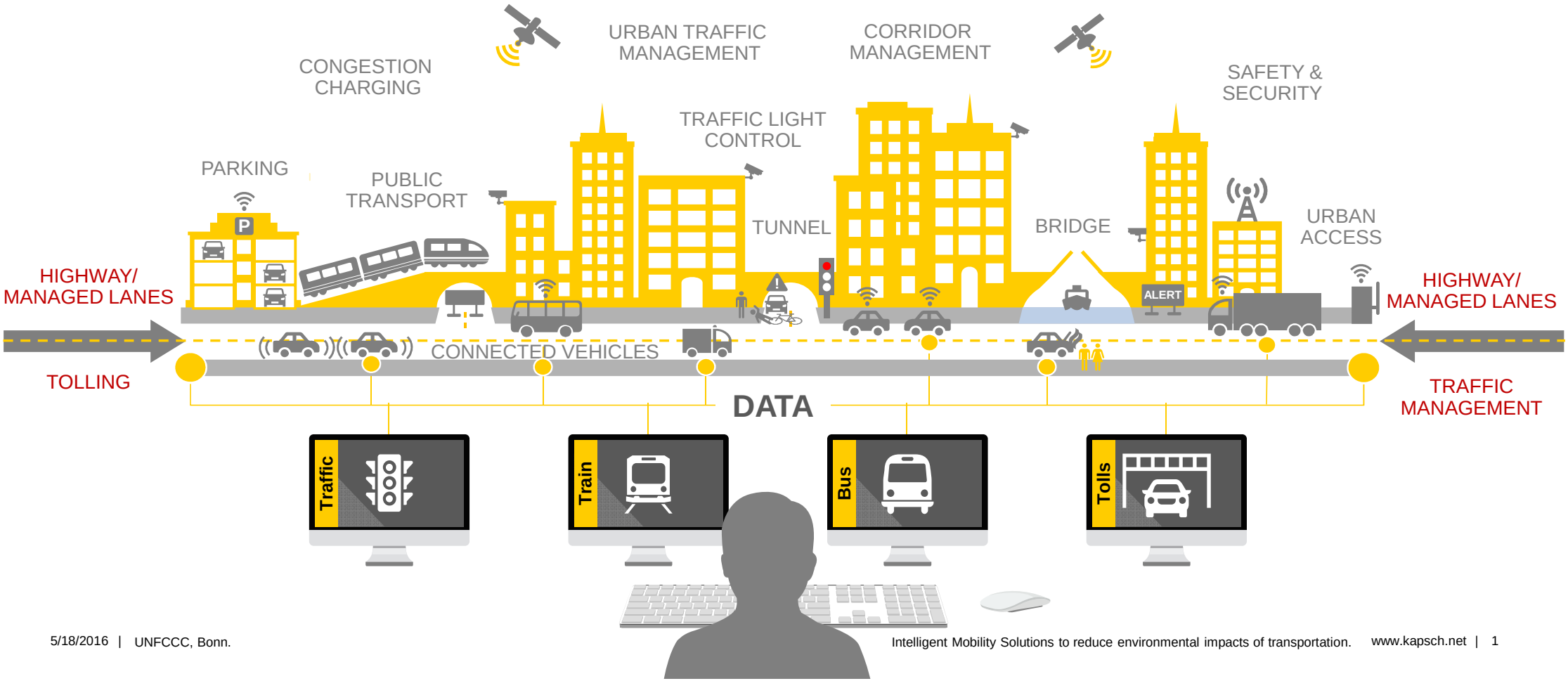
Intelligent Mobility Solutions.

From Highways to Cities.



At a Glance.

