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TRAFFIC MANAGEMENT IN CITIES (Torino and more)

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X CONGRESO INTERNACIONAL ITS
X SIMPOSIO DEL ASFALTO
II SEMINARIO INTERNACIONAL DE PAVIMENTOS DE HORMIGÓN
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CONTENTS

- Why ITS in cities
- Experiences from the “5T System” – Torino
- Integrated ITS systems in two other capital cities (BUCURESTI and KAZAN)

AN URBANISED WORLD

7,000,000,000 inhabitants in 2011
Today 51% in urban areas > 66% forecast in 2040
30 600 000 tonnes of CO_2
produced by human activities in 2010
Traffic, congestion, accidents …

MOBILITY affects economy, health, business and environment

A TARGET for MOBILITY

SMART CITIES which can:

- Offer good quality of life
- Adapt to new mobility requirements
- Grant accessibility to all
- Offer individual + collective advantages
- With minimum ecological footprint
- Be ‘shock resistant’ (to emergencies)
- …..

“Sustainable mobility – SMART MOBILITY”
(not easy, but ITS can help)

BENEFITS FROM ITS

BENEFITS PROVIDED BY
ITS HAVE BEEN DEMONSTRATED

ACCIDENT REDUCTION OF 30%
CONGESTION REDUCTION OF 15%
ENERGY CONSUMPTION REDUCED BY 20%

VERY HIGH BENEFIT/COST RATIO

e.Safety Forum, EU

FEW PRINCIPLES FOR REAL BENEFITS

CONSIDER ITS in “CITY PLANNING”

- Technology alone is not the solution

TACKLE REAL PROBLEMS, FIX TARGETS

- Do not follow “fashion”

USE PROVEN TECHNOLOGIES

- Look at documented results

APPLY A SERIOUS PROJECT MANAGEMENT

- ITS is a team work

ASSESS RESULTS AGAINST TARGETS

- Learn from results

PLAN FOR THE FULL LIFE CYCLE

- Open systems

The TORINO case revisited
&
BUCURESTI, KAZAN

KEY FIGURES and Targets : TORINO

- **Population**: 900 K in city, 2M in metropolitan area
- 1,4 M motorised trips per day, of which:
  - 66% by private cars
  - 34% by public transport
- **Car ownership**:
  - 603 cars per 1,000 inhabitants

ITS «history»: 1990 - today

STRATEGY (1990):
DEPLOY ITS to help
PUBLIC/PRIVATE PARTNERSHIP
FIXED TARGETS: e.g
TRAVEL TIME REDUCTION BY 25%

SOME FIGURES and DRIVERS: BUCURESTI , KAZAN

- **BUCURESTI**
- Population: 1,9 M / 4M(?)
- Heavy **congestion** problems (2007)
- Increasing traffic

ITS deployment: 2005 - 2011

- **KAZAN**
- Population**:** 1,1M /2 M (?)
- Lack of infrastructure
- Big **events** planned

