

# Traffic Division City of Zurich

## Welcome

Martin Guggi  
Deputy Director

14th September 2012



**Stadt Zürich**  
Dienstabteilung Verkehr

# Need for mobility

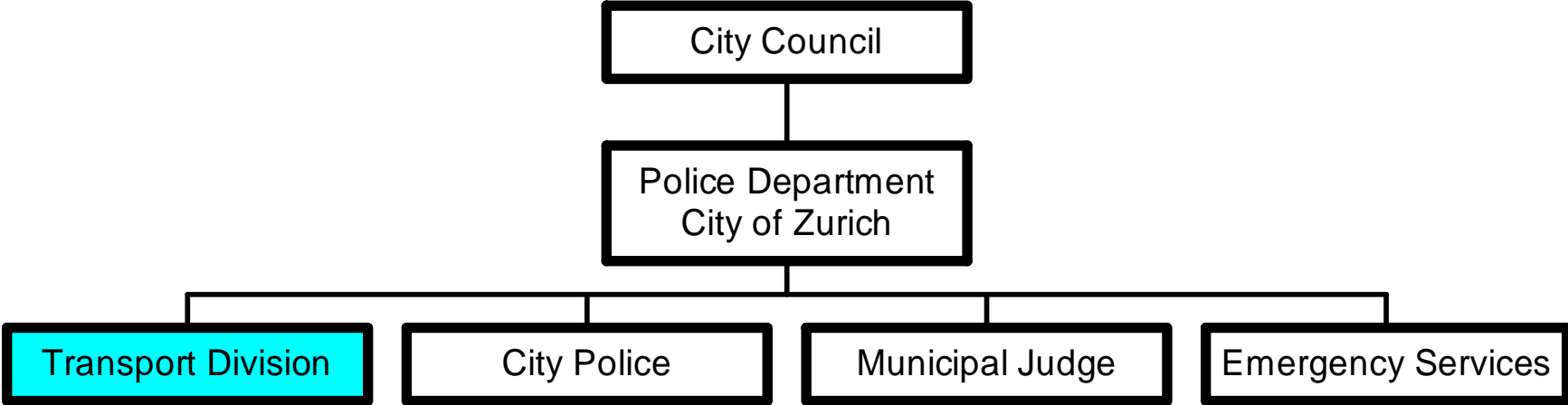


# Facts, Politics and Law

The development of traffic may not be left to coincidence. It must be influenced actively with foresight on a national, regional and local level:

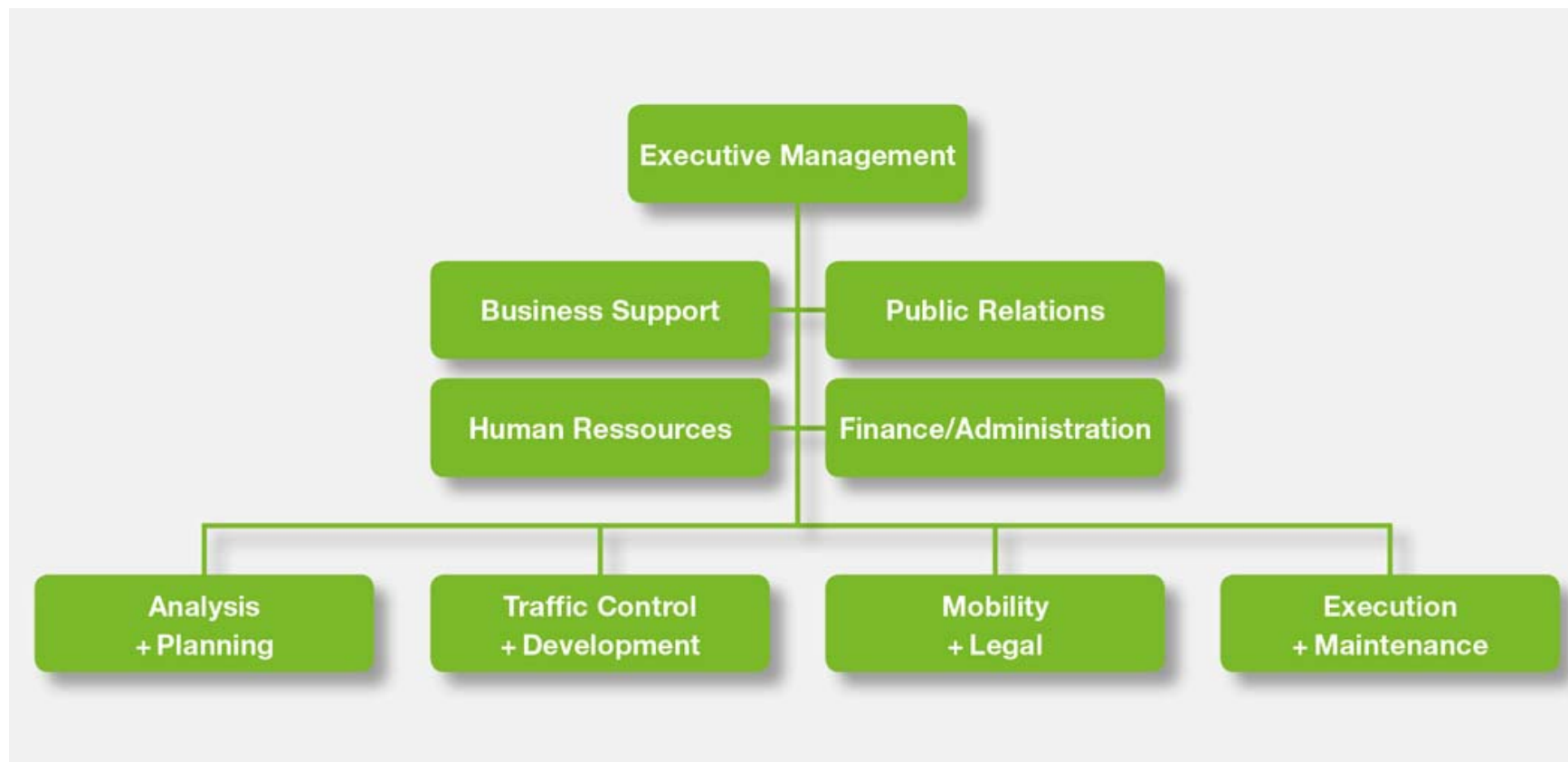
- demographic and social developments
- traffic policies and traffic law
- local and regional planning
- mobility strategy of the city of Zurich
- other political and legal areas

# Organization



# Traffic Division – Quintuple Expertise

## Five Centers of Excellence



# Analysis + Planning



- Project planning and planning of traffic routings
- Management of traffic reduction measures
- Modelling and simulation
- Traffic accident statistics and analysis

# Traffic Control + Development



- Design, test and introduction of programs
- Operating and servicing
- Preferential treatment of public transport and slower traffic at traffic lights
- Priority for emergency services

# Mobility + Legal



- Core competence: traffic law
- Monitoring of mobility trends
- Issuing of permanent traffic directives
- Management of public parking spaces



# Execution + Maintenance



- Regulating traffic flow during construction phases
- Implementing permanent and temporary traffic regulations (construction sites and mass events)
- Maintenance and repair of barriers and signals

# Milestones of Success



- Exemplary traffic flow management/focus on slower moving traffic «Zürcher Modell»
- City wide reduced speed zones (30/20 km/h)
- «Blue Zones» with preferential parking for residents
- Increased traffic safety

# Sustainable Mobility – Blue Zones



- Preventing commuters from parking their cars in residential areas
- Protecting residential areas from excessive vehicle emissions
- Resident parking permits

# Sustainable Mobility – Pedestrian Zones

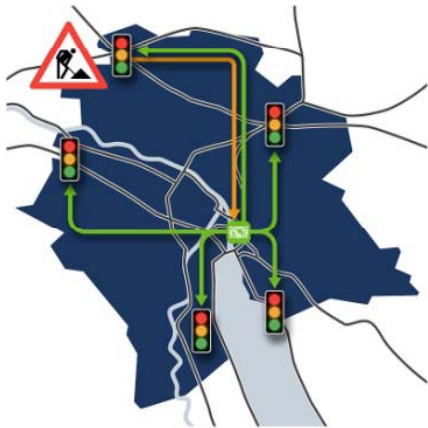


- Old/historical town
- Reserved for pedestrians only
- Motorized deliveries allowed between 5 – 12 am

# Sustainable Mobility – ITS



- «Zürcher Modell»
- Priority for public transport



- Adaptive traffic flow management: traffic management depending on number of cars
- Inflow management at city border
- Priority for outgoing traffic

# Sustainable Mobility – ITS

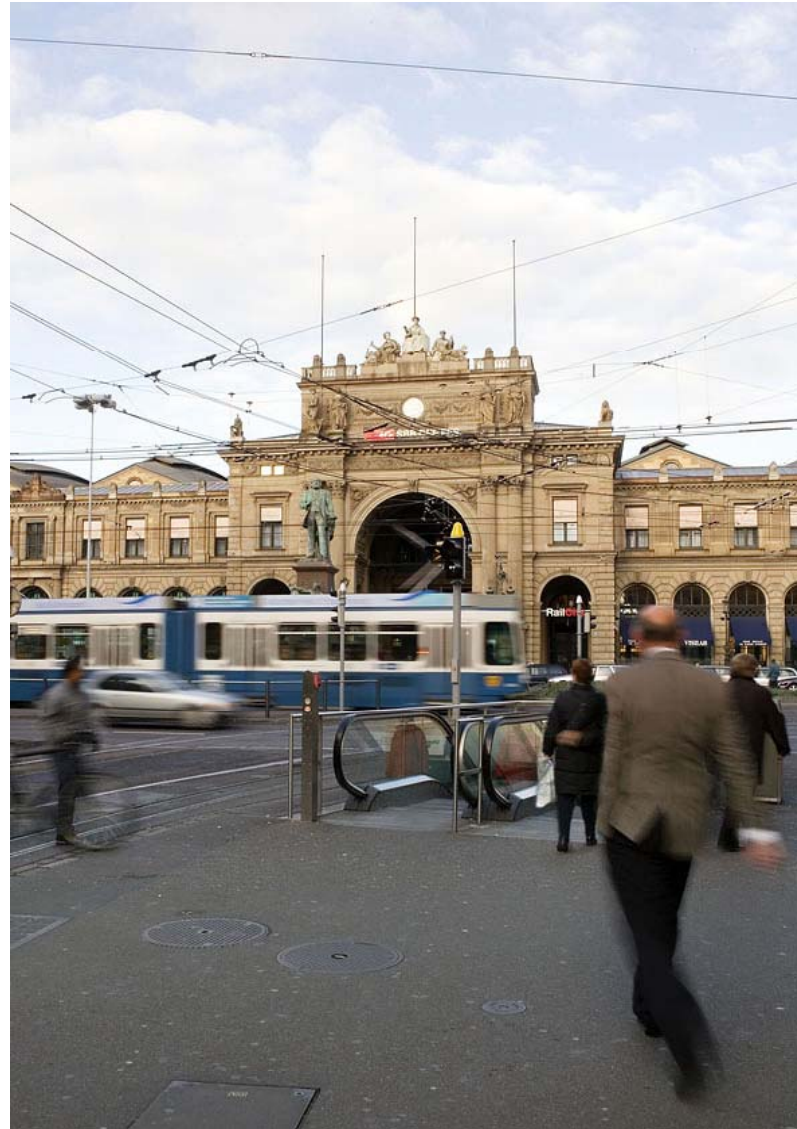


- 14 displays
- Traffic information and safety campaigns



- Guidance system for parking garages/lots
- 250 dynamic and 60 static displays

# Q + A



# Financing

Exchange on Multimodal ITS Strategies

Susanna Dutfield  
Head of Finance

14th September 2012



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# Authorities in Switzerland

The **Swiss Federation** is organized in three political levels, the federation, the cantons and the communities.