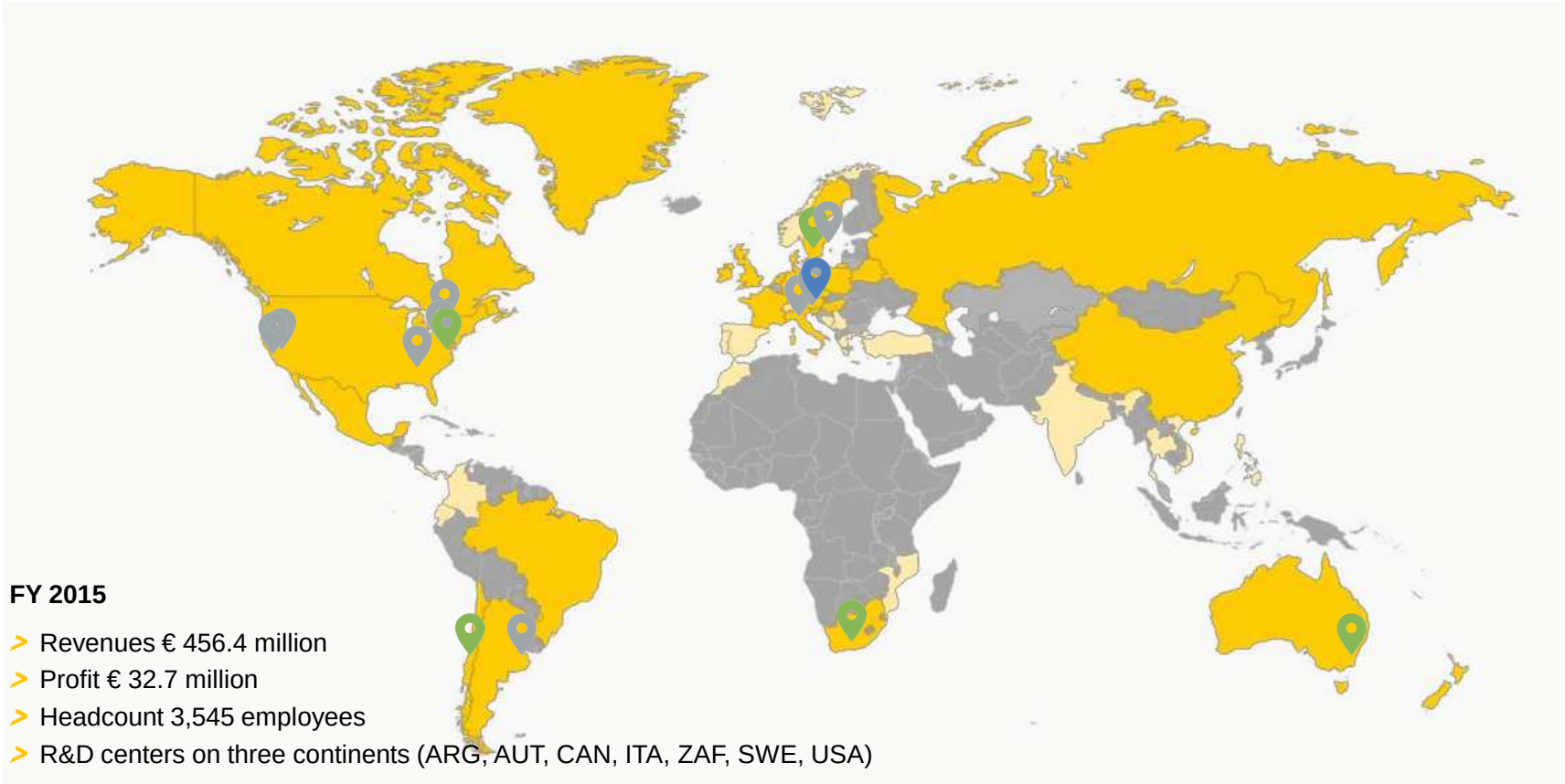
References in 44 countries on all continents.

References and subsidiaries

References without subsidiaries

Subsidiaries without references

No references or subsidiaries



Global headquarters

Regional headquarters

R&D Center

FY 2015

- Revenues € 456.4 million
- Profit € 32.7 million
- Headcount 3,545 employees
- R&D centers on three continents (ARG, AUT, CAN, ITA, ZAF, SWE, USA)

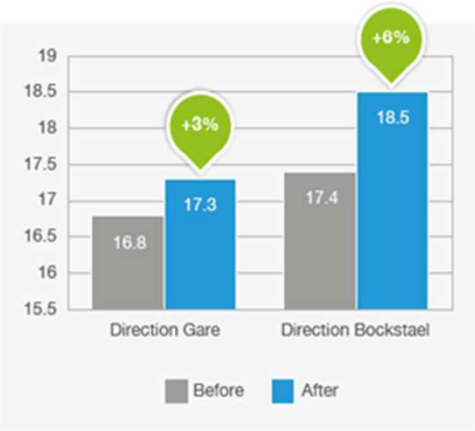
Polis Conduits KPI Decision support tool.

Wash-out of environmental benefits by potentially induced demand effects.

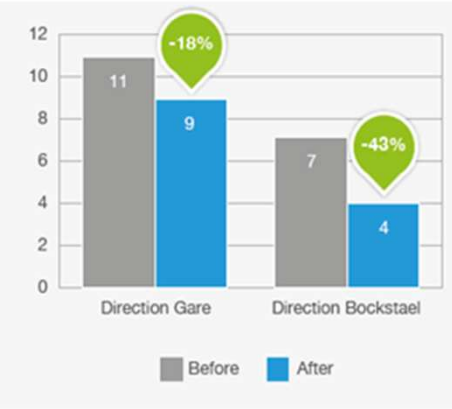
Conduits KPI DST

- Measure the effect of an ITS on pollution
- Polis, PTV, Bruxelles Mobilité, City University of London, TUM, Kapsch
- Tool has been tested in Brussels, Stuttgart, München, Ingoldstadt, Tel Aviv, Haifa, Paris, Rome

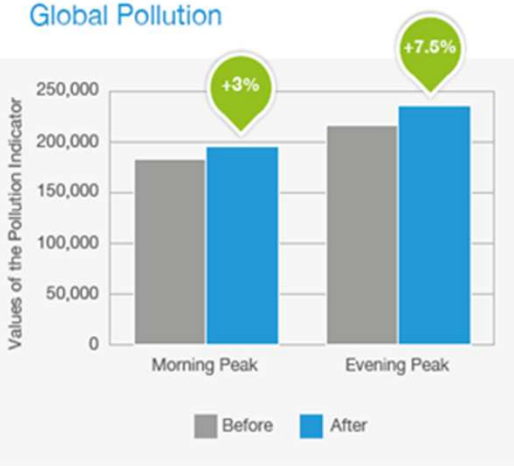
Bus Average Speed (km/h)