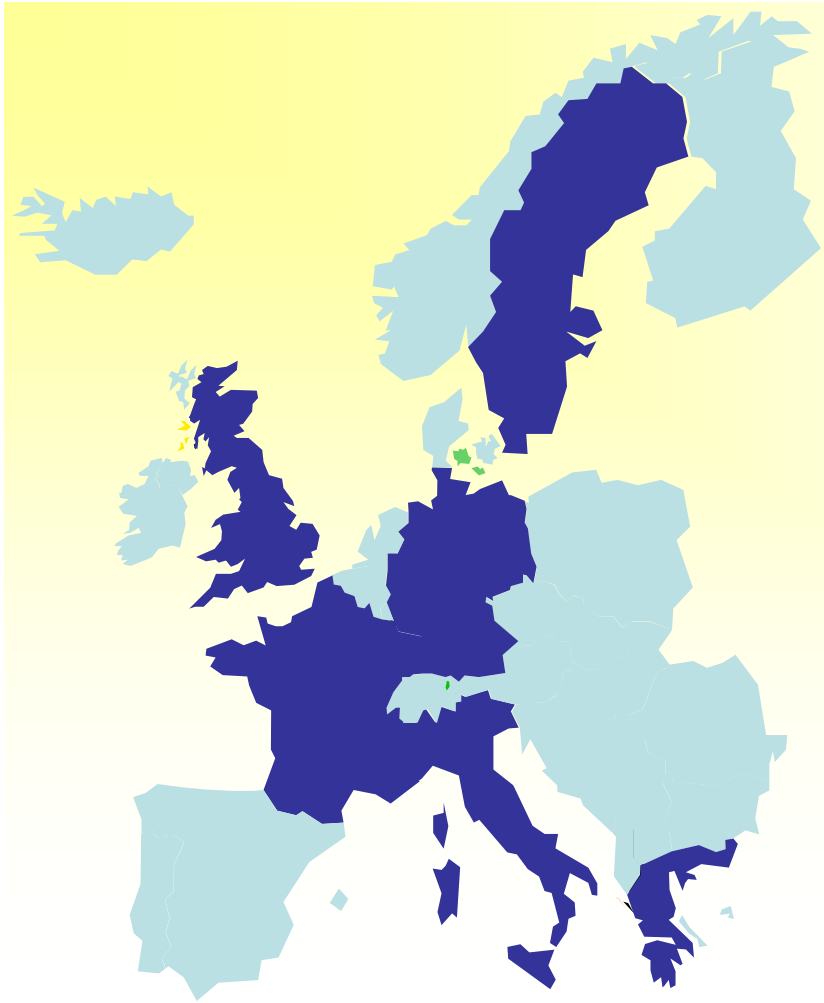
(Universiade 2013, FIFA Cup 2018)

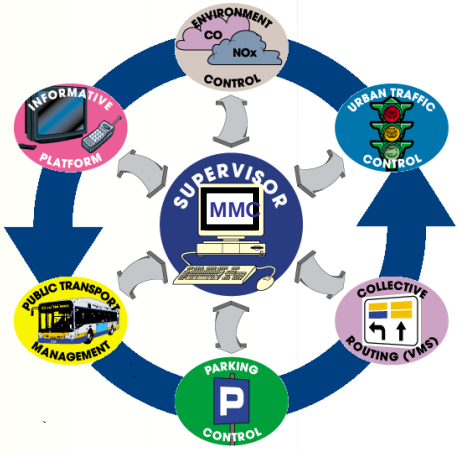
ITS deployment: 2011- today

5T ARCHITECTURE (1992 – 1997)

- **Fully Adaptive UTC** (140 intersections, 1000 detectors)
- **Public Transport Management and RTPI** (1,300 bus/tram, 120 bus stops)
- **Collective Traffic Guidance** (26 VMS)
- **PK Management and Guidance** (12 areas, 20 VMS)
- **Individual on-board Driver Guidance** (5 beacons, 50 cars)
- **Ambulance Guidance System** (50 cars)
- **Environment Monitoring and Control**
- **Integrated Payment System** (public transport, park)
- **Multimedia Infomobility Services** (web, info-kiosks, mobiles)
- **Town Supervisor**

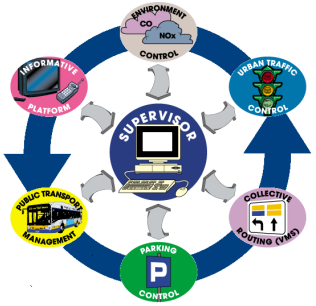
Impact Assessment (1996 – 1997)



