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Austrian Nationwide Multi-Lane Free-Flow Truck Tolling Scheme

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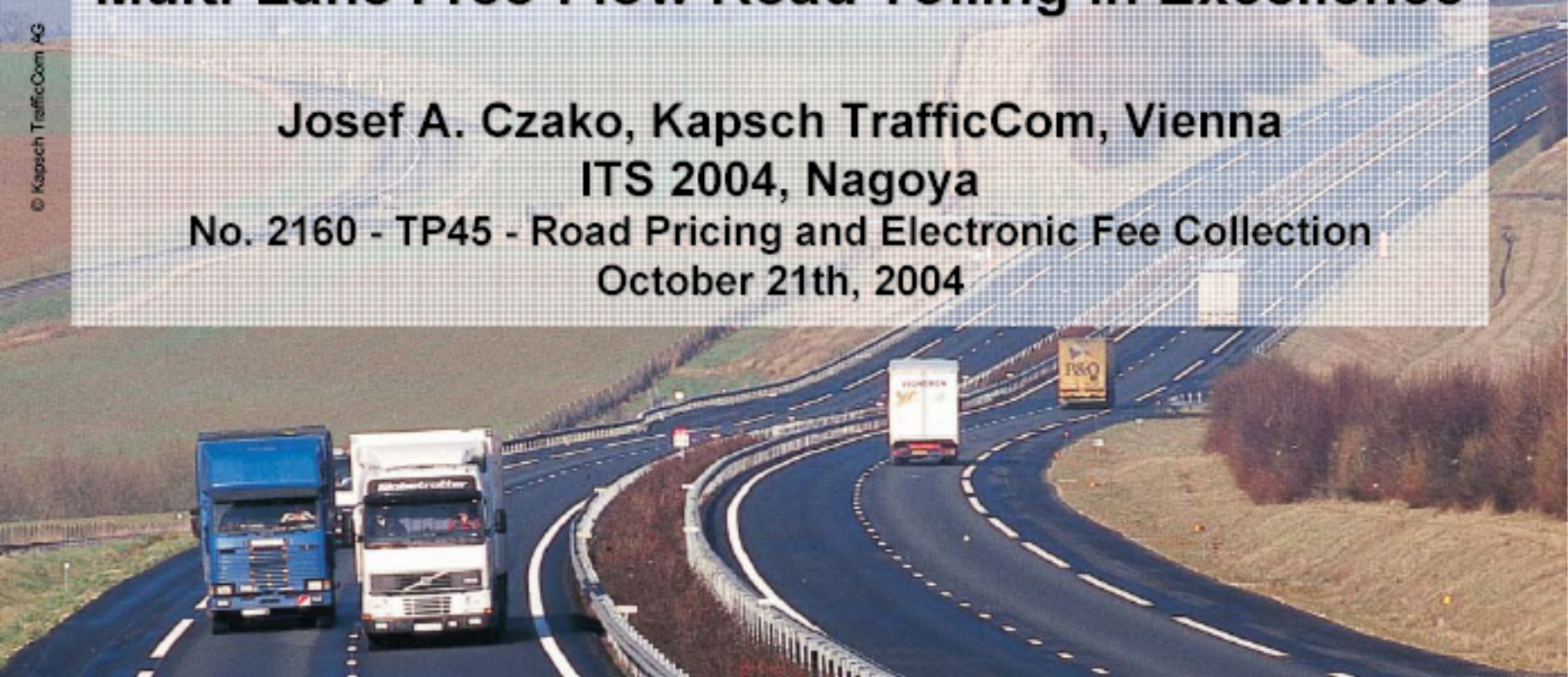


*11th World Congress on ITS
Nagoya, Aichi 2004, Japan*

The Austrian Nationwide Truck Tolling Scheme or Multi-Lane Free-Flow Road Tolling in Excellence

**Josef A. Czako, Kapsch TrafficCom, Vienna
ITS 2004, Nagoya**

**No. 2160 - TP45 - Road Pricing and Electronic Fee Collection
October 21th, 2004**



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Austrian Nationwide Multi-Lane Free-Flow Truck Tolling Scheme

Presentation Overview

- 1. Overview on the Project**
- 2. Project Phases**
- 3. Technologies for Tolling and Enforcement**
- 4. Project Organization**
- 5. Experiences**
- 6. Success Factors**

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About the Kapsch Group

- > Founded in 1892
- > The company is operated and owned by the Kapsch family
- > Headquartered in Vienna, Austria
- > Business Areas:
 - Kapsch BusinessCom: Solutions for Telecommunications
 - Kapsch CarrierCom: Server Network Provider
 - **Kapsch TrafficCom: Road Traffic Telematics and Railway Communication**
- > Business 2003: Revenues €475m, 2.050 employees