The **Federation** is the name given to the Swiss state. The Constitution grants the federation certain powers; all other tasks are in the responsibility of the cantons.

Switzerland is divided into 26 states known as **Cantons**. They are the states that originally united in 1848 to form the federation, each relinquishing part of their sovereignty to the Federation.

All the cantons are divided into political **Communities**. In addition to the tasks that are allocated to them by the federation and the cantons, the communities also have their own powers.

# City of Zürich

The communities form the third level of the federal state. They are political entities with their own legal personality and hold various powers, such as that of managing their own budget, making their own political policy and decisions, and structuring their own internal organization according to their own criteria. The communities fulfill their own responsibilities including those relating to schools, social services, local planning, public utilities and taxes.

Budget 2012 (City of Zürich)	8 370 Million	Swiss Francs
	1 038 Million	Investments
Our Budget spending	63 Million	0.75 percent
Balance	- 20 Million	
Our Investments	8 Million	0.77 percent

# Implementation of transport projects

Start with project idea

- Elaboration of traffic management solution
- Technological feasibility if required
- Cost estimation, quotations if required
- Inclusion in financial planning
- Inclusion in yearly budget
  
- Application to the City Council for project budget
- Final configuration of traffic management solution
- Supplier selection procedure
  
- Implementing and operating new traffic management solution

# PPP «Parkleitsystem AG» (PLS)

The Organization was founded in 1998

The founder and owner is the «Parkleitsystem AG», a public private partnership from car park operators, City Association, ACS, TCS, the city of Zurich and others. The technical project management and operation of the PLS was outsourced to the service department for traffic (division of transport). The visual design of the displays and the selection of the signal locations was developed in collaboration with the 'rod of public space'.

## Financing and costs

For the construction of the entire parking guidance system a budget around 8.5 Million Swiss Francs was expected. The development costs, the construction of the PLS, as well as the running costs and the maintenance are funded of a fee of 50 Cents per entry into the car parks. The PLS is therefore fully funded by the users and will not claim any tax money.

# The Zurich model of the Traffic Section (DAV) in the context of the development and operation of a dynamic intermodal traffic control system

Exchange on Multimodal ITS Strategies

Gian Dönier  
Head of Traffic Control

14<sup>th</sup> September 2012



**Stadt Zürich**

Dienstabteilung Verkehr

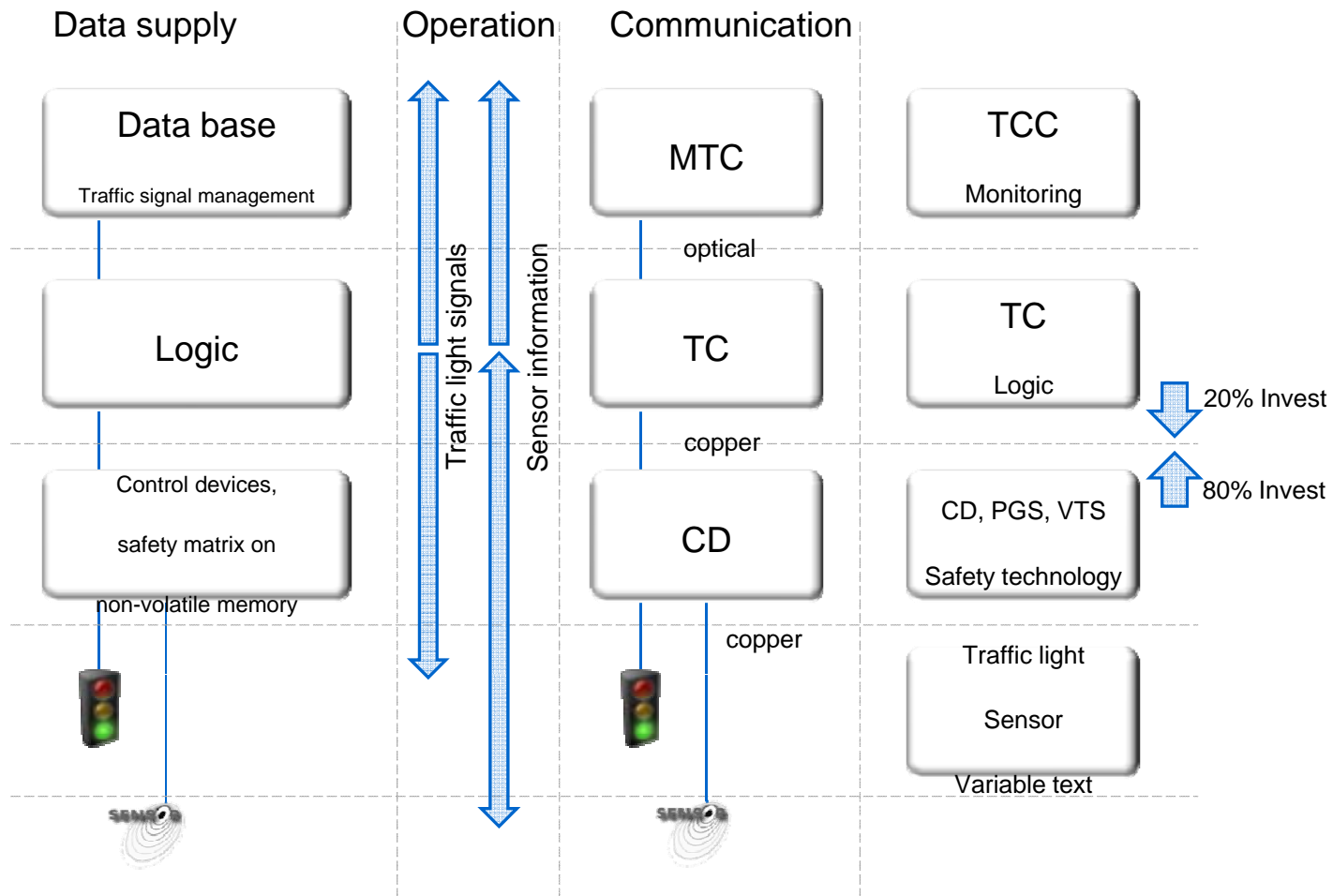
# The Zurich model in figures

	Signals and signposts	60.000
	Sensors	3.000
PGS	Parking guidance system panels	417
TCS	Traffic control signals	400
VTS	Variable traffic signs	110
TID	Traffic information displays	14
TC	Traffic computers Zurich	8
TCC	Traffic control centre	1

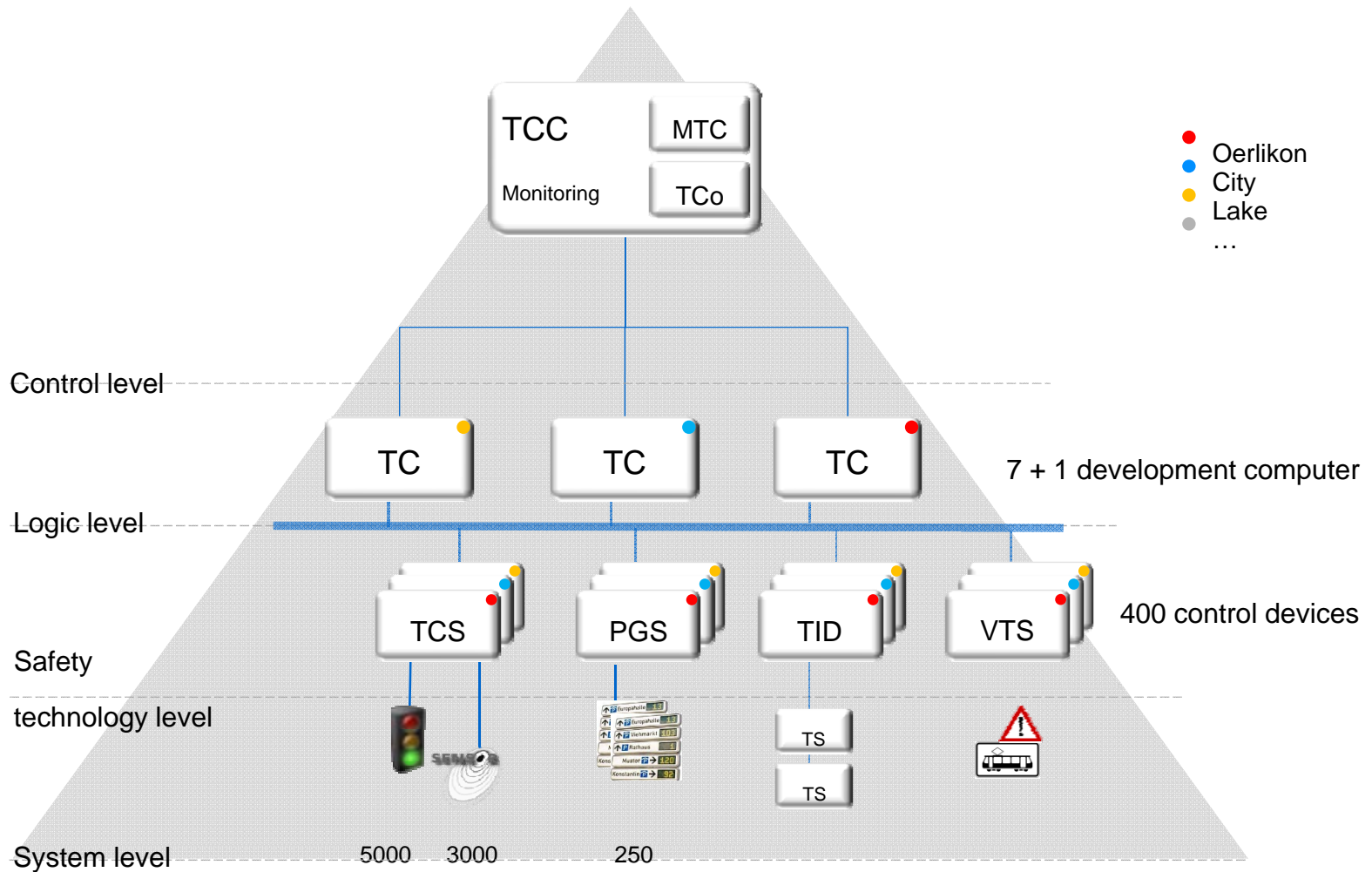
... all of which are connected via approx. 200 kilometres of communication cables and managed by 106 employees.