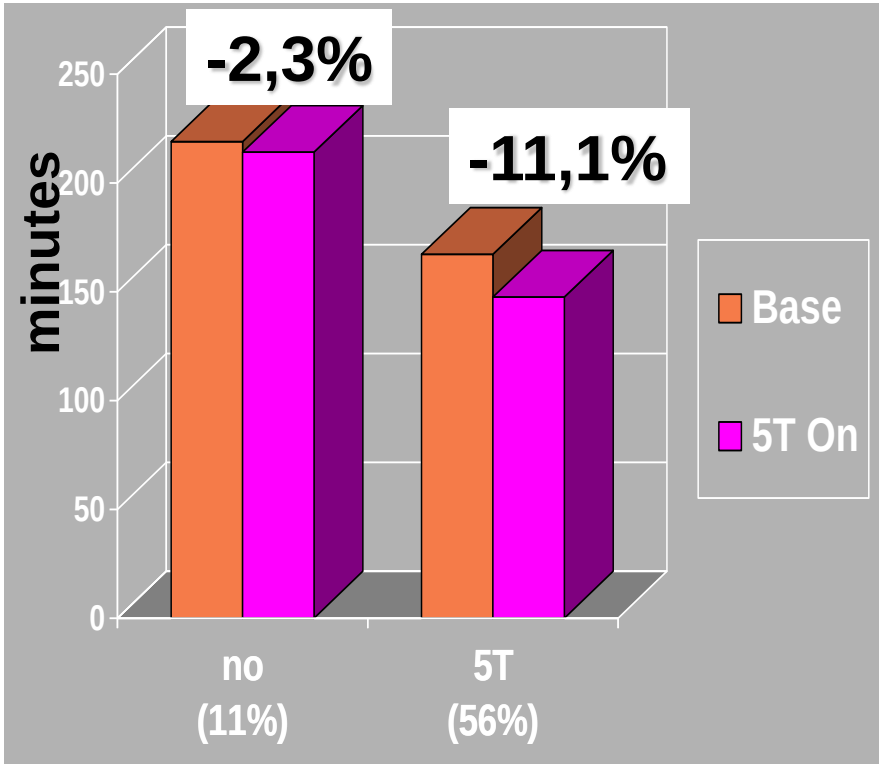


QUARTET PLUS

Some details



Origin- Destination travel times



TRAVEL TIME REDUCTION

21,6%

25 day trials (8+8+9)
9 OD pairs, 1250 trips in total
95% statistical confidence

ENVIRONMENTAL BENEFITS

EMISSION REDUCTION (NOx)

10% (wide area)

21% (specific areas)

12% env. Routing

6% UTC

3% MODAL SHIFT

FUEL CONSUMPTION REDUCTION (CO_2)

10%

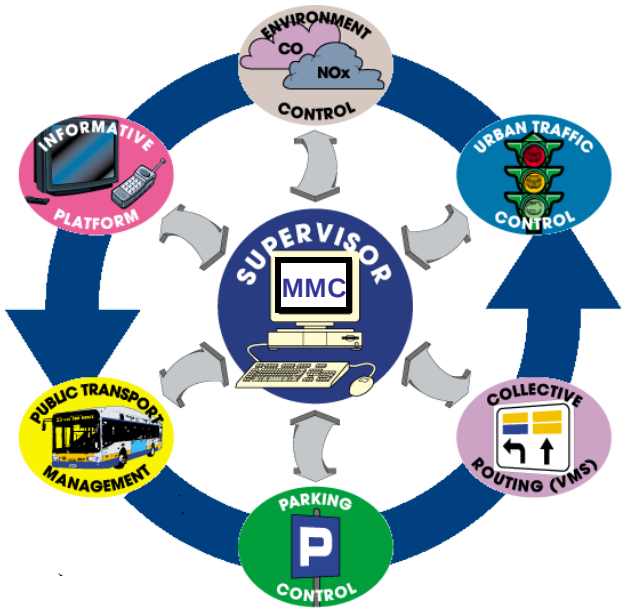
LESSONS LEARNED 1

ADAPTIVE UTC IS THE BASIS FOR ANY IMPROVEMENT

Within the UTC area:

- Savings in Car Travel Time: 17%
- Increase of PT Commercial Speed 20%
- Absolute and Selective Priority to Trams and to priority Buses