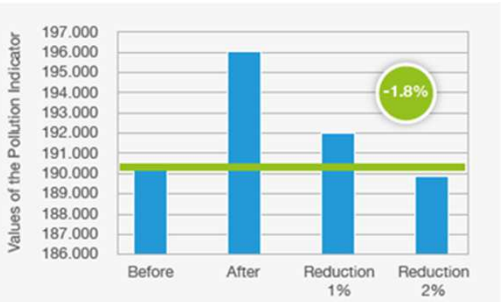
Number of Stops at Traffic Lights



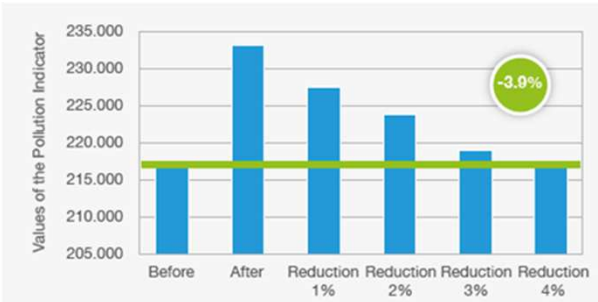
Global Pollution



Sensitivity Morning Peak



Sensitivity Evening Peak



Conduits KPI DST

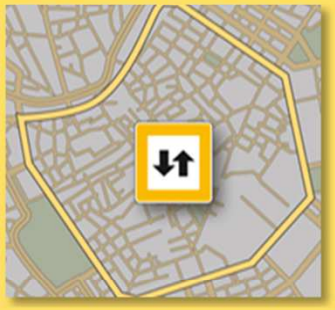
- Brussels case study
  - Impact of the planned introduction of bus priority at traffic lights on bus line 49 with micro-simulation (VISSIM)
  - Simulation scenarios: morning and evening peak, both directions and before and after implementation (Figure ‘Mobility’ & ‘Pollution’ indicator, Figure ‘Sensitivity Analysis’
  - Does not cover measures that aim to reduce car use, such as modal shift, suppression of trips by pricing, taxation or access control

Urban Access charging.

Schemes.

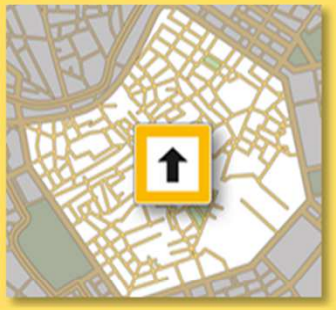
*Urban Access Charging schemes aim to **reduce traffic** and therefore **pollution**, and **generate revenue** to invest into sustainable modes of transport.*

Cordon
Single Access



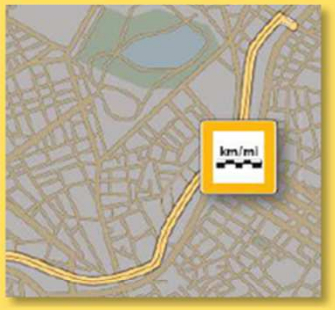
Charge per crossing in and/or out of the zone.

Zone
Day Access



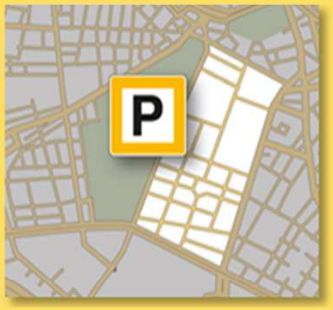
Charge per day for accessing the zone.

Distance
Pay as you Drive



Charge based on distance travelled (within the zone).

Duration
Dynamic Parking



Charge based on duration of stay within the zone.

Corridor
Transit Passage

Charge per passage through a particular road.

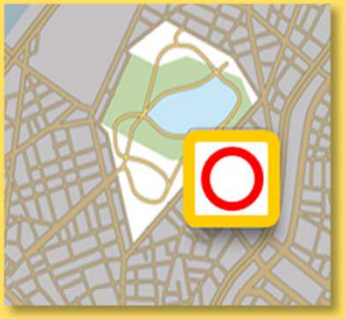
Dynamically adjusted charges based on time of day (peak / off-peak) and day of week (weekends, holidays).
Permit-based exemptions or reduced charges (e.g. residents, disabled, public services, commercial vehicles).

Urban Access restriction.

Schemes.

*Urban Access Restriction schemes **limit vehicular access** to **protect infrastructure** & the **environment**, and to improve **road safety**.*

Permit
Limited Access Zone



Limit access to the zone to permit holders only.

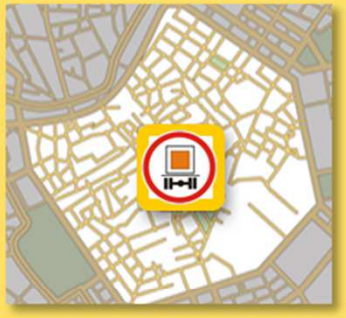
Emissions
Low Emissions Zone

Limit access to vehicles with low emissions only.

Dimensions
Limited HGV Zone

Restrict HGV access based on weight & dimensions.

Dangerous Goods
Protection Zone



Restrict access to HGV carrying dangerous goods

Flexible restrictions concepts based on time of day and day of week (weekends, holidays).
Possibility of charging for HGV permits (LEZ, weight/dimensions).

Global Success Stories.

Tangible improvements.

	Traffic Volume	Travel Times	Public Transport	CO_2	NO_x	PM10	Surplus
London	-21% (2002-2008)	-30% delays	+18%	-16%	-13%	-15%	$150M p.a.
Stockholm	-20%	-33% delays	+5%	-13%	-8%	-13%	$80M p.a.
Milan	-34%	-17%	n/a	-22%	-10%	-19%	$16M p.a.
Singapore	-44% (ALS)	n/a	n/a	n/a	n/a	n/a	$51M p.a.

> *PWC, Study on Urban Access Restrictions, 2010*

Jonas Eliasson on how to solve traffic jams

Director of the Centre for Transport Studies at Sweden's Royal Institute of Technology, TED talk 2012

- Create incentives, don't plan details, people will figure out and adopt quickly
- Traffic is a non-linear phenomenon
- Public support for charges (40% → 30% →70%)
- Travel patterns are not stable
- Don't people tell to adopt, nudge them

EcoTrafiX.