# Data structure of the Zurich model

(Centralised control, centralised data storage, remote supply, data flow)

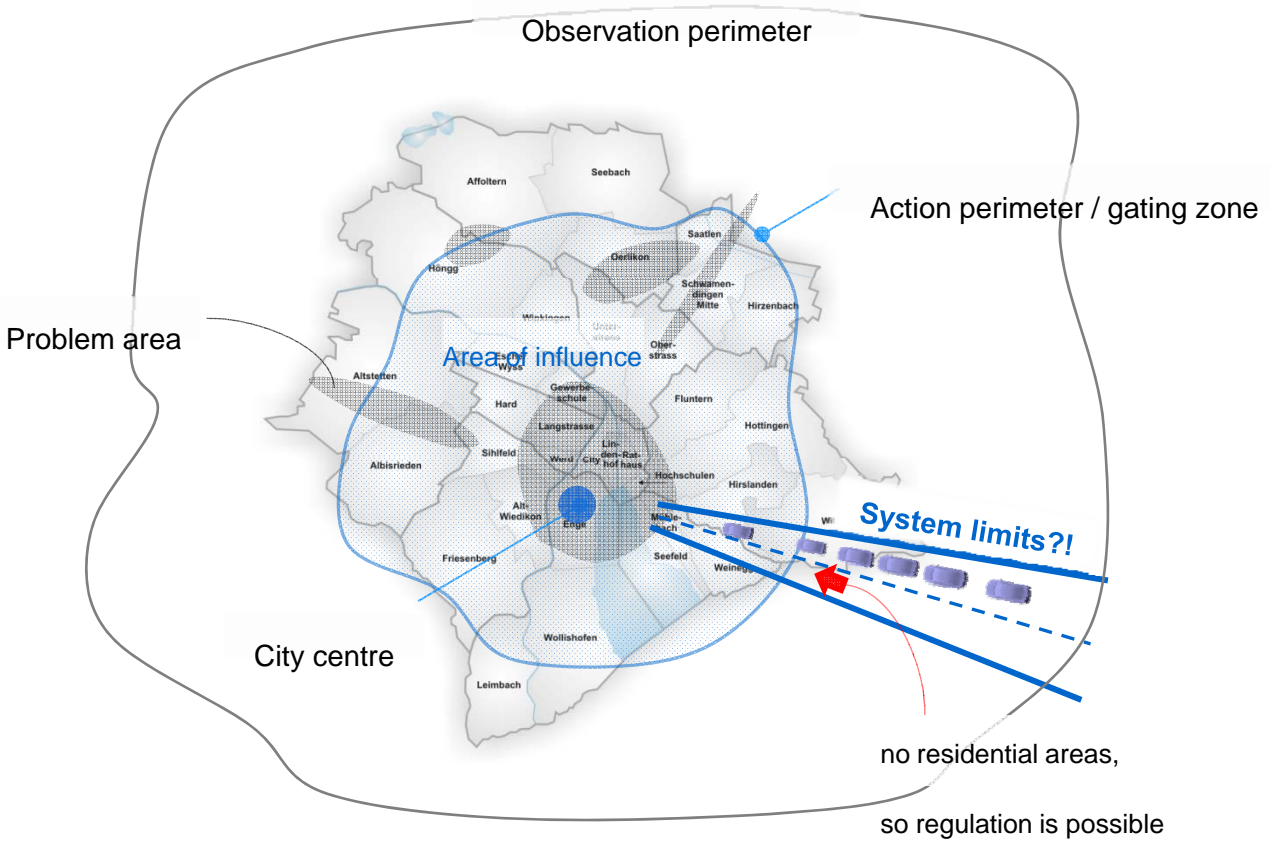


# Technical structure of the Zurich model



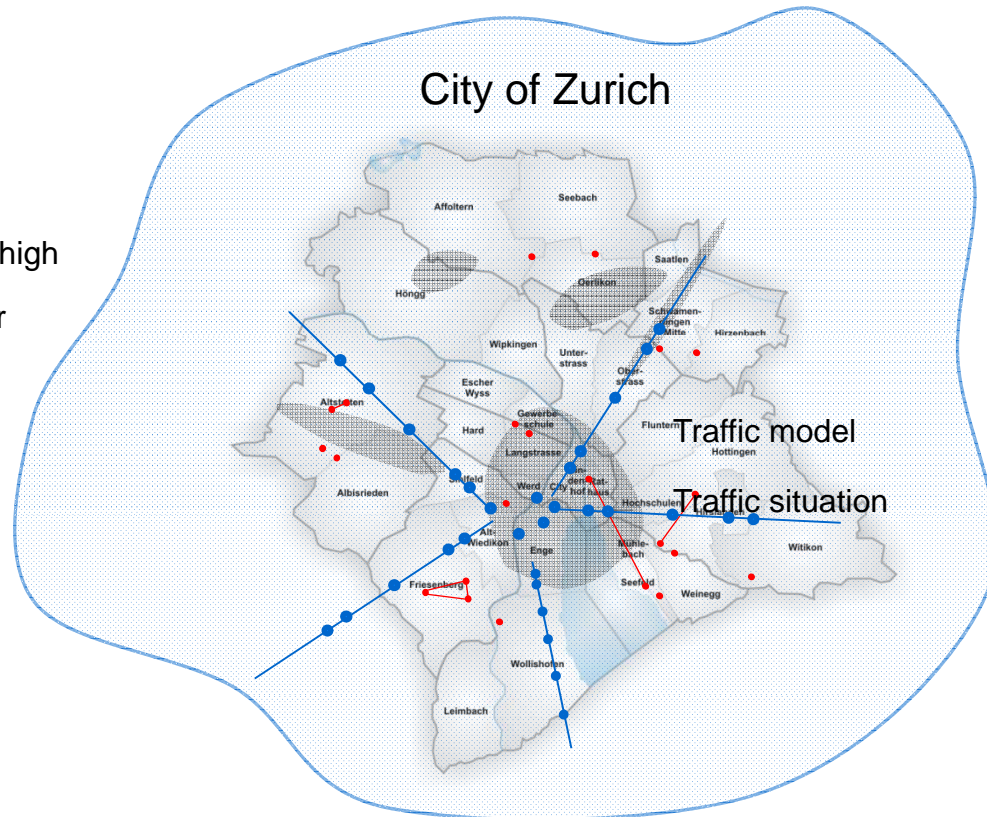
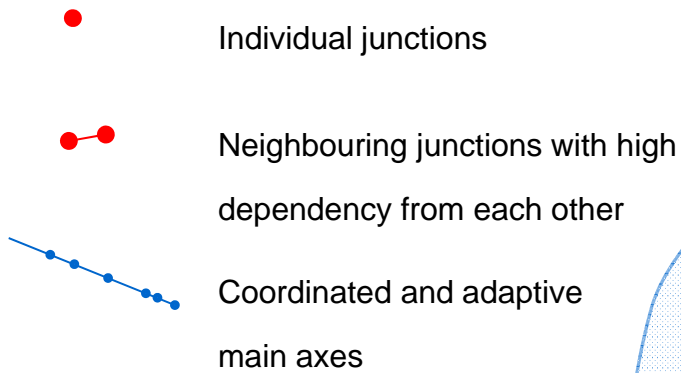


# Adaptive traffic flow management and its system boundaries



# Topography of the Zurich model

The structural basis of adaptive traffic flow management



# Topography of the Zurich model

## Coordinated axes

- Pfingstweidstrasse
- Hardturmstrasse
- Dörflistrasse
- Wehntalerstrasse
- Seebecken
- Dreikönigstrasse
- Winterthurstrasse

# Abbreviations

TCC	Traffic control centre
TC <sub>o</sub>	Traffic control
MTC	Master traffic computer
TC	Traffic computer Zurich
TCS	Traffic control signal
PGS	Parking guidance system
TID	Traffic information displays
TS	Traffic signs
VTS	Variable traffic signs

# Traffic Information

Exchange on Multimodal  
ITS Strategies

Heiko Ciceri  
Head of Communication

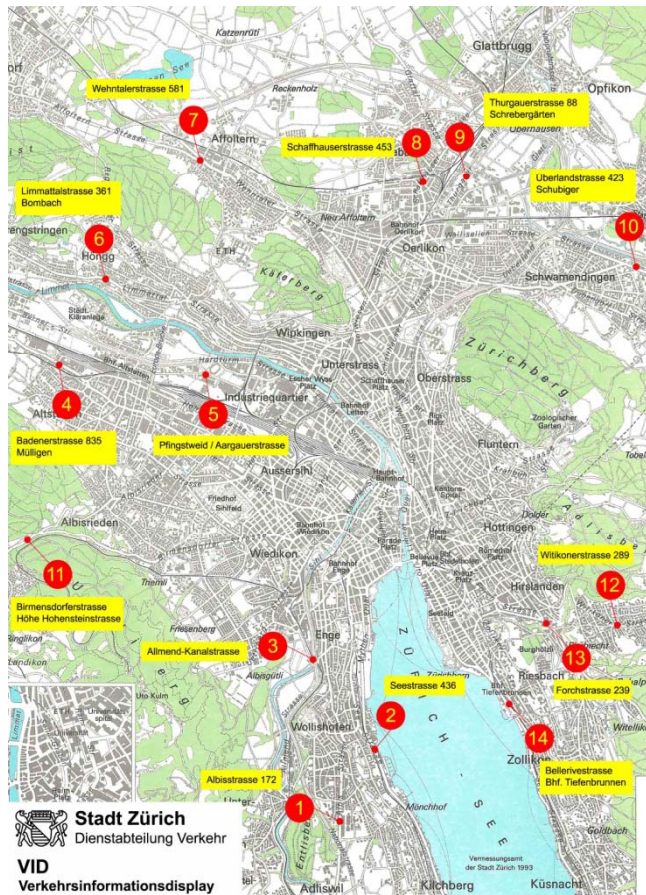
14<sup>th</sup> September 2012



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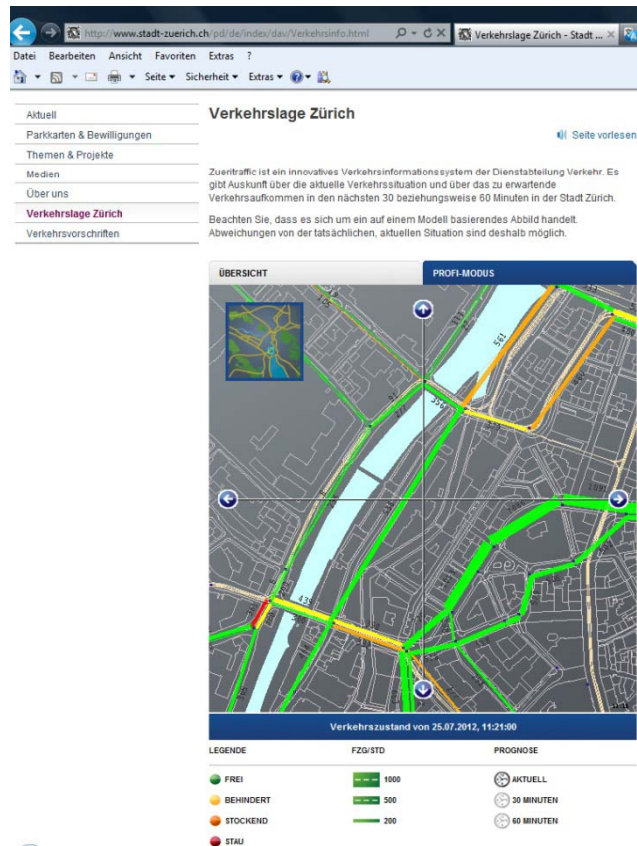


# Traffic information displays



- 14 displays on incoming mainroads
- LED-Technology, full-color
- Short Messages: Roadworks, traffic diversions, road safety campaigns
- Coming soon: inhouse-production  
→ short time reaction

# Online traffic forecast «Zürittraffic»



- [www.zuerittraffic.ch](http://www.zuerittraffic.ch)
- currently situation, forecast 30 and 60 Minutes
- based on informations from the 4000 detectors
- matched with the data from the regional traffic model

