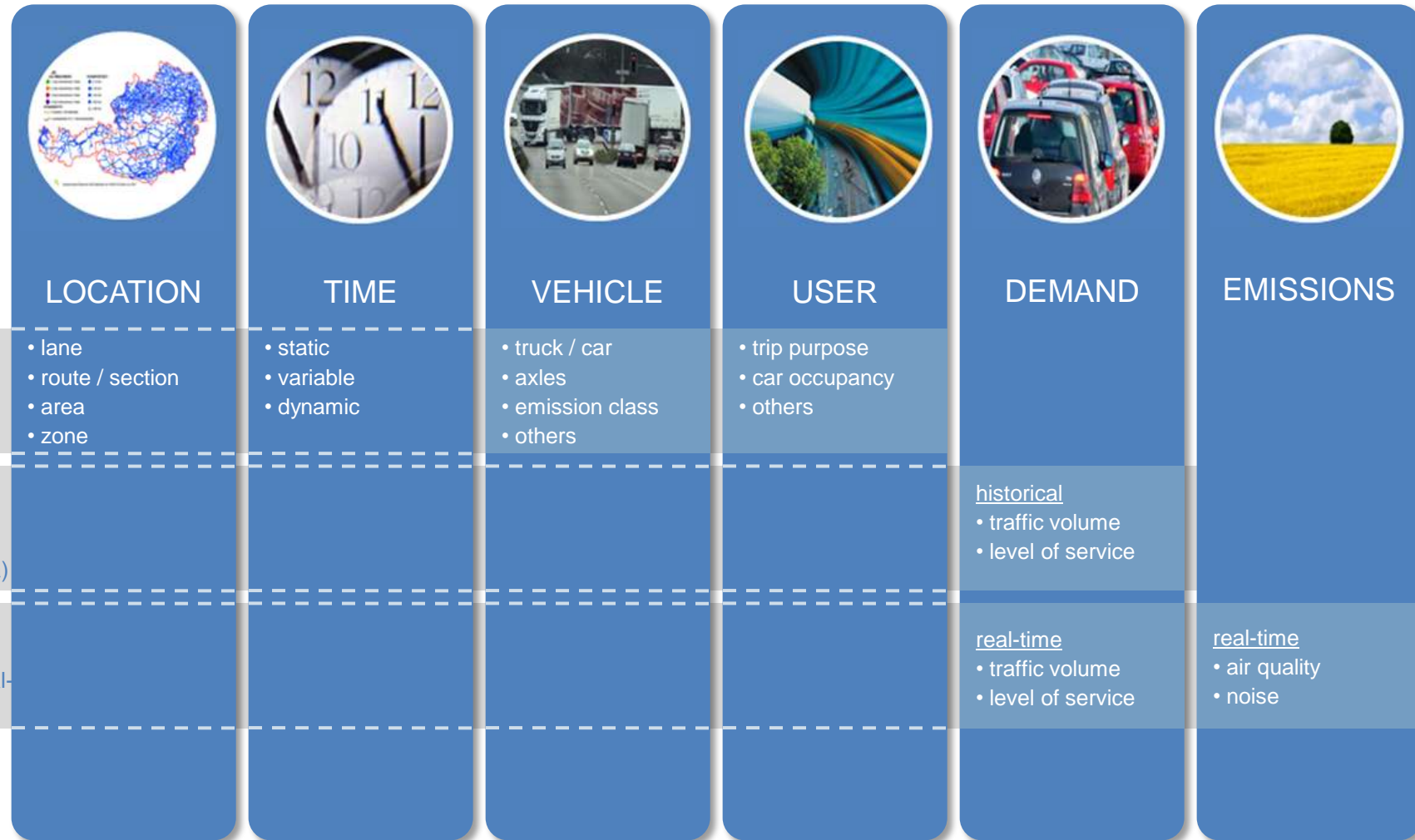
- Better distribution of traffic time-wise

Road User:

- Avoid/Consolidate trips
- Choose different route
- Choose different departure time
- Choose different transport mode