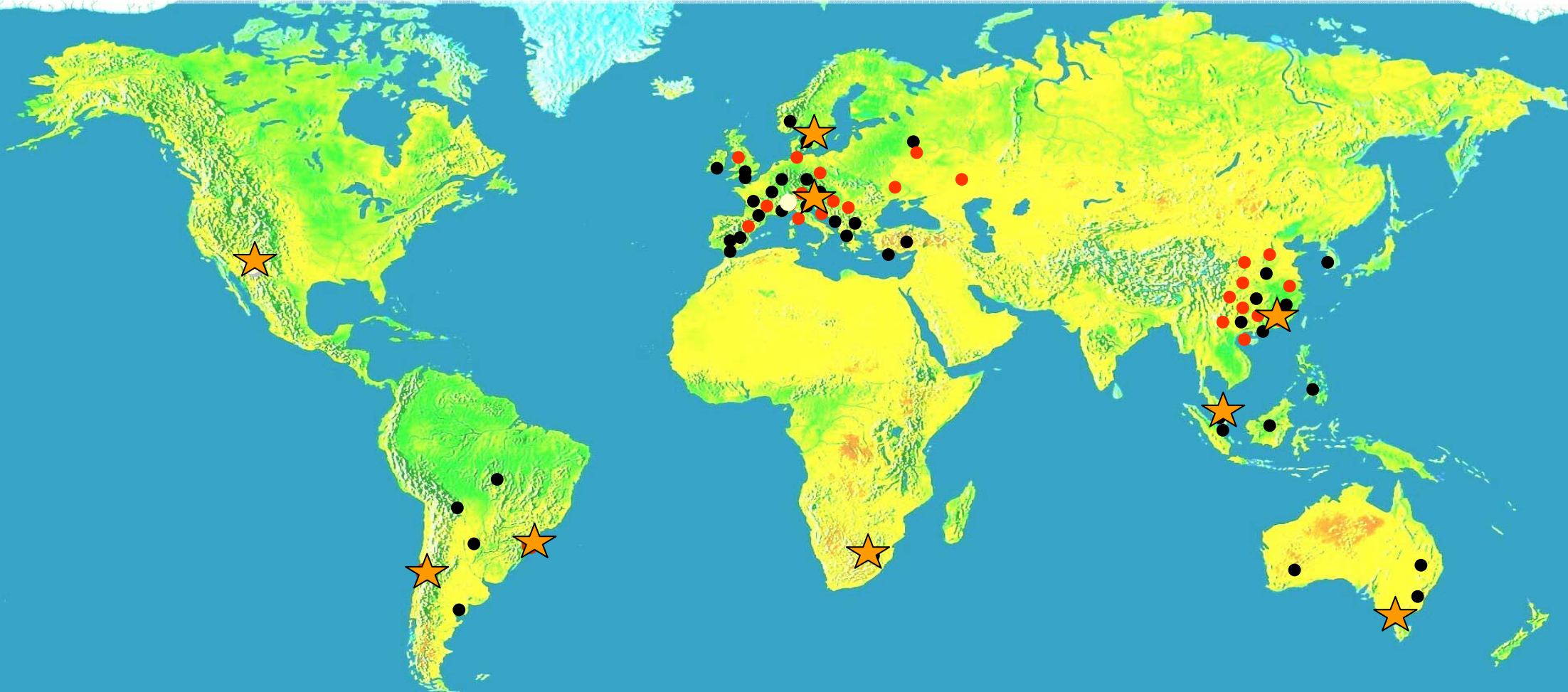
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References and Presence - Road and Rail



**Austria | Argentina | Australia | Brazil | Chile | China | Denmark | France |
Germany | Greece | Ireland | Malaysia | Norway | Poland | Philippines
|Portugal |Slovenia | Spain | Sweden | Switzerland | Turkey | U.K.**

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Major Multi-Lane Free-Flow References Kapsch TrafficCom

- > **Austria - Nationwide Truck Tolling Scheme**
- > Melbourne City Link, Australia
- > Switzerland LSVA - Nationwide Truck Tolling Scheme
- > Santiago de Chile: Costanera Norte, Norte-Sur, Vespucio Norte Express
- > Directs (UK)