# Parking guidance system



- [www.pls-zh.ch](http://www.pls-zh.ch)
- realtime informations (up-date every minute)
- LED-technology
- public privat Partnership (owner, city, trade association, automobile clubs)

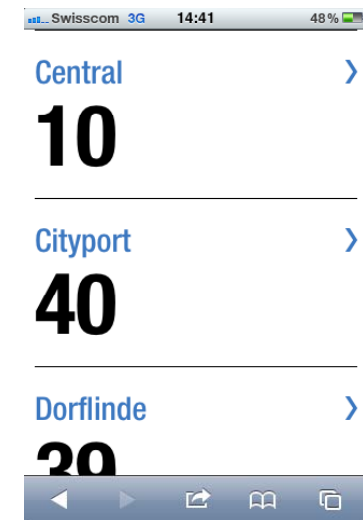




# Mobil internet



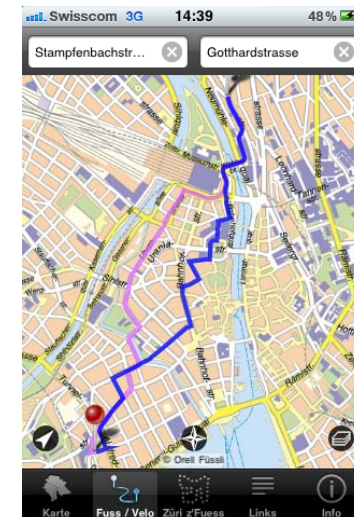
- [www.m.stadt-zuerich.ch](http://www.m.stadt-zuerich.ch)
- information about car parking
- based on [www.pls-zh.ch](http://www.pls-zh.ch)



# Mobil internet / Smartphones




- «ZüriPlan»
- Journey planner for bikers and pedestrians
- map, GPS, images



# Internet future

[Zurück](#) [Vor](#) [Neu laden](#) [Stopp](#) [FB aktiviert](#) [www.stadt-zuerich.ch/dav](#) [Google](#) [Startseite](#) [Lesezeichen](#)

[Startseite Portal der Stadt Zürich](#) [Tageschef: Benno Knapp](#) [Freitag, 8. Juni 2012 / 09:36](#)



### Störungen

**SBB/VBZ**

15:25  
Unterbruch SZU:  
Zürich Binz - Zürich Triemli

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**ZVV**

15:30  
Verspätung: RJ 346


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**ASTRA**

16:30  
A3 Westumfahrung Zürich:  
Chur Richtung Basel Stau

### Parkleitsysteme (3)

Innenstadt  
Oerlikon  
Zürich West



Accu	141
Center Eleven	333
Cityport	145
Dorflinde	48
Eisfeld	257
Jungholz	122
Max-Bill-Platz	50
Messe	999
Nordhaus	150
Octavo	101
Parkside	38
Stadthof 11	176
Uni Irchel	736
Züri 11 Shopping	61

### Ereignisse

Ereignisse-Kalender

**Heute (3) Freitag, 8. Juni 2012**

08:30 – 12:00 Chemieunfall am Central / Verkehrszusammenbruch  
10:00 – 14:00 Zürich-Marathon  
17:00 – 19:00 Theater-Spektakel

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**Morgen (2) Samstag, 9. Juni 2012**

16:00 – 19:00 Markt in der Innenstadt  
20:00 – 22:00 Fussballspiel im Letzigrund

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**Übermorgen (3) Sonntag, 10. Juni 2012**

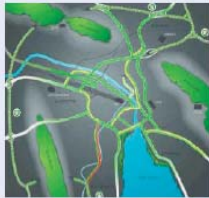
08:30 – 12:00 Duis autem vel eum iriure dolor  
10:00 – 14:00 Commodo consequat  
20:00 – 22:00 Lorem ipsum dolor

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**Gestern (2) Donnerstag, 7. Juni 2012**

10:00 – 14:00 Commodo consequat  
17:00 – 19:00 Nam liber tempor cum soluta

### Verkehrslage



**Stadt Zürich**

Verkehrslage: **Behinderungen**  
Aufkommen: **mittel**  
Massnahme: **keine**



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**Region Zürich**

Verkehrslage: **fliegend**  
Aufkommen: **klein**  
Massnahme: **VPM ausgelöst**


### Kameras (8)

Bucheggplatz  
Sanität 01  
**Sanität 02**  
Triemli  
Klusplatz  
Rentenanstalt  
Uniepitall  
Limmatplatz

### Verkehrsinformations-Display (14)

Seestrasse (VID2 / Höhe Haus Nr. 436)



Ulenbergtunnel  
Baustellenarbeiten  
bis Okt. 2012

### Technik

Systemliste (5)

BRR:	1
DPX:	2
KOR:	2

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Betriebsmittel

Keine Einträge

# Crowd Management New Approach



Jürg Christen, Head of Execution and Maintenance

14<sup>th</sup> September 2012



**Stadt Zürich**

Dienstabteilung Verkehr

Delegation Schweden  
14. September 2012, Seite 36

# Background

The situation during big events seems to be critical as the catastrophe during the Loveparade in Duisburg showed and did raise the awareness.

Analyses which can professionally classify the situation are broadly initiated, also in Zurich.

Arrangements and security models today base on experienced data. However the effectiveness is not yet verified.

# Approach

Quantitative analysis of the situation

Development of a model to evaluate the security situation:

- Capacities
- Evacuation channels
- Evacuation time

To evaluate the situation during the Streetparade 2011 did happen through a measure and model analysis.

Evaluation of variants to increase the security.

# Approach

Quantitative analysis of the situation

Development of a model to evaluate the security situation:

- Capacities
- Evacuation channels
- Evacuation time

To evaluate the situation during the Streetparade 2011 did happen through a measure and model analysis.

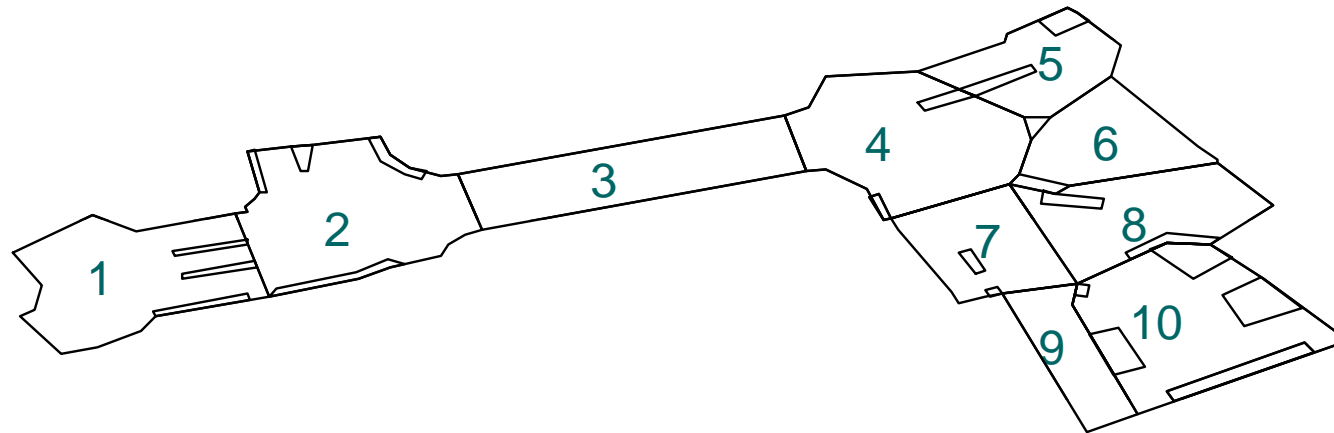
Evaluation of variants to increase the security.

# Definition 10 sectors from the critical area

Analyses air pictures (density)