Variable or dynamic RUC schemes

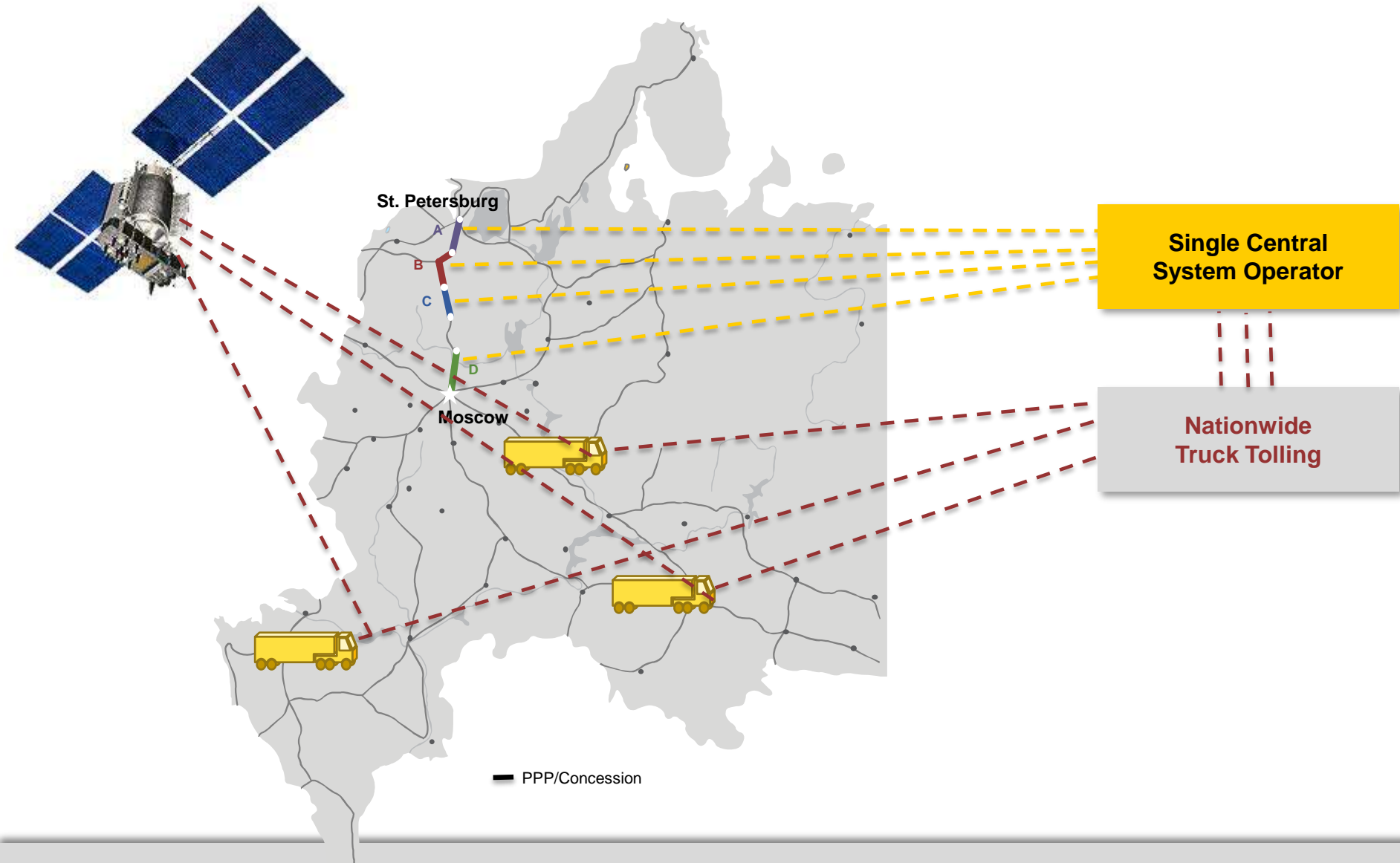
Parameters to set RUC – Pricing strategy.



Nationwide Tolling – From Patchwork to Network.