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MAUTSYSTEM FÜR LKW UND BUS

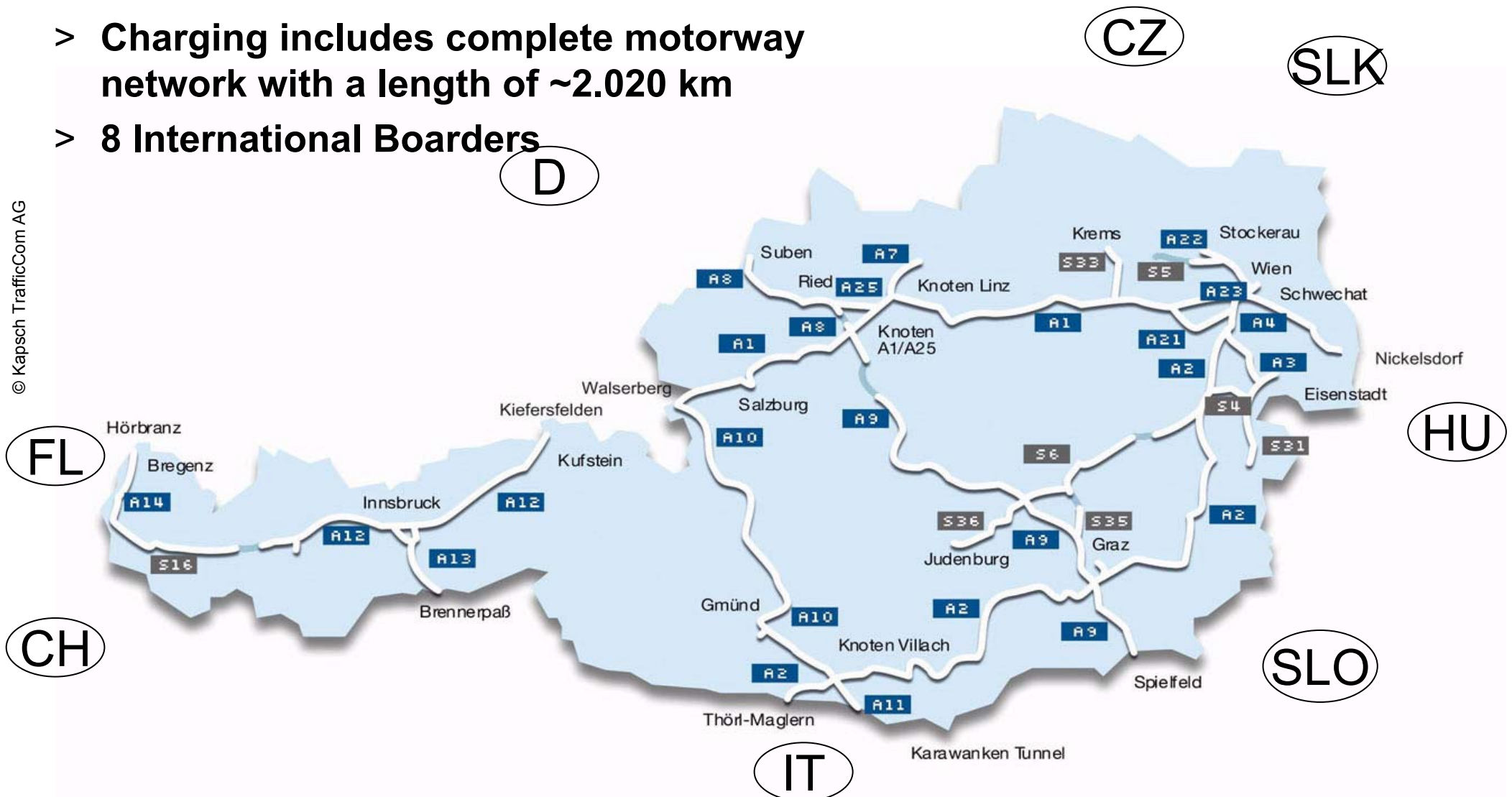
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**The Austrian Nationwide
Multi-Lane Free-Flow
Truck Tolling Scheme**

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The Austrian Motorway Network

- > Charging includes complete motorway network with a length of ~2.020 km
- > 8 International Borders



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Project Facts & Figures

- > Charging scheme for all vehicles above 3,5 tons
- > Legal framework for Charging and Enforcement in place
- > Mandatory OBU (required by law)
- > 400.000 Trucks expected
- > Categorisation for 2, 3, 4 and more, axles
- > Advanced Enforcement Strategy:
 - 100 Fixed Enforcement Gantries
 - 32 Enforcement Vehicles for spot checks
 - 20 portable enforcement stations