LESSONS LEARNED 2

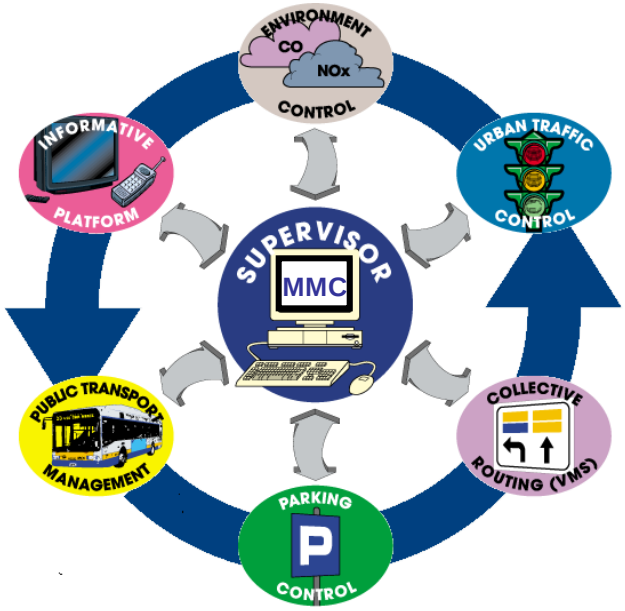


INFORMATION HELPS (in 1996 with VMS)

City wide:

- Savings in Car Travel Time: 4%-5%

LESSONS LEARNED 3



PUBLIC TRANSPORT RECEIVES HIGH BENEFITS FROM ITS

City wide:

- Increase of service regularity: 30%
- Decrease of operational costs (due to integration with UTC)
- Modal shift: 3%

LESSONS LEARNED 4

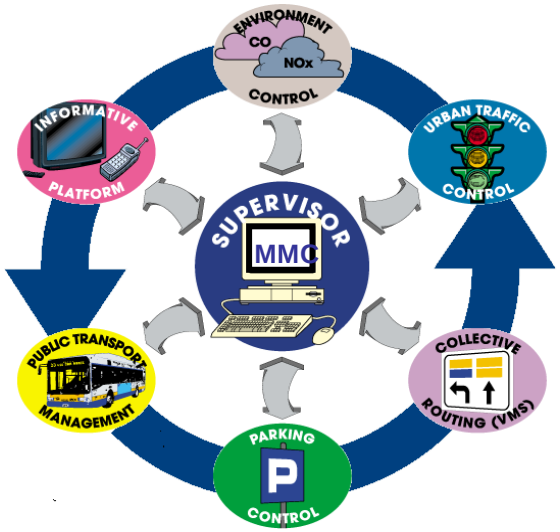
ITS for PUBLIC TRANSPORT
«PAYS FOR ITSELF»

PT management+ UTC + Priority
= Gain in commercial speed and regularity
= less vehicles for same service
= LOWER OPERATIONAL COSTS

REAL DATA:
TORINO LINE 3:

PAY BACK TIME:
922 days (company benefits only)
131 days (social benefits included)

LESSONS LEARNED 5



LARGE INTEGRATION IS FEASIBLE AND BENEFICIAL
ITS HELPS

KEY FACTORS:

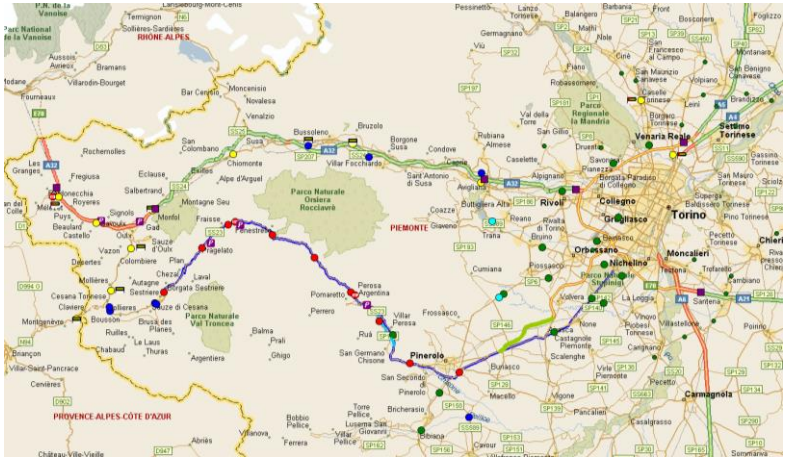
- OPEN SYSTEMS
- STANDARD PRODUCTS

- ORGANIZATIONAL ARCHITECTURES

5T TODAY

- Expanded in the city
- Extended to the region

- New applications e.g.
  - Access control
  - Enforcement
- Event management
  - Winter Olympics (2008)
  - 2015 events