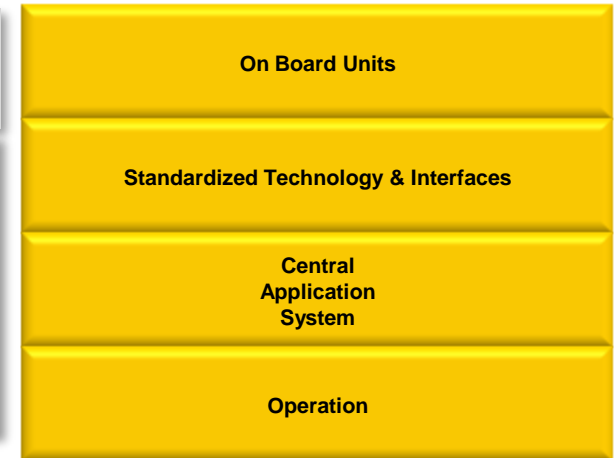
Interoperability – Seamless linkages and interconnectivity of systems.



Single Central System Operator – Responsibilities and Services.

Responsibilities

- Ensure interoperability across different tolling schemes
- Transactions and payment clearing; Provide information to concessionaires & to MoI, MoF, MoT
- Perform Operation services



Services

- Road User Services: PoS, Call Centers, Web Portals
- Billing: Issuance of invoices and collection procedure
- Enforcement: Road Side and Central Verification; Stationary, portable, and mobile enforcement

Migration of systems and Convergence of ITS solutions.