Real-time traffic management to reduce emissions. Traffic Signals Control, Traffic Information, Speed Enforcement, Integrated Corridor Management.

Emissions reduction summary

Hardware

EcoTrafiX Controller	182 kgCO2eq/y
City (400 junctions)	72.8 tCO2eq/y

Traffic Systems

Traffic signals control (1Mcars/y)	45,000 tCO2eq/y
ITS information services (2.5Mcars/y)	57,000 tCO2eq/y
Speed enforcement (1,000 fines/day)	7,300 tCO2eq/y
Integrated Corridor Management	9,400 tCO2eq/y

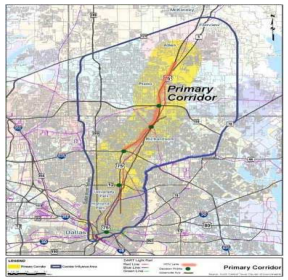
EcoTrafiX.

Integrated Corridor Management. Dallas.

BENEFITS

Benefits to the public administration

- Enhanced cooperation between agencies and operators.
- 'Integrated cockpit view" into a single interface of all existing traffic & transport systems, increasing operators' situation awareness and efficient operation.



Benefits to the citizens

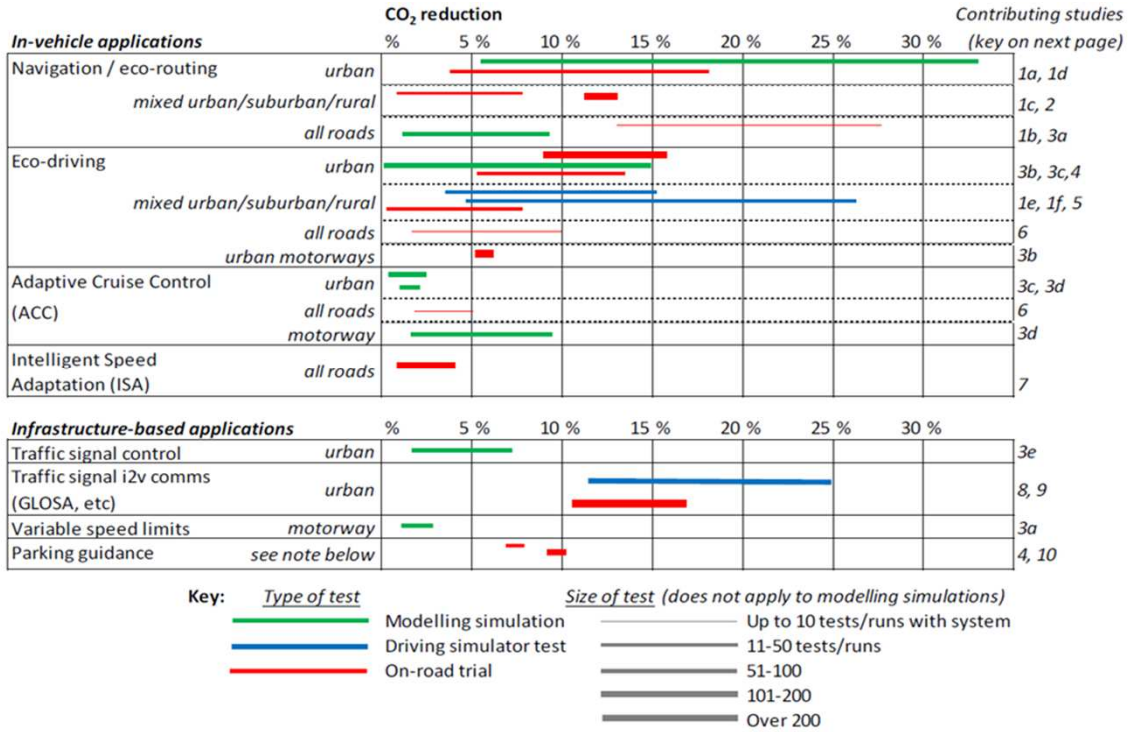
- "My city is taking care of my day-to-day traffic problems!". The solution enables citizen to touch the benefits of getting real-time information to best plan their mobility, save time and money, while feeling an improved level of safety.
- It makes citizen feel they are part of a more sustainable region which invests to improve the quality of living, while optimizing its own systems.

TANGIBLE IMPROVEMENTS

Benefits by type	Benefits quantified
Annual Travel Time Savings (Person-Hours)	740,000
Improvement in Travel Time Reliability (Reduction in Travel Time Variance)	3%
Gallons of Fuel Saved Annually	981,000
Tons of Mobile Emissions Saved Annually	9,400
10-Year Net Benefit	$264M
10-Year Cost	$14M
Benefit-Cost Ratio	20:1

Conclusions.

Tests & Studies. Initiatives.