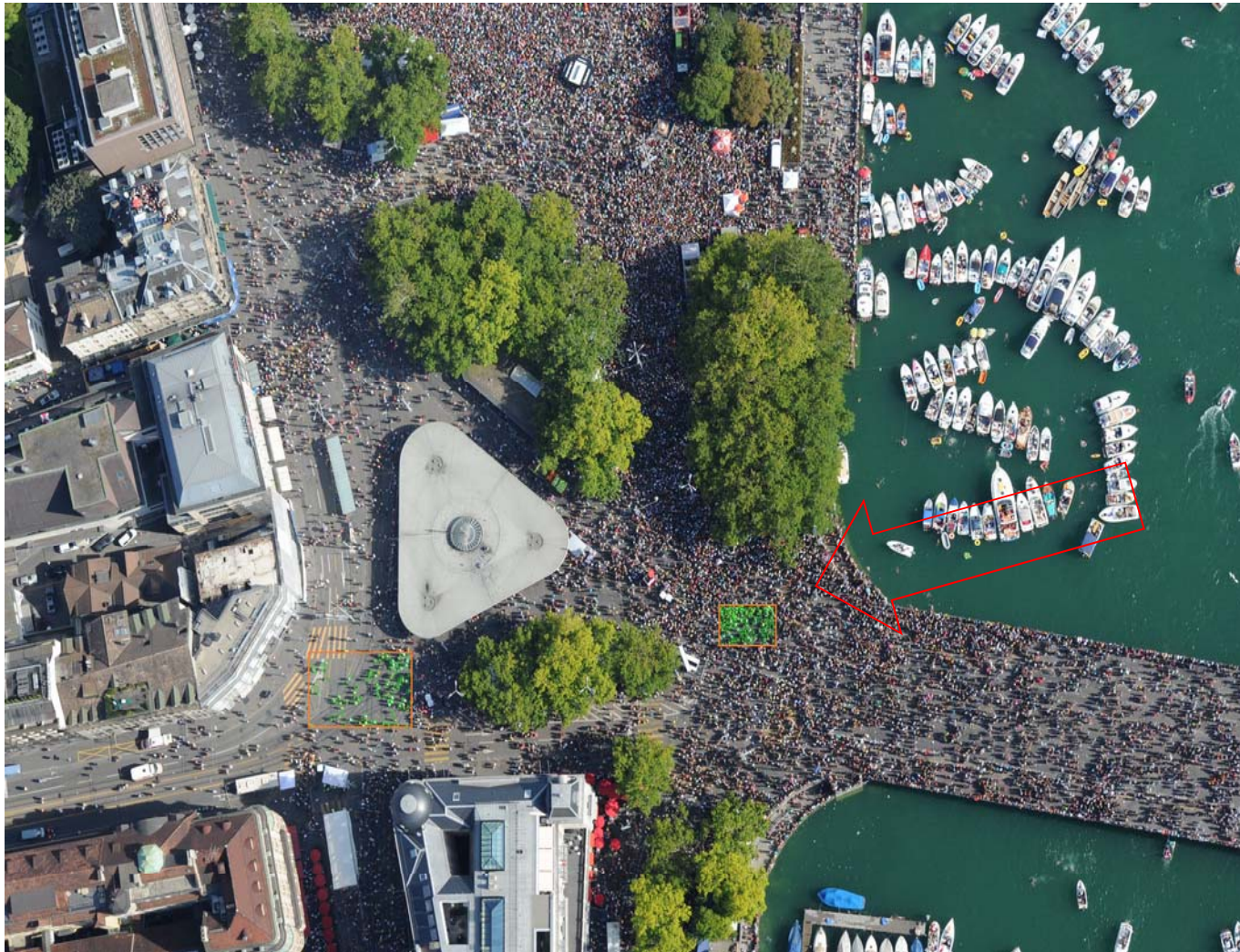
Evacuation model with the exit ways

Calculate the evacuation time





# Streetparade – Density at 4pm



# People density Level of Service (LoS)

## LoS People density

A < 0.8 P/m<sup>2</sup> No restriction of movement

B < 1.1 P/m<sup>2</sup> Consideration for others

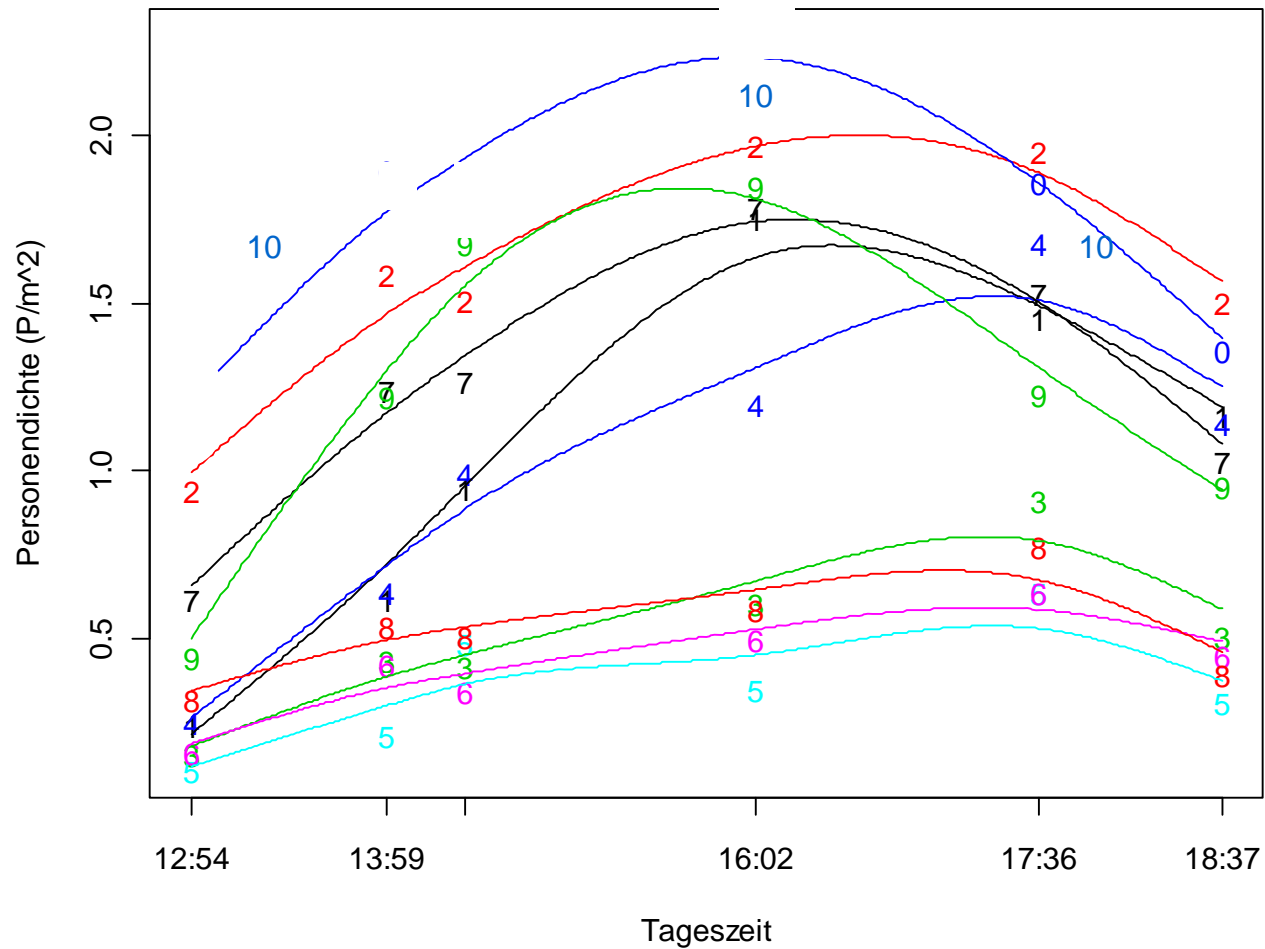
C < 1.5 P/m<sup>2</sup> Comfortable stay not possible

D < 3.6 P/m<sup>2</sup> Slightly restricted movement

E < 5.4 P/m<sup>2</sup> Severely restricted movement

F > 5.4 P/m<sup>2</sup> Unable to move / panic reaction

# People density / Sector 10 maximum / LoS D Slightly restricted movement

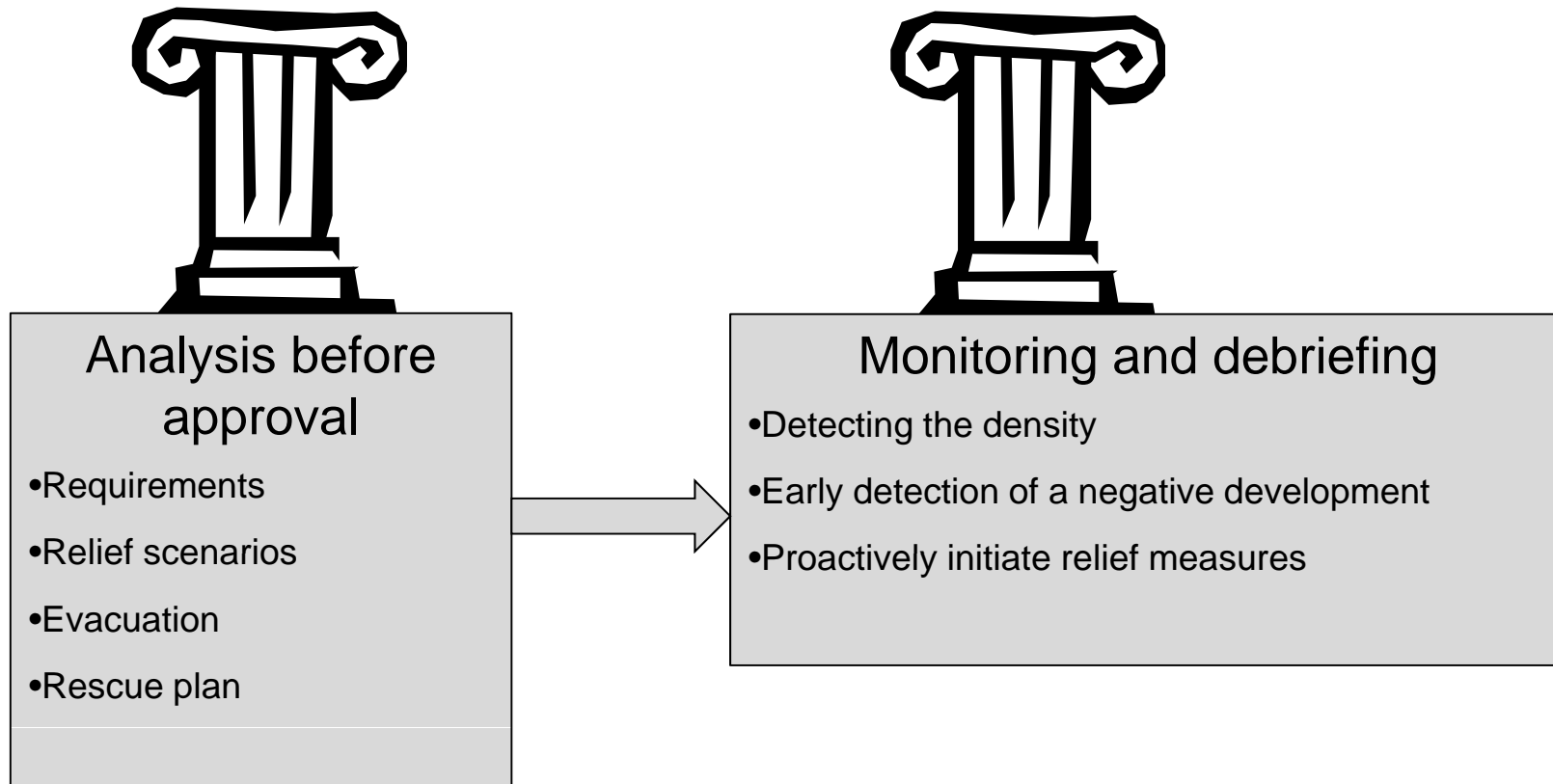


- The area can be evacuated under extreme loads within 6 minutes
- Conversely: Within this short period, the theoretical density of people dramatically increases
- Around the area are over a half million visitors

- The highest density (2.2 persons/m<sup>2</sup>) was achieved in sector 10 at 4pm
- In this section stayed 45'000 persons
- If another 27'000 persons would join the parade, a critical limit would be exceeded (3.6 persons/m<sup>2</sup>)