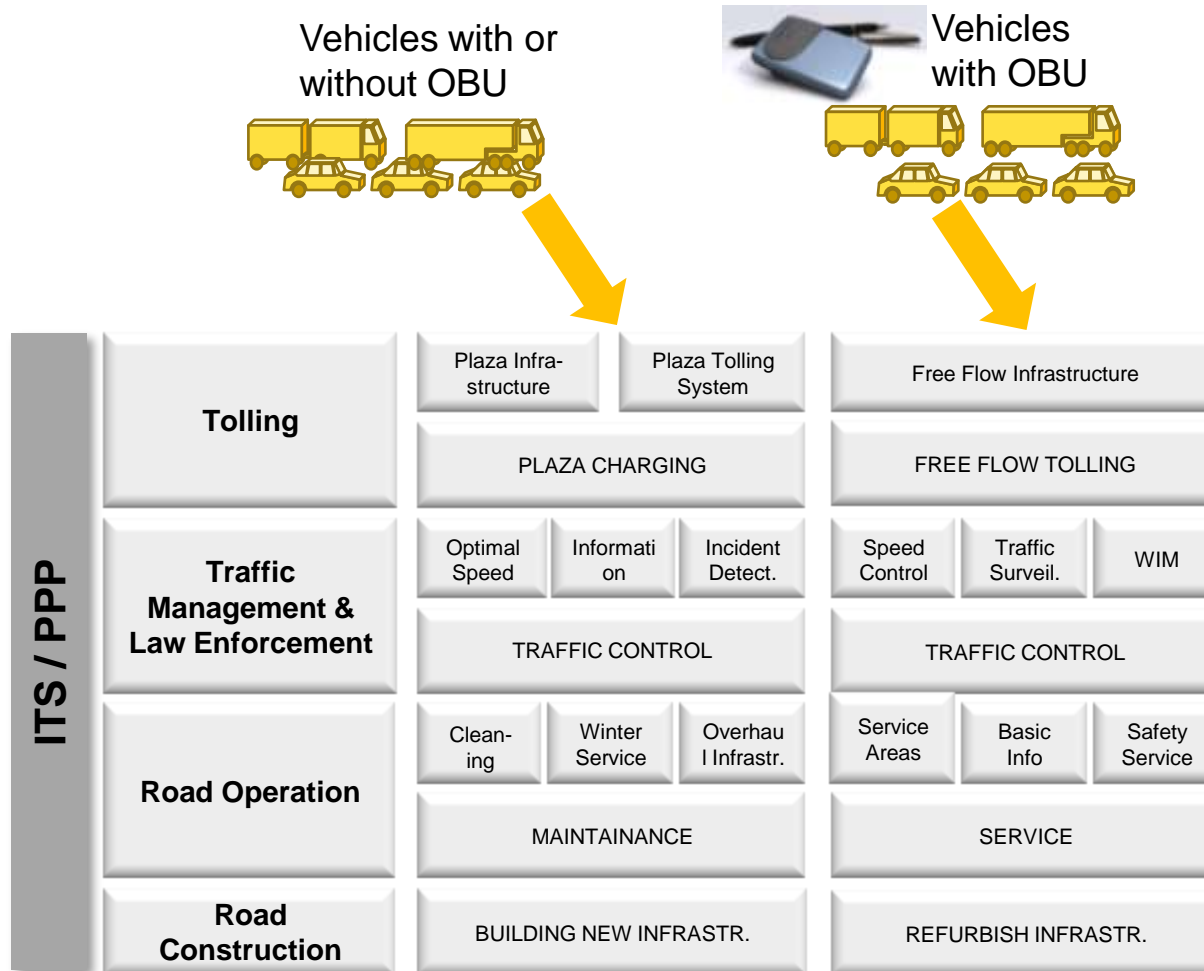








Figure: Concessionaire

Nationwide RUC schemes in Europe.

		Supplier	Type of roads	Length	Vehicles included
	Austria	Kapsch	Highways and Expressways	2.135 km	Trucks & busses >3,5t
	Czech Republic	Kapsch	Highways and Expressways	1.265 km	Trucks & busses >3,5t
	Germany	Toll Collect	Highways and some Federal Roads	13.043 km	Trucks ≥12t
	Slovakia	Skytoll	Highways and 1st class roads	2.009 km	Trucks, (busses) > 3,5t
	Switzerland	Kapsch/Fela/OZD	All roads	71.380 km	Trucks > 3,5t
	Poland	Kapsch	Highways, 1st class and other roads	7.600 km	Trucks & busses >3,5t

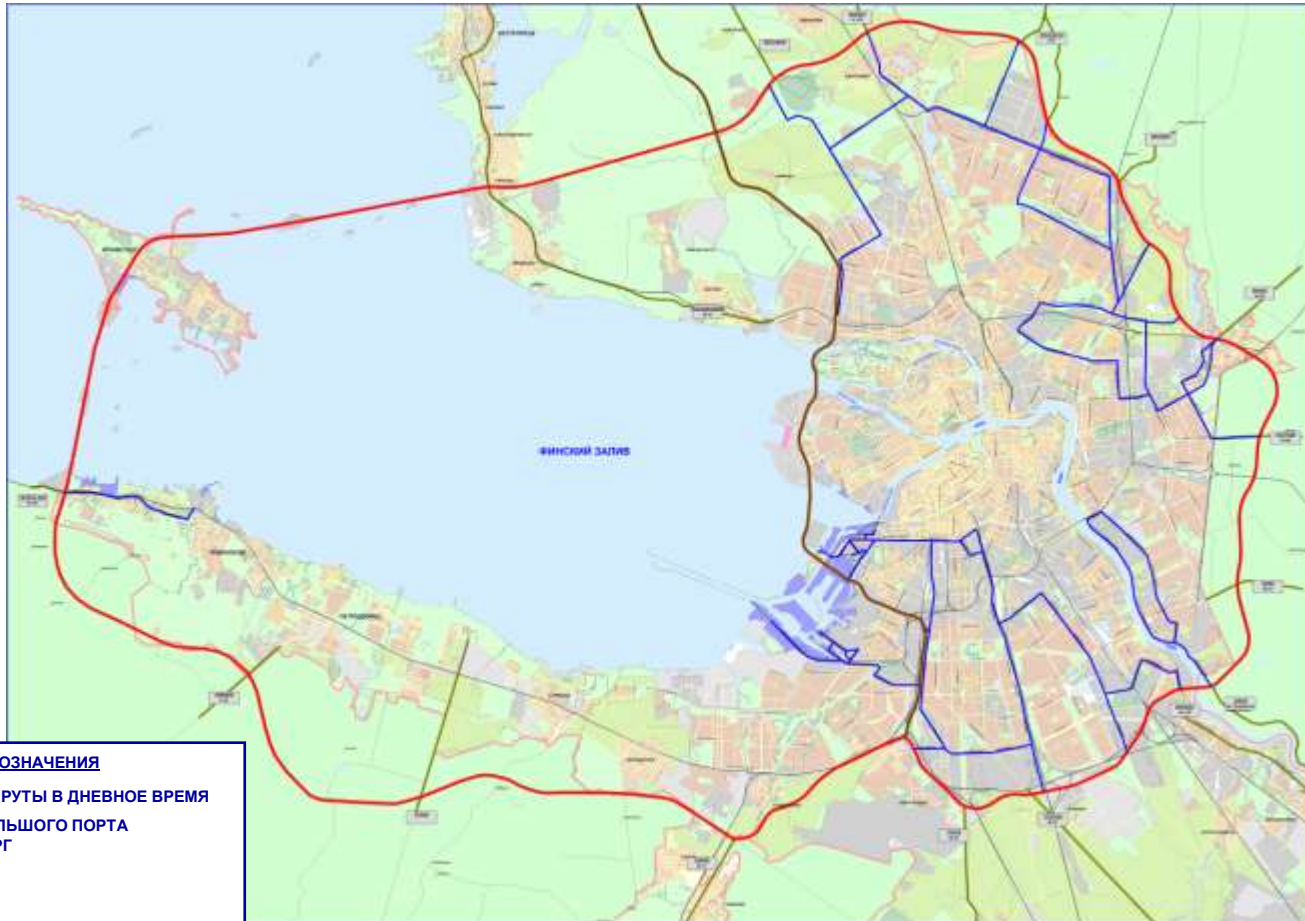
Urban Use Case – HGV access regulation.