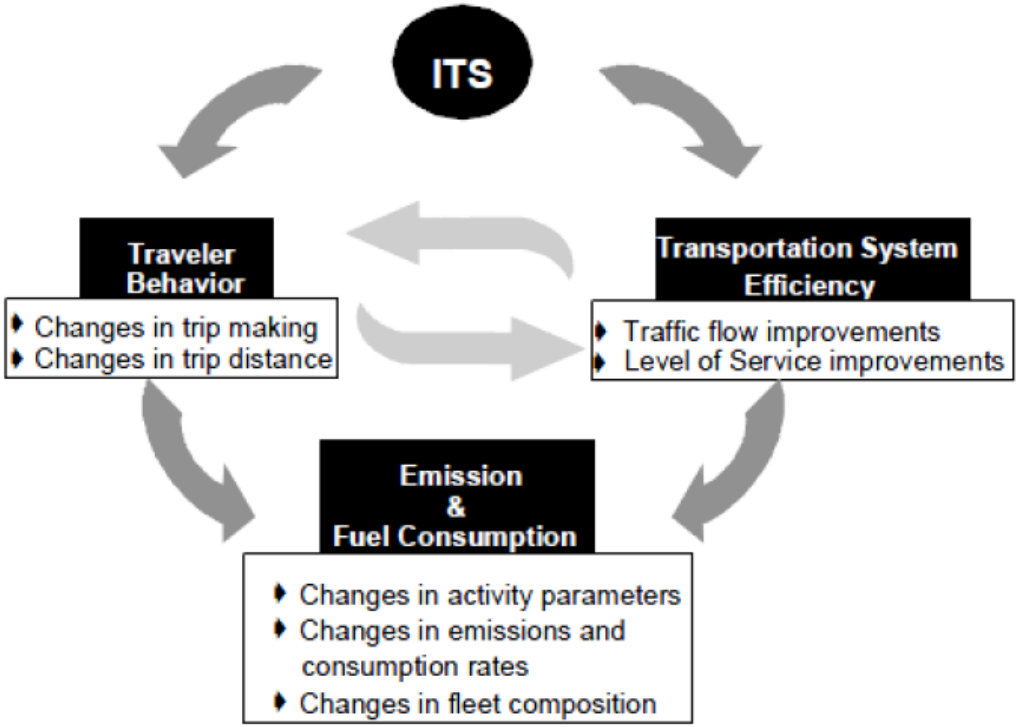
- *ERTICO, Study of Intelligent Transportation Systems for reducicng CO2 emissions for passenger cars, 2015*

Studies, projects and tests

- **EU "ICT-Emissions" project**
  - Developed a generic methodology to simulate and quantify real impact of ICT measures on fuel consumption and CO2 emissions of current and future vehicle fleets, combining micro scale (i.e. driving profile) and macro scale (i.e. network)
  - Considering all basic categories of measures (e.g. traffic management and control, demand and access management)
  - Testing "ON" and "OFF" modes to have real-world scenarios (Madrid, Rome, Turin etc.)
  - Target groups: local authorities, automotive industry, OEMs.
- **"ITS for climate"**, French initiative to promote ITS applications to climate change action and policies with the view to contribute to COP21's objective.
- **U.S. National Center for Sustainable Transportation**, supported by the U.S. DOT, Intelligent Transportation Systems for Improving Traffic Energy Efficiency and Reducing GHG Emissions from Roadways, 2015
  - ITS programs to reduce energy and emission on the order of 5% to 15%
  - Benefits range widely due to type of application, pre-existing conditions etc.
  - To counteract undesired effects, programs may have to be coupled with some specific travel demand management measures such as pricing.

Conclusions.

Balanced approach. To do's, Policy action needed.



- Impact chain of traffic management and ITS measures; Master Thesis "Analysis of the Traffic related Emission Reduction Potential of Urban Traffic Management Measures" Roman Schagala, 2011

Further policy action should

- Consider greenhouse gas mitigation as part of the bigger picture of **automated, connected, electric and shared mobility**
  - Connected and automated vehicle technologies offer great potential to improve road safety, traffic flows and environmental performance of the transport system (EU Amsterdam Declaration on the Cooperation in the field of connected and automated driving, April 2016)
- Take into account that most of the environmental-ITS programs are additive and therefore **greater benefits may be achieved when a multitude of these programs are put into place**
- **Couple environmental-ITS programs with specific travel demand management measures** such as pricing
  - U.S. National Center for Sustainable Transportation, Intelligent Transportation Systems for Improving Traffic Energy Efficiency and Reducing GHG Emissions from Roadways, 2015

Your contact.

Gilbert Konzett

Policy Officer
International Relations & Government Liaison

Kapsch TrafficCom AG
Am Europlatz 2 | 1120 Vienna | Austria
Phone +43 50 811 2153 | Mobile +43 664 628 2153
Gilbert.konzett@kapsch.net