The Tender Process

- > Winning Bidder: Autostrade S.p.A. / Europpass
- > Contract signed: 25th June 2002
- > Start of system operation: 1st January 2004
 - **Realization period: 18 months !**
 - **Punctual, no delays!**
- > Contract includes 10 years of operation and maintenance
- > Total project value ~ €750m
 - ~ 12% costs for ownership

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Project Partners

Concessionaire

A|S|F|i|N|A|G



Contractor



Turnkey Supplier

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Scheme

Implementation of a nationwide truck tolling scheme, including 10 years of operation

Operation

Customer Relation Management, OBU Distribution, Accounting

ETC

Entire Tolling System (ETC and infrastructure), and maintenance

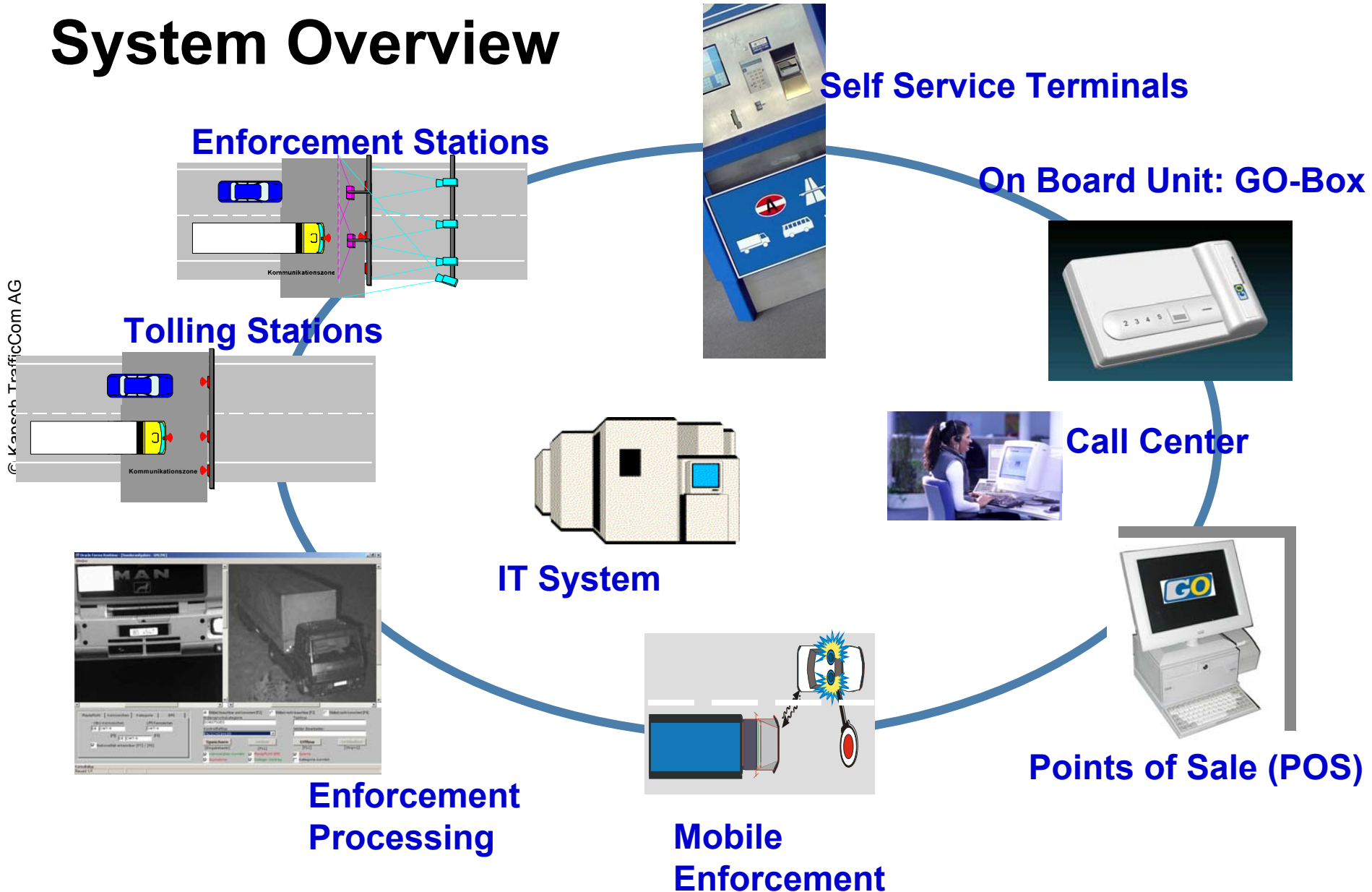


Project Requirements

- > Good economic efficiency / good Value for Money
- > High legal security: Consistency of the law before the courts (toll dodgers)
- > High enforcement rate
- > User friendliness and acceptance
- > Interoperability