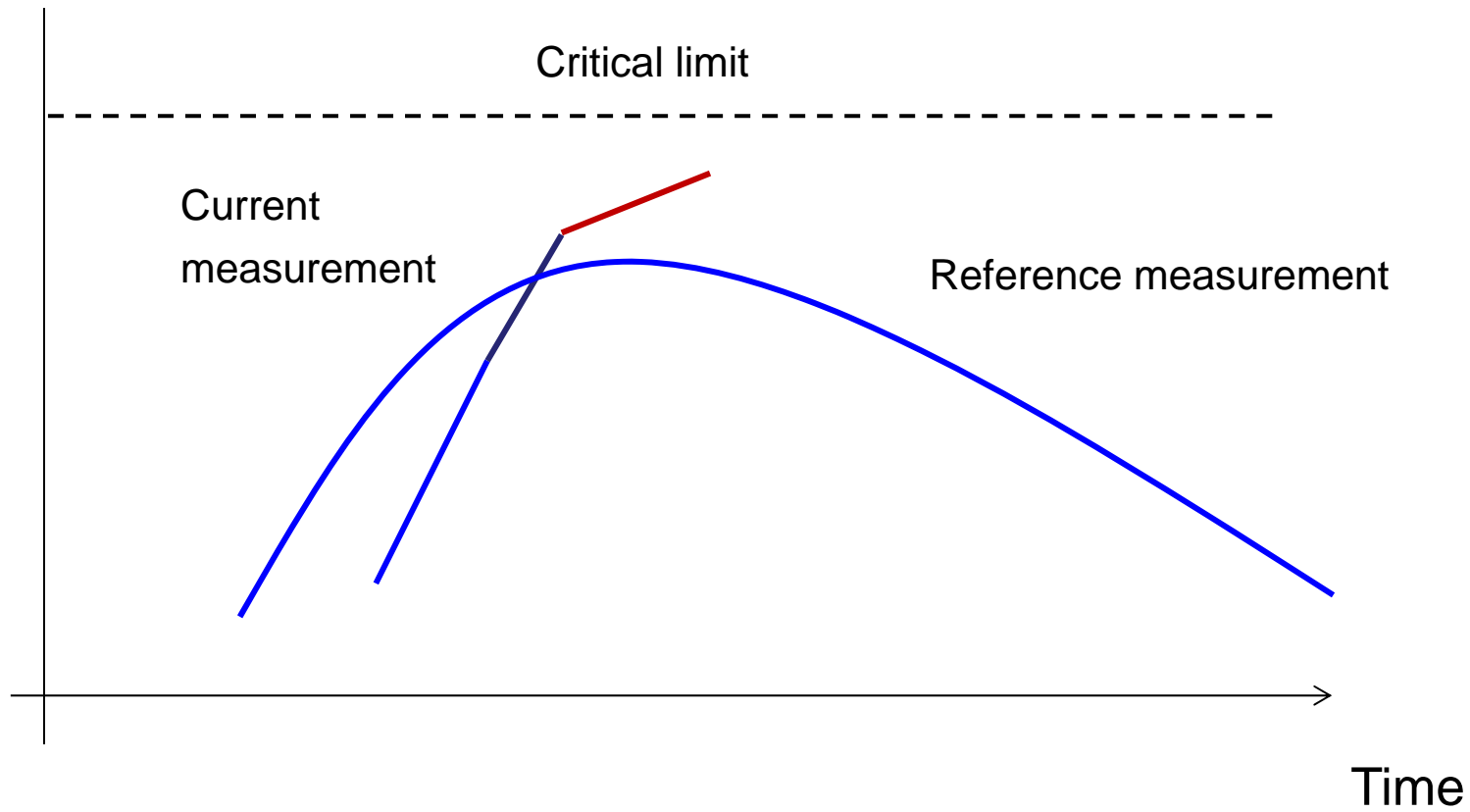
# Security concept

Two pillars principle



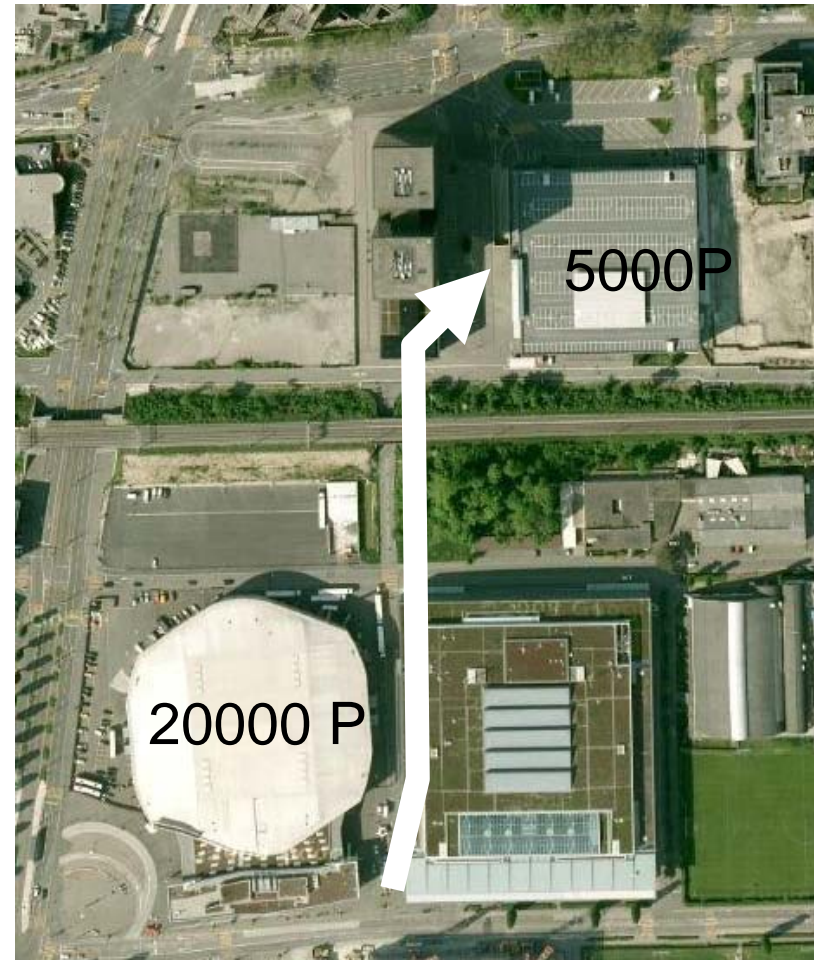
# Early intervention

Density



## No optimisation possible?

- National audience
- People leave at the same time the event
- Large crowd in the parking garage
- Loop detect vehicle
- Traffic lights turn longer green



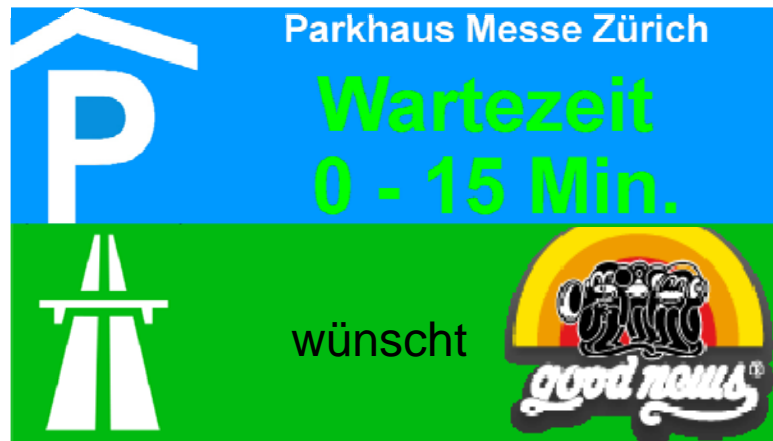


## Dangerous and night-time noise

- Congestion and aggression in the parking garage
- Waiting time over 1,5 hours
- Noise at night
- Hazardous situation (fire, poison gas, panic, fatigue...)



# Crowd Management / Chain optimisation

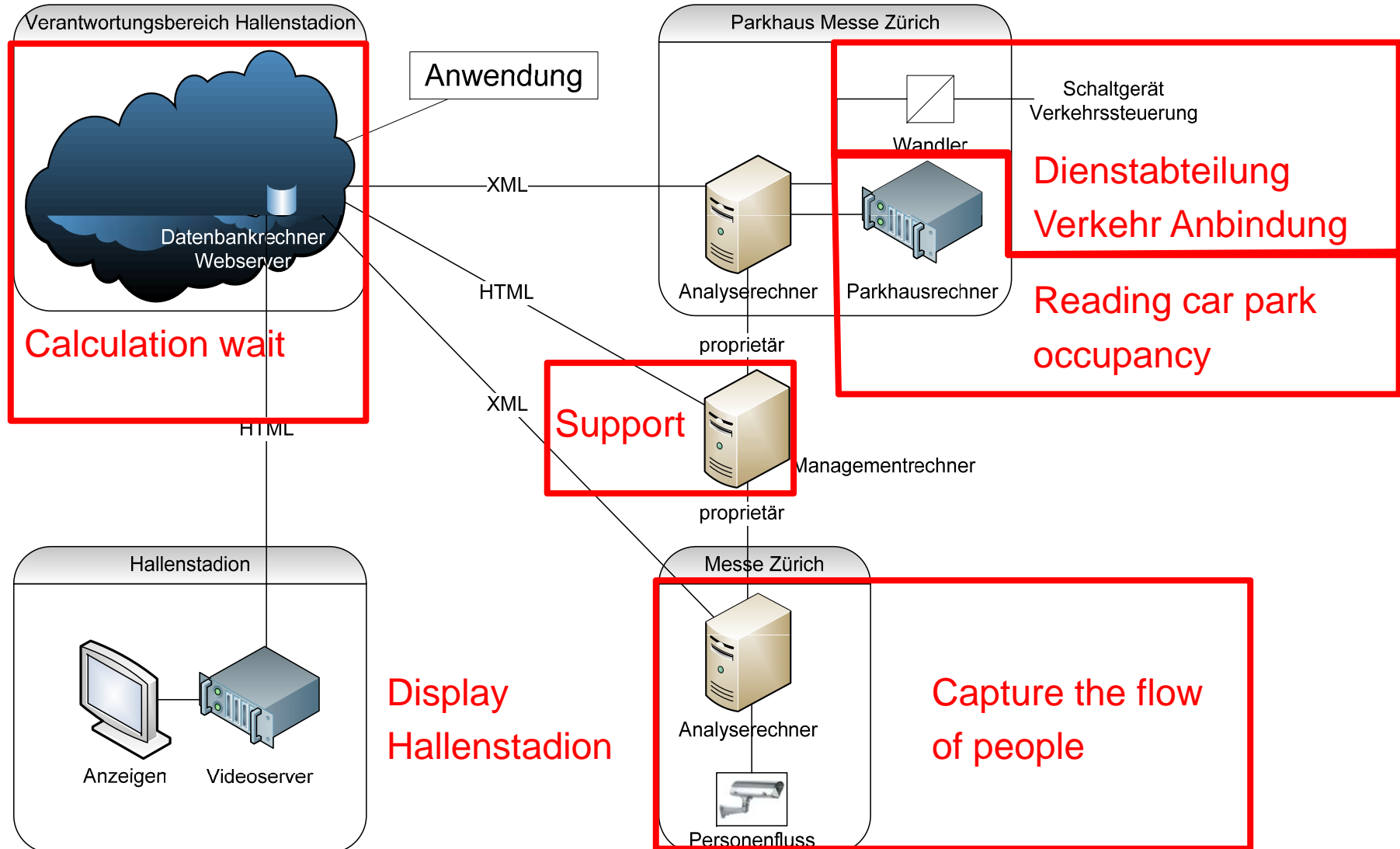


- Personal flow trigger the exit control from the parking garage
- Information delays (Display und iPhone)
- Behaviour modification / detection influencing factors