Traffic Supply and Demand Management – how it works together.

	Environmental Policy			Transport Policy			
Traffic Policy Goals	Increase the market share of clean vehicles	Reduce energy consumption and traffic emissions	Decrease local emissions and improve quality of life	Decrease parking pressure	Reduce congestion	Increase the efficiency of the transport system	Increase the attractiveness of public transport
Control Available Traffic Infrastructure	Increase Available Traffic Infrastructure: <ul style="list-style-type: none"> • Shift public transport to green energy • Cycling, Modal shift 			Increase Available Traffic Infrastructure: <ul style="list-style-type: none"> • Public Transport, Roads, Traffic Information Decrease Available Traffic Infrastructure: <ul style="list-style-type: none"> • Traffic Signalling, Bus Lanes 			
	<div style="background-color: #444; color: white; text-align: center; padding: 5px;"> People get alternatives to their private cars </div>						
Control Traffic Demand	Reduce Traffic before it starts: <ul style="list-style-type: none"> • Encourage private green car usage • Low Emission Zones 			Reduce Traffic before it starts: <ul style="list-style-type: none"> • Urban Road User Charging • Low Emission Zones • Limited Access Regulation 			
	<div style="background-color: #444; color: white; text-align: center; padding: 5px;"> People get encouraged to use alternatives to private cars </div>						

Scheme Description Saint Petersburg – Allowed Routes for HGVs.



Scheme description.