System Overview



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On Board Unit (GO! Box)

- > Every vehicle to have an OBU
- > Personalized (number plate, vehicle category, bus/truck, payment)
- > Change of vehicle class by driver
- > Easy to mount by driver (adhesive Velcro strips)
- > Payment choices:
 - **Post-Pay**
 - ⊗ Credit Cards
 - ⊗ Fleet Cards
 - ⊗ Maestro Card
 - **Pre-Pay**
 - ⊗ Cash
 - ⊗ Credit Cards
 - ⊗ Fleet Cards
 - ⊗ Maestro Card
- **Proven DSRC 5.8 GHz technology, based on CEN TC 278 standard**



Multi-Lane Free-Flow Tolling Stations



**New
Infra-
structure**



**Use of existing
infrastructure, at bridges
and tunnels**

Roadside Cabinet



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Portable Toll Stations



- For Deviations
- During Construction



Integration of existing Toll Roads

- 6 Special Toll Roads in Austria, e.g.:
 - Brenner Pass
 - Tunnels
- Integration of the use of the GO! - OBU



Enforcement

- > **Major Goal:**
Ensures revenues for Operator and Concessionaire !
- > **Combination of different methods:**
 - **100 Fixed Enforcement Stations, with:**
 - **DSRC**
 - **Classification**
 - **Digital video**
 - **LPR/OCR**
 - **20 Portable Enforcement Stations**
 - **32 Enforcement Cars**
- > **Integrated IT structure for enforcement**



Laser Technology based Enforcement Stations

- **Precise enforcement for standard traffic situations**
- **DSRC Communication with OBU (tolling)**
- **Vehicle Detection & Classification**
- **Video System**
 - *OCR / License Plate Reading (LPR)*
 - *Front Photo*



Stereoscopic Video Technology based Enforcement Stations “Stop&Go”

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- > **Most Precise Enforcement for stop & go Traffic,**
- > **Stereoscopic Vehicle Classification**
- > **DSRC Communication with OBU (tolling)**
- > **Digital Video Processing:**
 - > **OCR / License Plate Reading (LPR)**
 - > **Front Photo**
 - > **Side Picture**

Mobile Enforcement Stations

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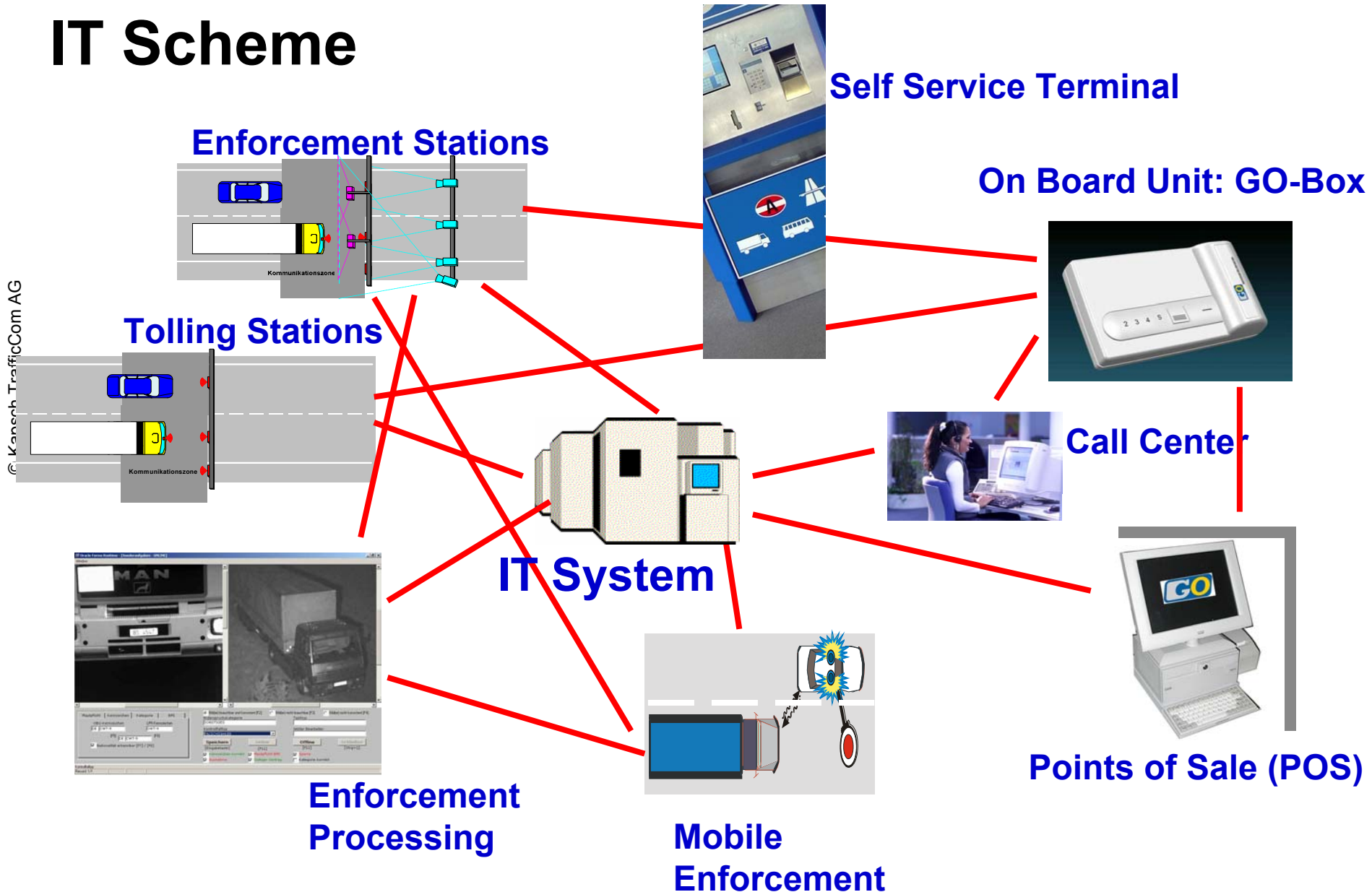