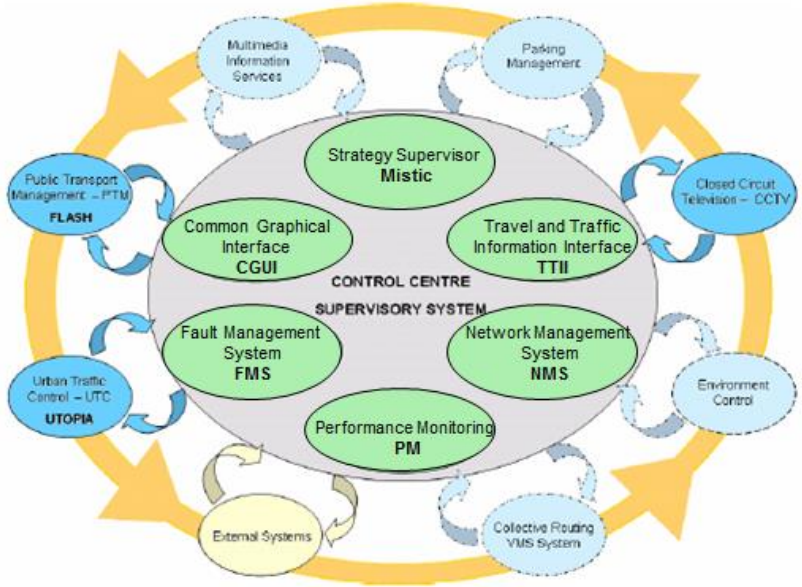


ITS Integration in BUCHAREST - BTMS

BTMS System Main Components

- Main systems (distributed systems) :
  - Urban Traffic Control(UTC)
  - Public Transport System(PTM) -
  - Video Surveillance - CCTV

- CCSS – Control Centre Supervisory System
  - Common Graphical User Interface – CGUI
  - Strategy Supervisory System
  - Fault Management System
  - Travel Time Information Interface
  - Network Management System
  - Performance Monitoring



BTMS Impact on Urban Mobility

Public Transport Priority Travel Time savings

North – South Axes

Piata Victoriei – Piata Universitatii :

BEFORE – AFTER STUDY

19% average in off peak hours and **22%** in peak hours

Traffic Volume Increased : North – South Axe

Piata Victoriei – Piata Universitatii :

5% in off peak hours and **4%** in peak hours

BTMS Impact on Urban Mobility

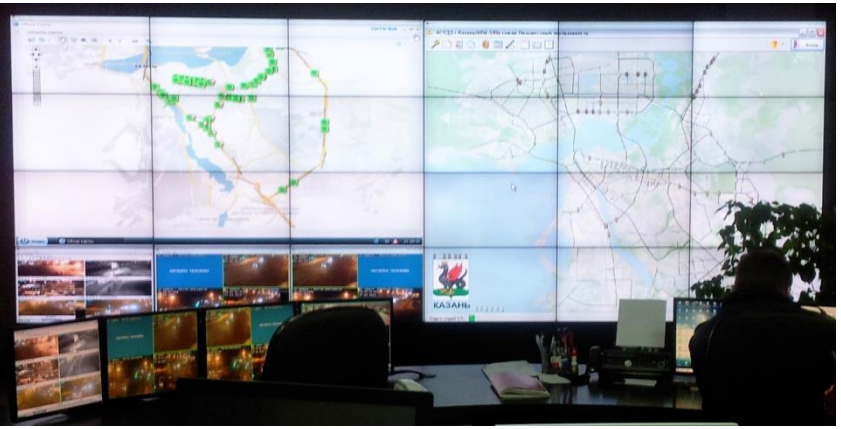
The Fully Adaptive control contribution

- Real time traffic modelling
- Robust feedback control
- Rolling horizon method
- High performance priority management