➔ Optimised wait



# Technical design



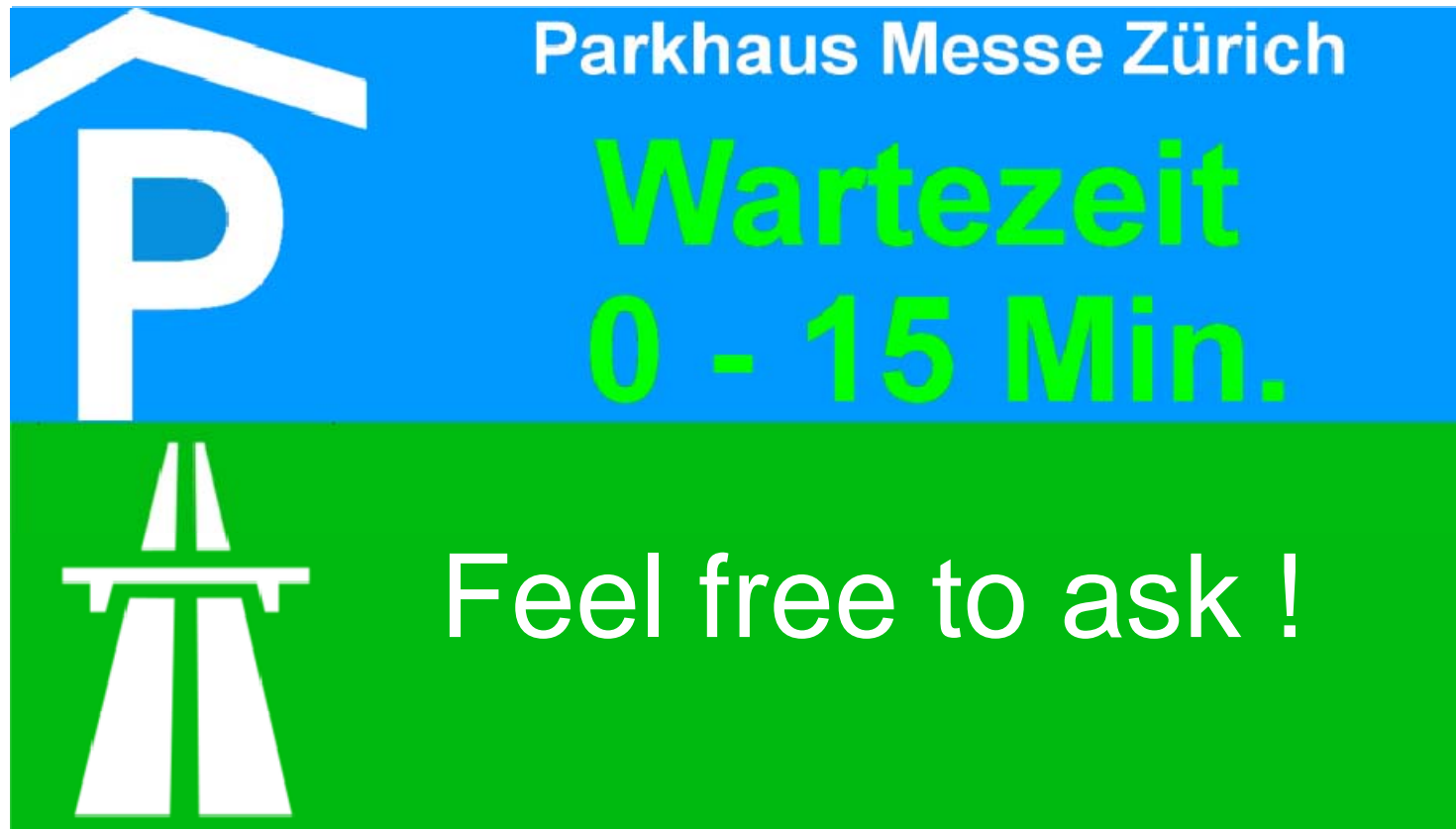
# Benefit

- Reducing waiting time -> Security crowd
- Increased customer satisfaction through accurate information
- Sales growth and security in the main building
- Traffic lights can be automatically switched
- Minimisation of traffic overload

# Experience / Learning visitors

- Proactive emptying the car park (the first 20 minutes without traffic jams)
- Floor control (scheduler) results 30 minutes less waiting time
- Package of measures, including influencing crowd, result in a median waiting time of less than 15 minutes

# Prophylactic influencing crowd with simple information



# Transport Modelling and its Benefit for ITS



Presentation for the  
Exchange on Multimodal ITS Strategies

Christian Heimgartner  
Head of Modeling and Simulation

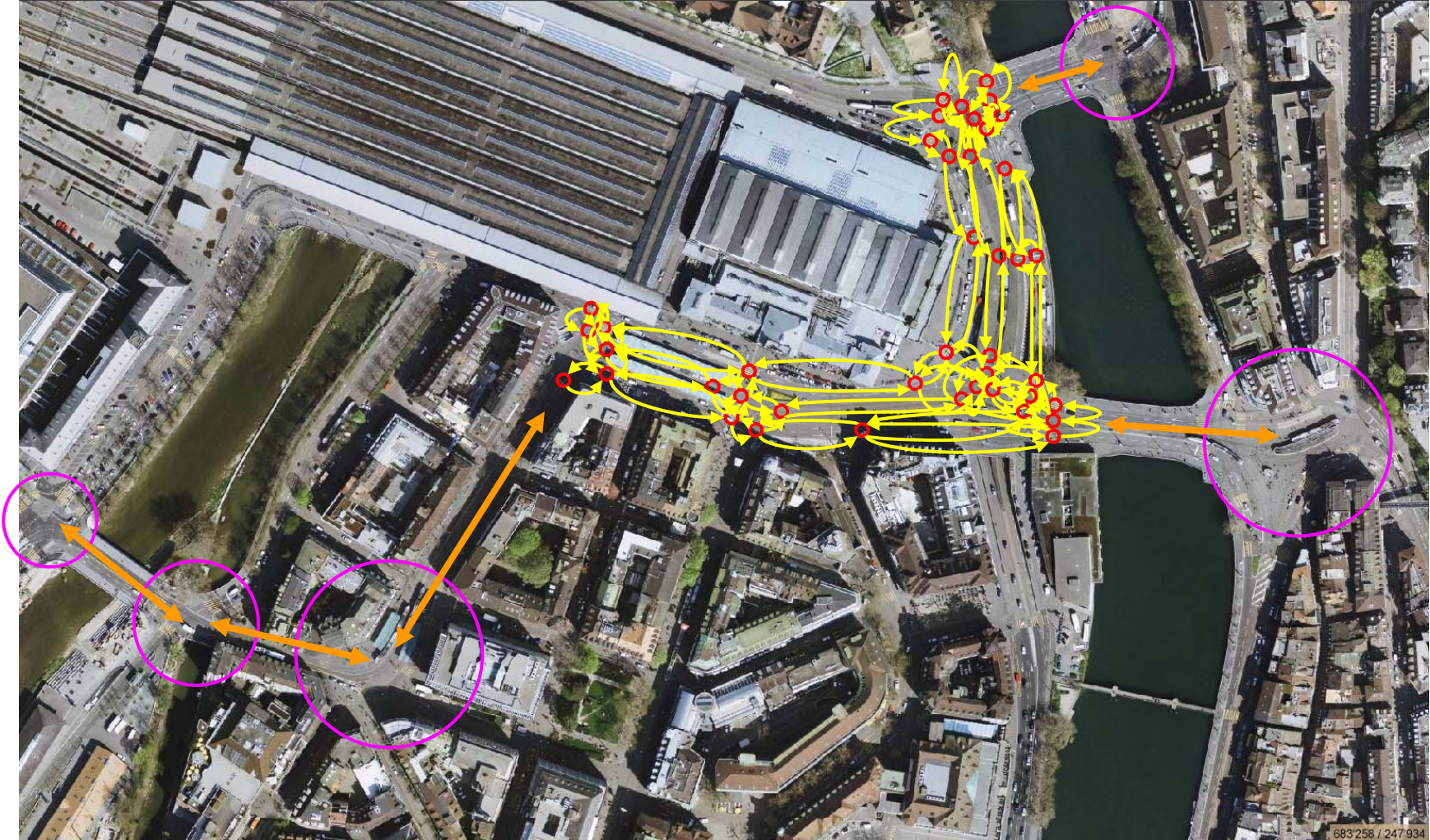
14<sup>th</sup> September 2012



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# Transport Challenges around Zurich Main Railway Station





# Facing Transport Challenges with Intelligence

Designing transport systems as intelligent as possible

→ Establishing ***Intelligent Transport Systems (ITS)***

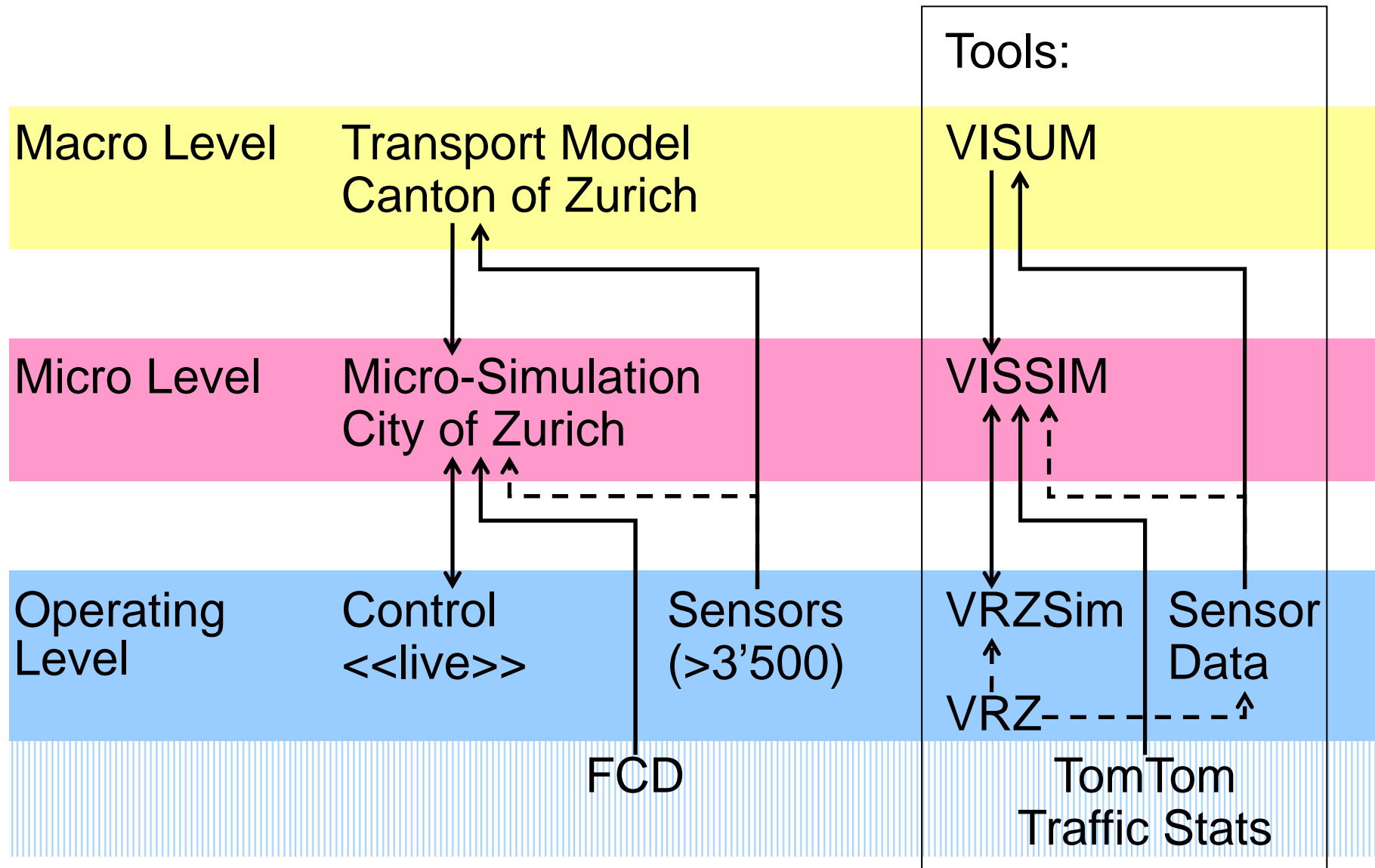
Supporting decision makers with suitable tools

→ ***Best Practice*** (e.g. ITS Toolkit 2DECIDE)