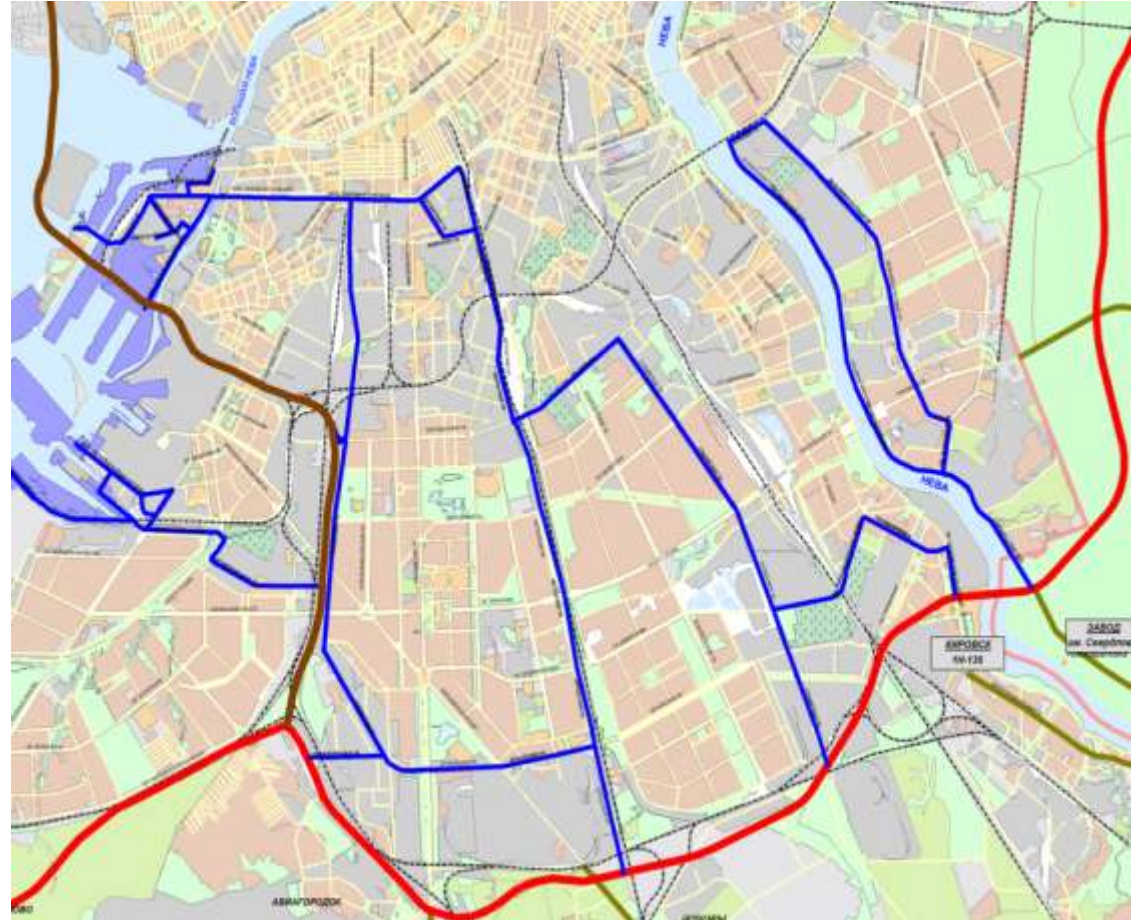
HGVs over 12t are assigned to dedicated routes

Distance-based charge

- The more kilometres are driven, the higher is the charge

Deviations from the allowed routes are not allowed

- Detection of violations



Potential Technical approach.

Vehicle Tracking

- Usage of GLONASS for tracking trucks over 12t
- Every HGV under regulation that is supposed to travel in St. Petersburg is obliged to carry an On-Board Unit (OBU)
- OBUs can be obtained at the check points

Enforcement

- At the city limits, electronic enforcement stations are used to supervise the OBU obligation
- The enforcement stations are using a DSRC link to the OBU and license plate cameras
- The stations can be used for all vehicle charging in a later stage



Functional Description Tracking.

Basic Procedure

Collect positions

Detect map segments related to collected positions

Determine the driven route

Rate the toll based on driven route and possible violations



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Checkpoints.

Entering vehicles

- The checkpoint is the place where access permits and OBUs are obtained
- Every vehicle is checked automatically whether or not it is carrying a working OBU
- Frequent users are identified

Leaving vehicles

- Every vehicle is checked automatically whether or not it is carrying a working OBU
- In case of a committed violation, an alarm is raised

Possible additional features

- Height control, weight control



Access points others than Checkpoints.

All access points where a HGV may physically enter or leave the zone aside the checkpoint are equipped with identification units



In case that a suspect HGV passes, an alarm is raised, containing the license plate number, evidential images and the OBU-ID (if any)



System Components.

GLONASS on-board unit

- Thin client following EETS guidelines
- Hybrid design combining DSRC, GLONASS and GSM/GPRS modules
- Recording, storing, encrypting, packaging and transferring of positions to central system
- Holding and providing vehicle specific & system specific data
- Parameter and software updates via the air interface
- Mounting at windscreen & external power supply for GLONASS functionality



System Components.

Roadside equipment at Check- and Access points

- ANPR cameras and DSRC transceivers for enforcement purposes
- Checkpoints-only:
 - Points-of-sale for OBUs
 - Payment of charge and fines



Central system

- Map matching
- Updates of tariff and route data, e.g. Redefine areas
- Storage of passages and violations
- Billing
- Customer Relation Management, Call centre

Our experience so far.



Lesson learned

From Patchwork to Network

- Network connections on nationwide, federal and municipal level and harmonized systems
- Migration of systems

Communication & Education

- Communication of pros and cons
- Education on Road user behaviour and alternatives
- Consider different customer experiences with user fees

Cooperation

- Inter agency cooperation on national level
- Cooperation on international level with IO's



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