Enforcement Cars

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IT Scheme



Sales & Marketing (by Operator Euroypass)

- > Manned Point of Sales (215) at petrol stations, motorway services, shipping agencies, and service centers
- > 24h Vending Machines (80) located in the highway network and on the access roads at the boundaries of the neighboring Countries
- > 24h Call Center (free 0800 number, 6 languages, ordering of OBU's, claims handling)
- > Web Services (Self Care, Public, Press)
- > Printed Materials (in 12 languages)
- > Mailings



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Why Multi-Lane Free-Flow Technology?



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Multi-Lane Free-Flow Technology in use:

- > Austria Nationwide Truck Tolling Scheme
- > London Congestion Charging
- > Melbourne City Link
- > Santiago de Chile
- > Switzerland
- > UK Directs
- > Toronto 407 ETR
- > Cross Israel Highway



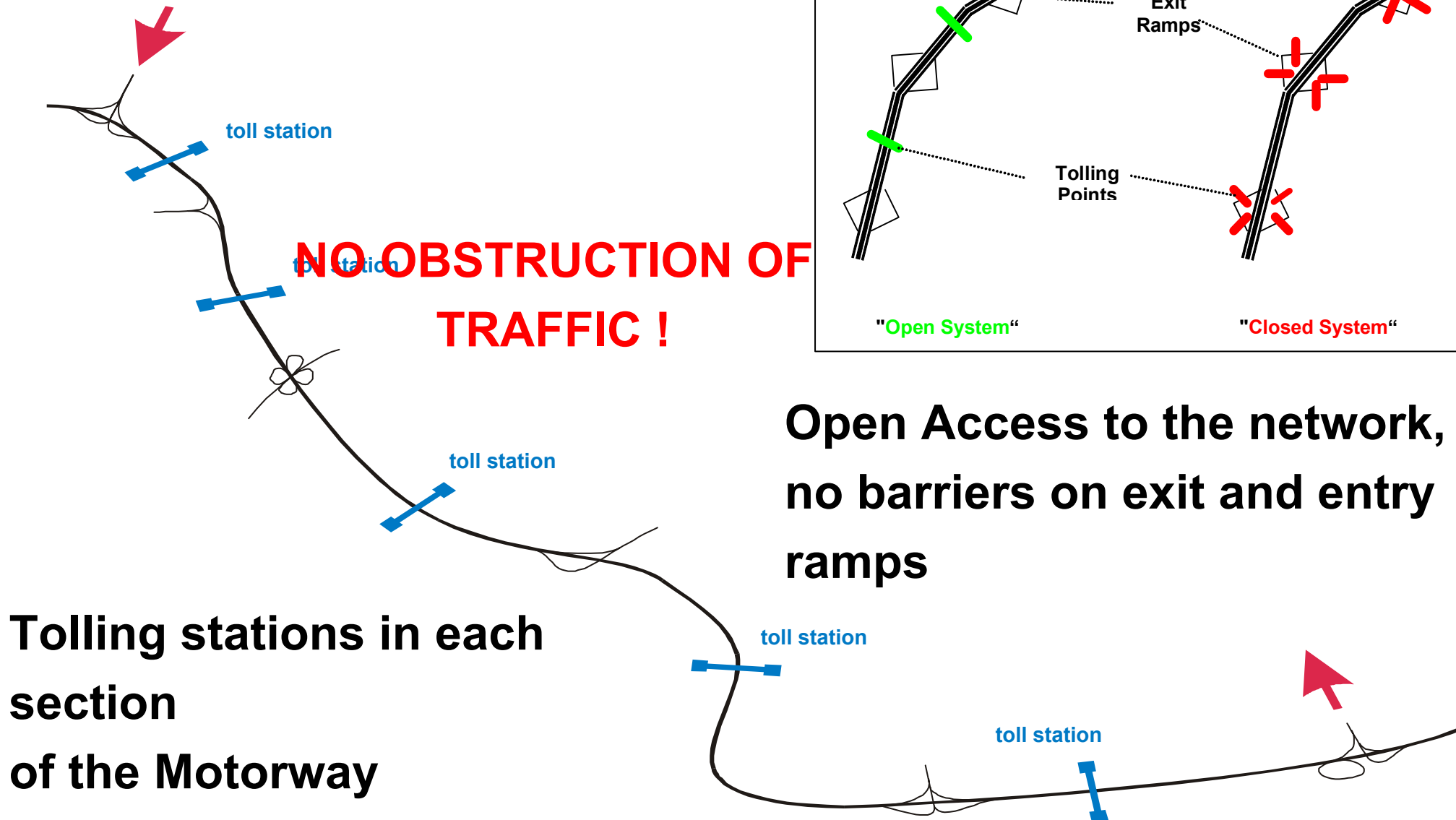
Lane Throughput Comparison

System	Vehicles per hour and lane
Manual, with barriers	200 - 300
ETC, with barriers	500 - 650
ETC, Stop & Go	~ 1.000
Multi-Lane Free-Flow	~ 3.000 depending on road capacity

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Multi-Lane Free-Flow Architecture

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Tolling stations in each section of the Motorway

Open Access to the network, no barriers on exit and entry ramps

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Benefits of Multi-Lane Free-Flow Electronic Tolling

- > **More comfort for the users**
- > **Reduce congestions**
- > **Reduction of accidents**
- > **Lower operational costs: personnel, toll booth, maintenance**
- > **Lower investments costs for new Toll Roads: less property needed for Toll Stations**
- > **Enables Tolling also on new roads, where manual tolling is not possible, e.g.**
 - **for Congestion Charging Schemes**
 - **where no space is available (bridges)**
 - **where manual operational costs are inappropriate**



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Why DSRC Microwave 5.8 GHz Technology?