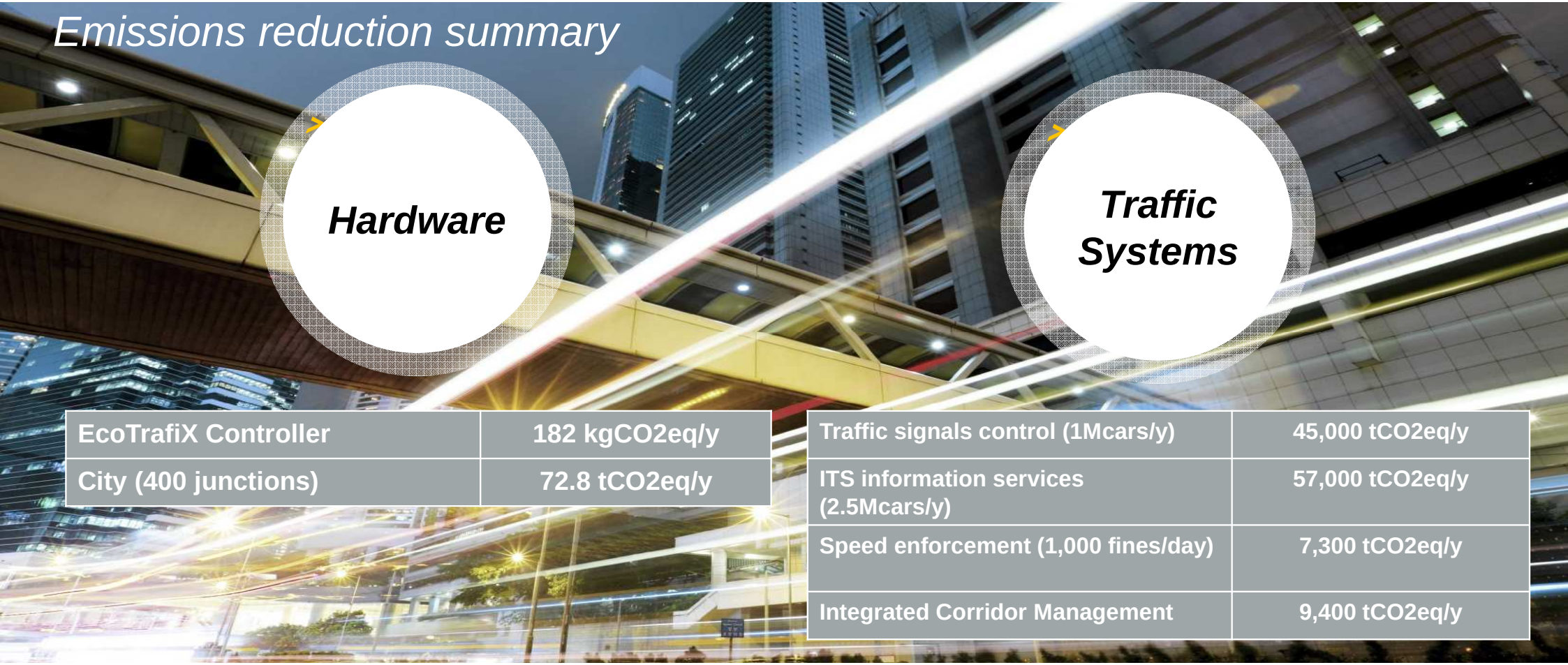
Further EcoTrafiX solutions and Kapsch Solutions Portfolio.

EcoTrafiX, Smart Tram, Kapsch TrafficCom AG solutions portfolio and references.

EcoTrafiX.

Real-time traffic management to reduce emissions. Traffic Signals Control, Traffic Information, Speed Enforcement, Integrated Corridor Management.

Emissions reduction summary



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Integrated Corridor Management	9,400 tCO2eq/y

EcoTrafiX.

Controller.

BENEFITS

Benefits to the public administration

- Redesigned signals controller
- Sustainability considerations at the manufacturing process
- Specifically adapted to low-power traffic-light LED modules
- Reduced internal power consumption, to low-power lighting
- Yearly power cost reduction

Benefits to the citizens

- “My city is controlling traffic in efficient and sustainable way!”. The final power cost and emissions directly affects funding needs for city services
- Citizen get part of global emissions reduction and a sustainable city, while maintaining and even increasing the expected services.

TANGIBLE IMPROVEMENTS

Benefits by type	Benefits quantified
Audited average energy consumption reduction	- 55W
kWh saved in yearly consumption for each junction	- 480 kWh
Tons of Mobile Emissions Saved Annually per junction (EU average 380gr/kWh)	- 182 kgCO2eq
Tons of Mobile Emissions Saved Annually for typical city (400 junctions)	- 72.8 tCO2eq
Yearly power cost reduction - per junction - for the city	 62.4€ 25 k€ (- 60%)

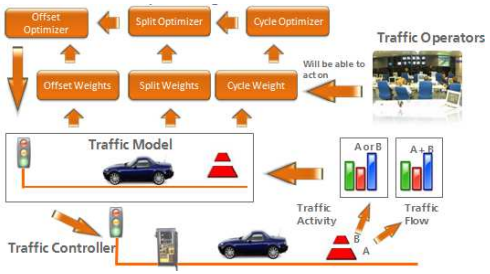
EcoTrafiX.

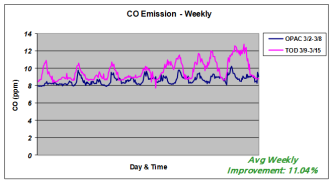
Traffic Signals Control.

BENEFITS

Benefits to the public administration

- Implement traffic-responsive and traffic-adaptive control
- Reduced periodic recalculation of timing plans





Benefits to the citizens

- Reduce delays and Stop&Go effects, by smoothly adapting traffic light timing to existing traffic, increase mean speed
- Lower congestion levels
- The city lowers traffic-related contamination both noise and emissions, increase quality of life

TANGIBLE IMPROVEMENTS

Benefits by type	Benefits quantified
Audited results: - Average speed increase - Delays & Stops	 + 17% - 8%
Effect on air quality (before/after adaptive mode) - CO2 emissions - PM25 emissions	 - 12% - 17%
Consumption reduction for 1M cars /year	- 18 M liters
Mobile Emissions Saved Annually for 1M cars /year	- 45,000 tCO2eq

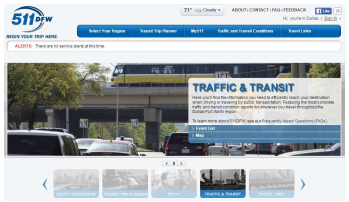
EcoTrafiX.

ITS Traffic Information services.