Average travel time savings - 16%

Average queing time reduction - 50%

KAZAN - TRAFFIC MANAGEMENT CENTER

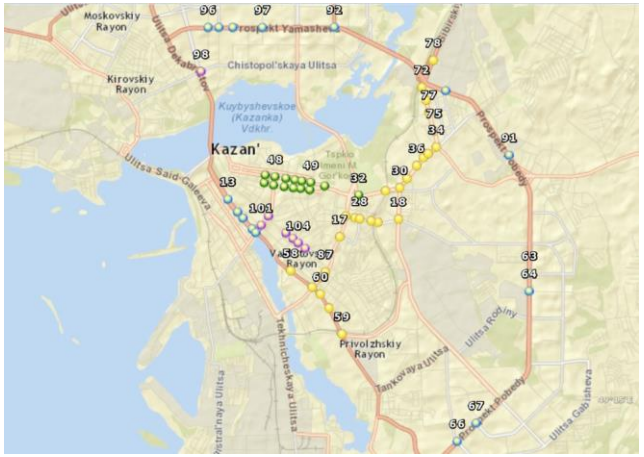


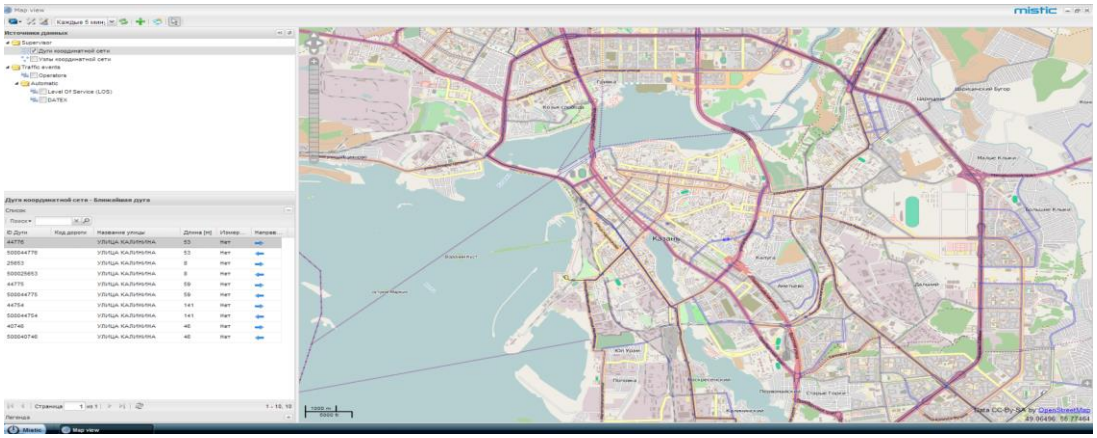
KAZAN SYSTEM COMPONENTS

- Adaptive UTC (100 int.s)
- Priority to PT
- Priority to selected vehicles (emergency and VIPs)

- Freeway control
- User information (VMS)

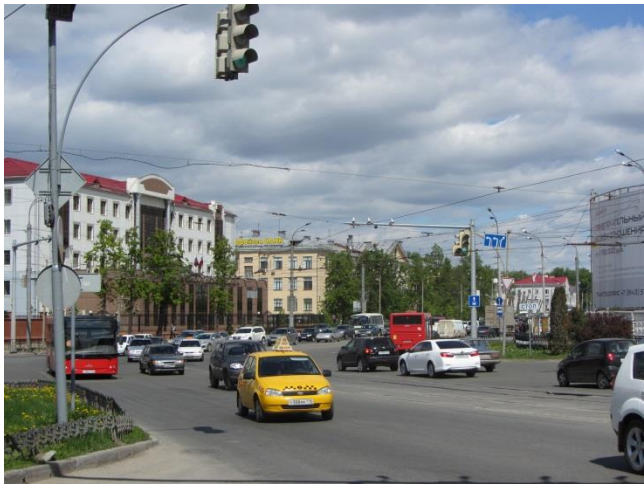
- BIG DATA (on line traffic analytics)





THE BENEFITS MEASURED

- 21% increase in vehicle throughput at each intersection
- 18% increase of average speed
- 20% decrease of total congestion volume
- 20% reduction in CO_2 emissions
- 25% decrease of travel time during rush hour



MY CONCLUSIONS:

IT TOOK SOME TIME … BUT:
… NOW ITS is a BASIC COMPONENT FOR URBAN MOBILITY
… READY FOR NEW DEVELOPMENTS

MANY THANKS FOR YOUR KIND ATTENTION