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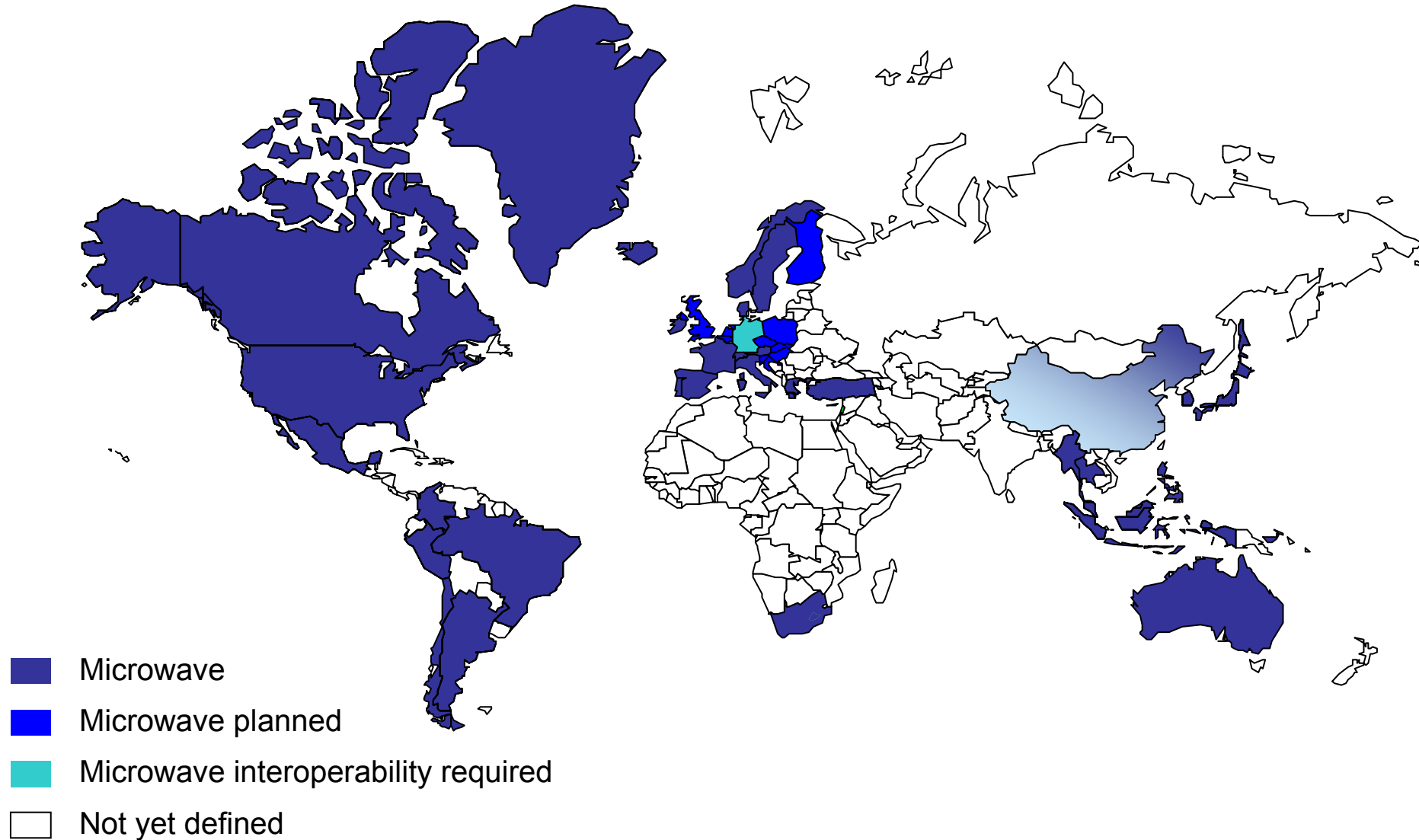
Benefits DSRC 5.8 GHz Microwave

- > Proven technology
- > Excellent performance:
 - All weather conditions
 - High vehicle speed possible
 - Multi-Lane Free-Flow best suitable
- > Standard for World Wide Interoperability
- > Good cost of ownership



DSRC Microwave ETC Systems Worldwide

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Experiences after 9 months of operation

- > 380.000 OBU's in use**
- > 80% of vehicles volumes are international**
- > ~ 2 Million transactions per day**
- > 99,6% toll transaction accuracy rate**
- > Detected toll dodgers 2,5%, subject for enforcement, 99,8% of tolls are collected**
- > 70% of customers are post pay customers**
- > Revenues from Scheme in 2004
~€720m p.y. (~ € 2 m revenues per day)**



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Success Factors

- > **Good acceptance by users**
→ **Easy to use**
- > **Integration of proven DSRC technology and Multi-Lane Free-Flow Operation**
→ **Low risks**
- > **Experienced suppliers and project partners**
→ **Best design and punctual schedule**
- > **Turn key supply and maintenance**
→ **Excellent performance**



A look ahead - future applications

- > Section Control (speed measurement)**
- > Charging of all vehicles (also private cars)**
- > Integration of Urban Charging Schemes (Congestion Charging)**
- > Parking / Access Control**
- > Hazardous Goods Management**
- > Traffic Management (electronic traffic signs, closing lanes, changing speed limits)**
- > HLS – Homeland Security**
 - Dragnet operations for vehicles**
 - Search and monitoring vehicles**



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Summary

Austrian Nationwide Truck Tolling Scheme

- > First nationwide Multi-Lane Free-Flow Charging Scheme worldwide**
- > MLFF ensures no obstruction of traffic flow due to toll payments**
- > Intelligent enforcement strategy to secure tolling revenues**
- > Use of proven and reliable technology**
- > Interoperable**
- > Economic and efficient operations**
- > User friendly**



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Austrian Nationwide Multi-Lane Free-Flow Truck Tolling Scheme

**Welcome to visit Austria,
to see the most modern
Nationwide
Multi-Lane Free-Flow
Tolling Scheme
Worldwide**

kapsch >>> **Ours work.**

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**THANK YOU
FOR YOUR ATTENTION**

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