BENEFITS

Benefits to the public administration

- Assure information dissemination to citizen, including critical situations (events, incidents)
- Leverage existing systems data towards public information visibility, website, DMS, radio broadcast
- Enable, as possible, alternatives to private car by promoting public transit modal shift



Benefits to the citizens

- Increase awareness of general traffic situation
- Reduce travel times and fuel consumption with suitable selection of trip period
- Access to public transit information and services

TANGIBLE IMPROVEMENTS

Benefits by type	Benefits quantified
Delays and stops average reduction	- 5%
Average consumption reduction vehicle/100km	- 0.05 l
Consumption reduction for 2.5M cars /year in wide area or city (daily trip 50km)	- 22.8 M liters
Mobile Emissions Saved Annually	- 57,000 tCO2eq

EcoTrafiX.

Speed Enforcement.

BENEFITS

Benefits to the public administration

- Assure law compliance, mostly on speed and red-light
- Efficiently process infractions, reduce impunity feeling
- Revertion of incomes to traffic safety improvements
- Reduced Social cost of injured people

Benefits to the citizens

- Increase awareness of mobility rules
- Benefit from increased safety traffic conditions
- Reduced noise effects and emissions in periurban/urban areas.

TANGIBLE IMPROVEMENTS

Benefits by type	Benefits quantified
Mean speed reduction on highways - Before enforcement system - After enforcement system	 135 km/h 122 km/h
Average consuption reduction per enforced car and 100km	- 0,8 l
Consumption reduction for 10,000 over-speeding cars/day (average daily trip 100km)	- 8,000 liters
Mobile Emissions Saved Annually	- 7,300 tCO2eq

EcoTrafiX.

Integrated Corridor Management. Dallas.

BENEFITS

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- Enhanced cooperation between agencies and operators.
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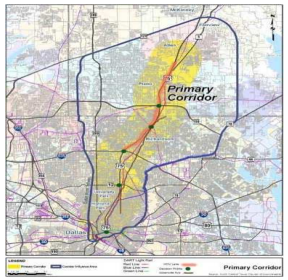

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10-Year Net Benefit	$264M
10-Year Cost	$14M
Benefit-Cost Ratio	20:1

Smart Tram.

Linz Linien. Mobi.efficiency.

Our solution

Delivery of mobi.efficiency for Linz Linien to increase resource efficiency of trams in 2014/15.

- 10-18% energy reduction of heating system
- -53% sanding duration while accelerating
- -32% sanding duration while breaking
- Improvement of efficiency of maintenance
- Monitoring of recuperated energy (30%)

10.2 %
Reduction of energy requirements

85 tons
Reduction of CO2 per year

300 households
Electricity savings potential for the entire vehicle fleet

Kapsch TrafficCom

Solutions & Products Portfolio.

Kapsch TrafficCom at a Glance.

Key Facts.

Revenues (FY 2014/15)

€ 456.4 million

Leading intelligent transportation systems (ITS) provider and a pioneer in intelligent mobility solutions (IMS).

Profit (FY 2014/15)

€ 32.7 million

Worldwide Presence

Subsidiaries and representative offices in 33 countries

Headcount (as of March 31, 2015)

3,545 employees

R&D Centers

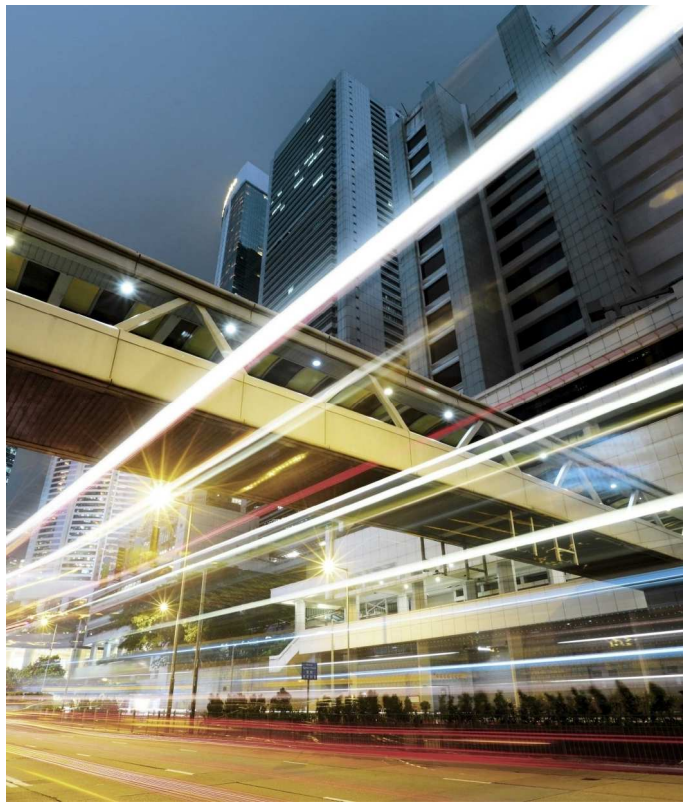
Ten R&D centers on three continents (ARG, AUT, CAN, ITA, ZAF, SWE, USA)

Global Headquarters

Vienna, Austria

Leading ITS Supplier

#1 ETC solution supplier globally, broad spectrum of ITS solutions



Strategic Roadmap.

From ETC to ITS to IMS. From Highways to Cities.

Our Portfolio.

Intelligent Mobility & Data Services

Tolling

Electronic Toll Collection
City Tolling
Plaza Tolling

Traffic Management

Highway Traffic Management
Managed Lanes
Tunnel & Bridges Traffic Management

Smart Urban Mobility

Urban Traffic Management
Integrated Mobility Management
Smart Parking

Safety & Security

Road Safety Enforcement
Commercial Vehicle Enforcement
Electronic Vehicle Registration

Connected Cars

V2X Automotive
V2X Infrastructure
Connected Services

Integration Layer “Multi-Application Suite”

Tolling Solutions.