→ ex-ante impact analysis through ***Transport Modelling***

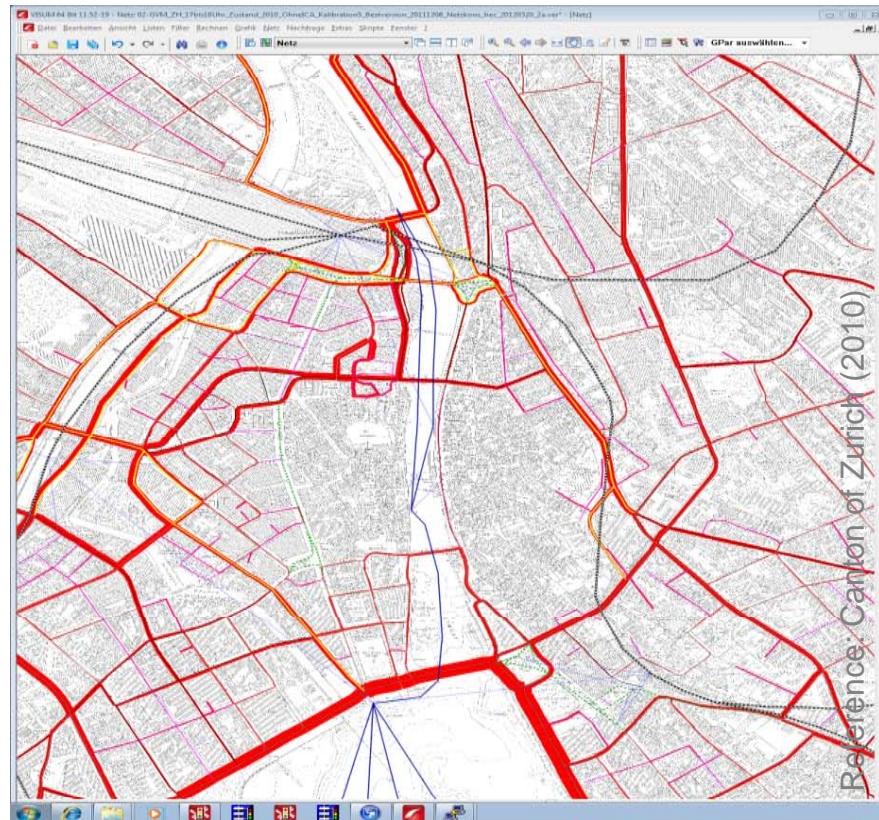
→ Establishing «***Virtual ITS Evaluation***»  
as an operating oriented traffic lab

# The «Virtual ITS Evaluation» Framework

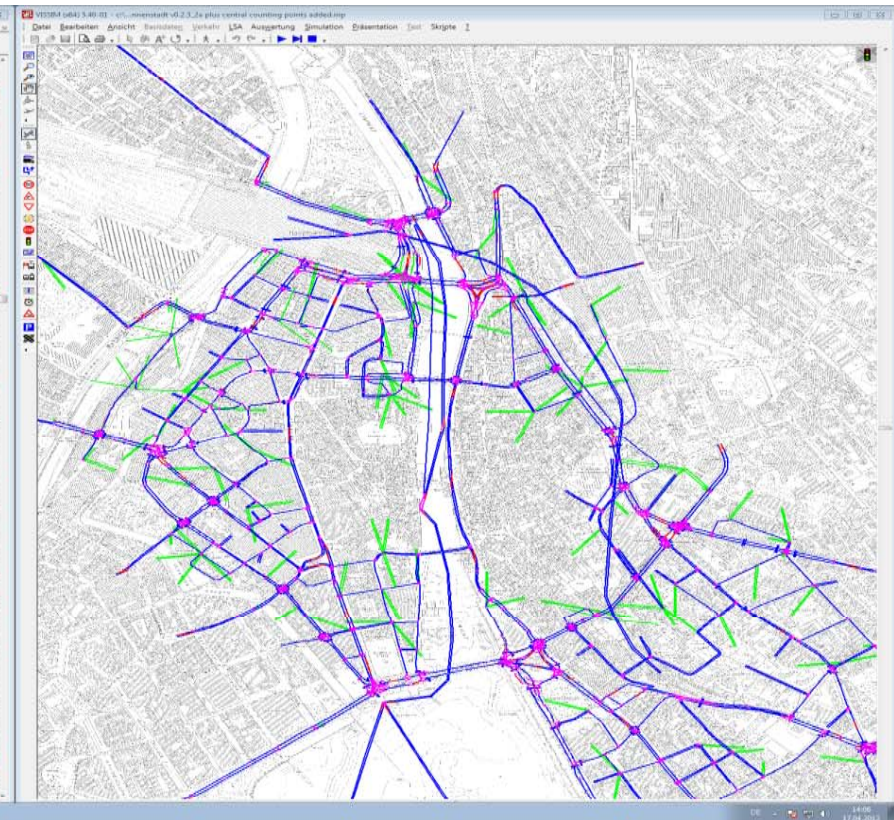


# «Virtual ITS Evaluation» in the Overview (1)

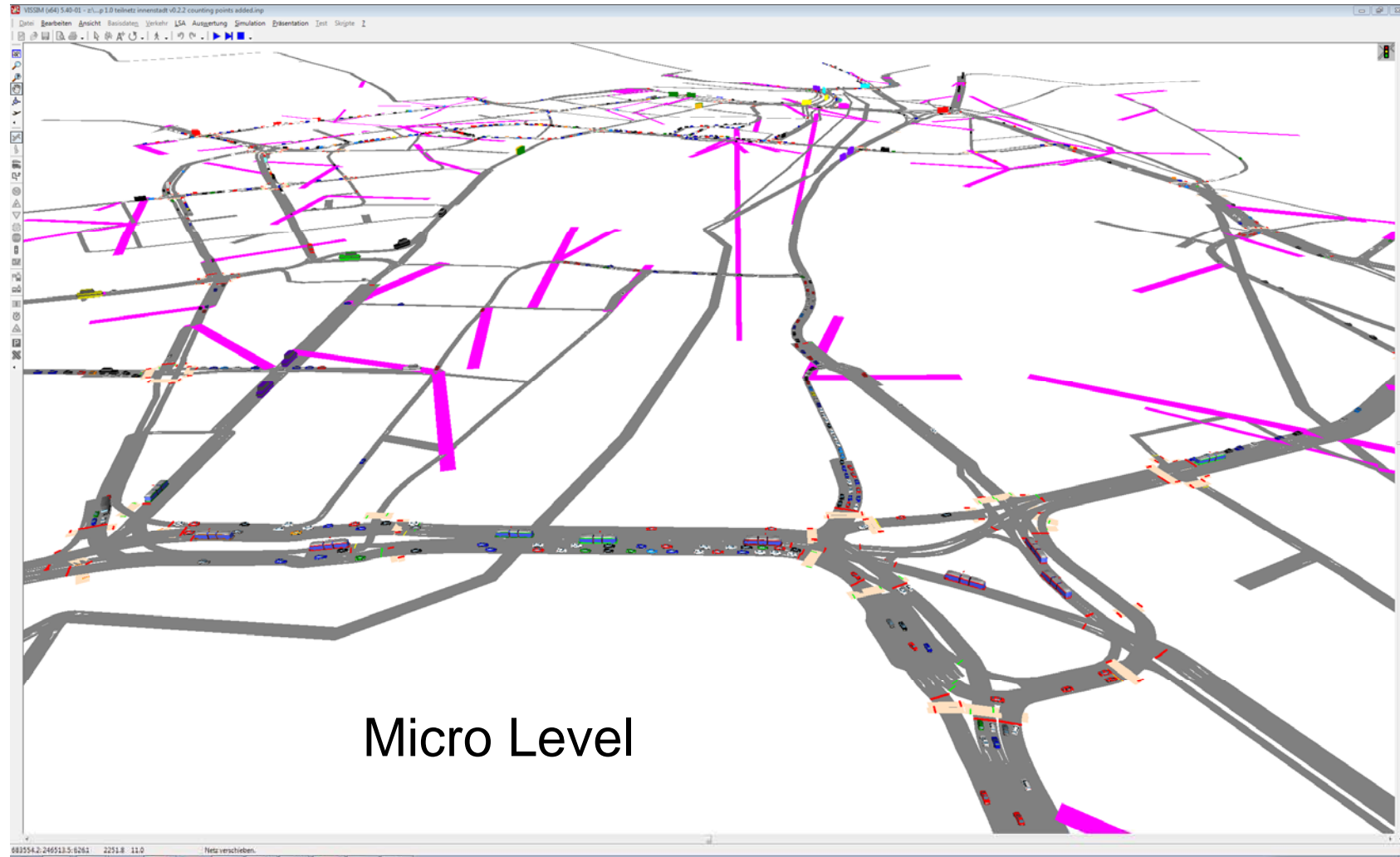
Macro Level



Micro Level



# «Virtual ITS Evaluation» in the Overview (2)



# Applications of the «Virtual ITS Evaluation»

- Development and optimisation of control logics
- Optimisation of traffic routing
  
- Analysis and visualisation of traffic flows
- Analysis and visualisation of other impacts
  
- Operating simulation Zurich Public Transport
  - of the actual operating state
  - for projects
  - in case of construction sites

# A First Application: Fixed Time Signal Plans vs. Zurich's Signal Plans

Evening peak hour results using CONDUITS DST  
(Technion et al. 2011, 2012)

Fixed time signal plans						
Vehicle type	Sum of distance [m]	Total emissions in [g]			Vehicles counted	KPI [ ]
		NO <sub>x</sub>	CO <sub>2</sub>	Particulate		
Bus	75.2	1'443	46'814	29.5	85	
Car	15'265	3'286	1'324'489	128	15'602	
LGV	197	103	16'906	5.36	142	
HGV	270	1'859	78'844	42.2	218	
						341'905

Zurich's signal plans						
Vehicle type	Sum of distance [m]	Total emissions in [g]			Vehicles counted	KPI [ ]
		NO <sub>x</sub>	CO <sub>2</sub>	Particulate		
Bus	91.5	1'058	37'790	24.3	89	
Car	16'935	2'814	1'125'348	130	16'153	
LGV	196	89.2	15'038	5.19	135	
HGV	295	1'499	65'882	35.9	216	
						139'827

Reference: Heimgartner (forthcoming)

# Outlook

- Gaining experience using the «Virtual ITS Evaluation»
- Establishing additional areas of Zurich
- Integrating soft modes
- Intended upgrading of CONDUITS DST
- Research projects by Swiss Federal Institute of Technology

→ nnovatve and leading ITS for Zurich !

# Abbreviations

CONDUITS:	Coordination Of Network Descriptors for Urban Intelligent Transport Systems
DST:	Decision Support Tool
FCD:	Floating Car Data
VISUM:	Verkehr in Städten und Regionen - Umlegung (Softwaretool der PTV AG)
VISSIM:	Verkehr in Städten und Regionen – Simulation (Softwaretool der PTV AG)
VRZ:	Verkehrsrechner Zürich (Traffic Control Calculator)
VRZSim:	Verkehrsrechner-Zürich-Simulator (Traffic Control Calculator Simulator)



# References

Canton of Zurich (2010) Transport Model Canton of Zurich, Canton of Zurich, Zurich.

Heimgarter, Ch. (forthcoming) Virtual ITS-Evaluation – Establishment of Micro-Simulation for the City Centre of Zurich, paper presented at the *19<sup>th</sup> ITS World Congress*, Vienna, October 2012.

Technion Israel Institute of Technology, Imperial College London, Technical University of Munich, Institute of Studies for the Integration of Systems, Municipality of Barcelona, Rome Mobility Agency, City of Paris, Istanbul Metropolitan Municipality, ISBAK, Bruxelles Mobilité and POLIS (2011) CONDUITS, Coordination Of Network Descriptors for Urban Intelligent Traffic Systems, Haifa, London, Munich, Rome, Barcelona, Paris, Istanbul and Bruxelles, funded by the European Commission under the 7th Framework Programme for R&D, Theme 7 "TRANSPORT (including AERONAUTICS)", Bruxelles.

→ see [www.conduits.eu](http://www.conduits.eu)

Technion Israel Institute of Technology, Imperial College London, Technical University of Munich, Institute of Studies for the Integration of Systems and POLIS (2012) CONDUITS DST, decision support tool, Haifa, London, Munich, Rome and Bruxelles, on behalf of Kapsch, Vienna.

→ see [www.polisnetwork.eu/eu-projects/eu-projects-2/conduits-city-pool](http://www.polisnetwork.eu/eu-projects/eu-projects-2/conduits-city-pool)

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