What we do

ETC solution provider

Offering: In-vehicle Products, Field Equipment, Back Office, System Integration, Technical & Commercial Operations, Project Financing

Highlights

Pioneer in ETC solutions
(start of activities in the mid 80s)

#1 ETC Solutions Provider globally*

Core technologies and products produced in-house

Multi-technology approach

Target Applications

(DSRC) MLFF Tolling
HOT Lane Tolling
Satellite Tolling
Mobile Tolling
E-Vignette
Plaza Tolling
City Tolling

Selected References

- National Truck Toll System, Czech Republic
- National Toll System, Poland
- Tolling and Managed Lanes, LBJ and NTE, Texas, USA
- E-ZPass component delivery, USA
- Toll roads in Melbourne, Sydney, Brisbane, Australia
- Toll roads in Chile
- Toll Service Provider Axxes, France / Belgium

Traffic Management Solutions.

What we do

ATMS solution provider

Offering: Back Office (Dynac), Field Equipment (3rd-party), System Integration, Technical Operations

Highlights

35y+ experience in design, build and maintenance of mission critical automation applications

300+ systems deployed globally

World-class solution

Impressive references

V2X ready offering

Target Applications

Highway Traffic Management

Tunnel & Bridge Management

Managed Lanes

Selected References

- New York City bridges & tunnels, USA
- Boston Central Artery, USA
- New Zealand State Highways, NZ
- Cross Israel Highway
- M2 Highway Sydney, Australia
- TxDOT's LBJ and NTE Managed Lanes, USA
- NL and UK National Traffic Management Centers

Smart Urban Mobility Solutions.

What we do

Vendor of selected urban mobility solutions

Offering: Back Offices (EcoTrafiX, Streetline), Traffic Light Controllers, Parking Sensors, System Integration, Technical Operations

Highlights

Modern urban traffic management suite

Impressive urban references

Pioneer in Smart Parking

Target Applications

Urban Traffic Management (Telvent)

Integrated Mobility Management (Telvent)

Smart Parking (Streetline)

Selected References

- Madrid Transport Authority, Spain
- Barcelona Transport Authority, Spain
- Buenos Aires Transport Authority, Argentina
- Sao Paulo Transport Authority, Brazil
- Rio de Janeiro Transport Authority, Brazil
- Dallas Transport Authorities, USA
- Los Angeles Parking Authority, USA

Safety & Security Solutions.

What we do

Vendor of selected safety & security solutions

Offering: Enforcement Back Office, Enforcement Field Equipment (Section Control, e.g. Weigh-in-Motion, Speed/Red light) System Integration, Technical & Commercial Operations

Selected References

- Johannesburg Police Authority, South Africa
- 20+ other cities in South Africa
- Treviso (Traffic Surveillance), Italy
- Rio de Janeiro Transport Authority, Brazil
- Various Commercial Vehicle Enforcement Sites, USA
- Dallas Transport Authorities, USA
- Los Angeles Parking Authority, USA

Highlights

Modern urban traffic management suite

Impressive urban references

Pioneer in Smart Parking

Target Applications

Urban Traffic Management (Telvent)

Integrated Mobility Management (Telvent)

Smart Parking (Streetline)

Safety & Security Solutions.

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- Johannesburg Police Authority, South Africa
- 20+ other cities in South Africa
- Province Treviso (Traffic Surveillance), Italy
- ASFINAG (Weigh-in-Motion), Austria
- Kazakhstan (Weigh in Motion)
- Indiana Department of Transport, USA
- Montana Department of Transport, USA

Highlights

Broad spectrum of enforcement solutions

Over € 80,000 worth of infringement payments are collected per day in single major metropolitan deployment

Target Applications

Road Safety Enforcement

Commercial Vehicle Enforcement

Electronic Vehicle Registration

Connected Cars Solutions.

What we do

Envisioned vendor of V2X in-vehicle equipment to the Automotive Industry

Envisioned vendor of selected connected cars services

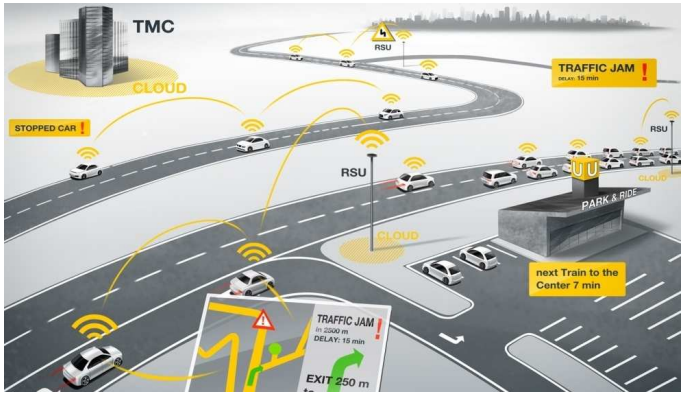
Vendor of V2X infrastructure solutions (roadside, back office)

Highlights

Forerunner in V2X technology

Participant in V2X “light-house” projects (e.g. Testfeld Telematik, European Corridor Project, Platooning Trails)

Very active in standardization (e.g. ETSI)



Selected References

- European Corridor Project, EU
- Testfeld Telematik, Austria
- RelCommH – Reliable Communication for Heavy vehicles (Platooning trial), Sweden
- US-DoT Safety Pilot, USA
- Various trials with the automotive industry, EU