AGENDA

1. What is a **SmartCity** and why do we need it?

2. European Commission view on Smart Cities

3. Smart cities: European **ranking**

4. Our vision on building SmartCities

5. "Ready for" UTI products for SmartCities

6. Solutions for city traffic

7. Example of an Traffic Management System architecture

Why Smart Cities?

Cities are on a rise

- More and more people move to urban areas
- Increasing pressure on cities' infrastructure
- +50%[1] of world people are cities inhabitants, from 2008
- By 2050, 70% of world population will be city dwellers

[1] *World Urbanization Prospects' report*

Urbanites grow

- World population will surpass 9 billion by 2050 (8 by 2030)
- Urban dwellers will surpass 6 billion by 2050
- Two in three people born in the next 30 years will live in cities

Quality of life

- Technology enhancements and access to information made citizens escalate the needs for **smart cities**, where technology, sustainability, citizen well-being and economic development integrate, aiming to a better quality of life

How's EU looking at Smart Cities?

European Commission launched in July 2012 the "Smart Cities and Communities Innovation Partnership" (SCC), aiming to:

- boost the development of smart technologies in cities
- demonstrate innovative urban solutions at the interface of energy, transport and ICT
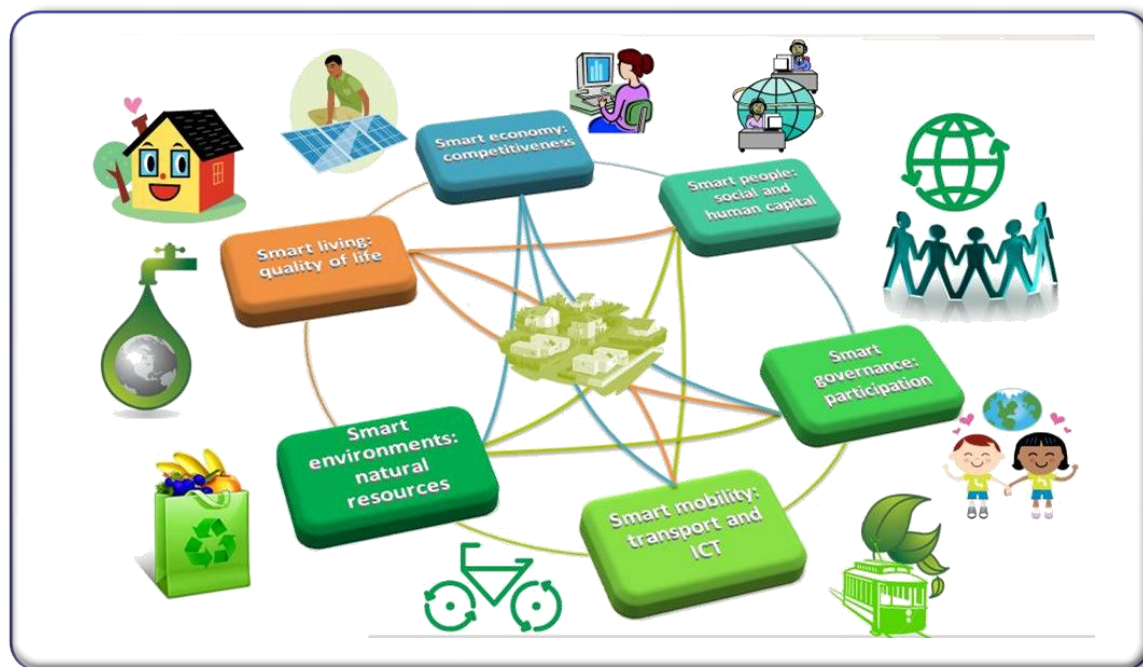
Definition:
a city becomes "Smart" when investments into human and social capital, transportation (ITS) and communications infrastructure (ICT) powers in a sustainable manner the economical development and high quality of life with an intelligent management of natural resources.
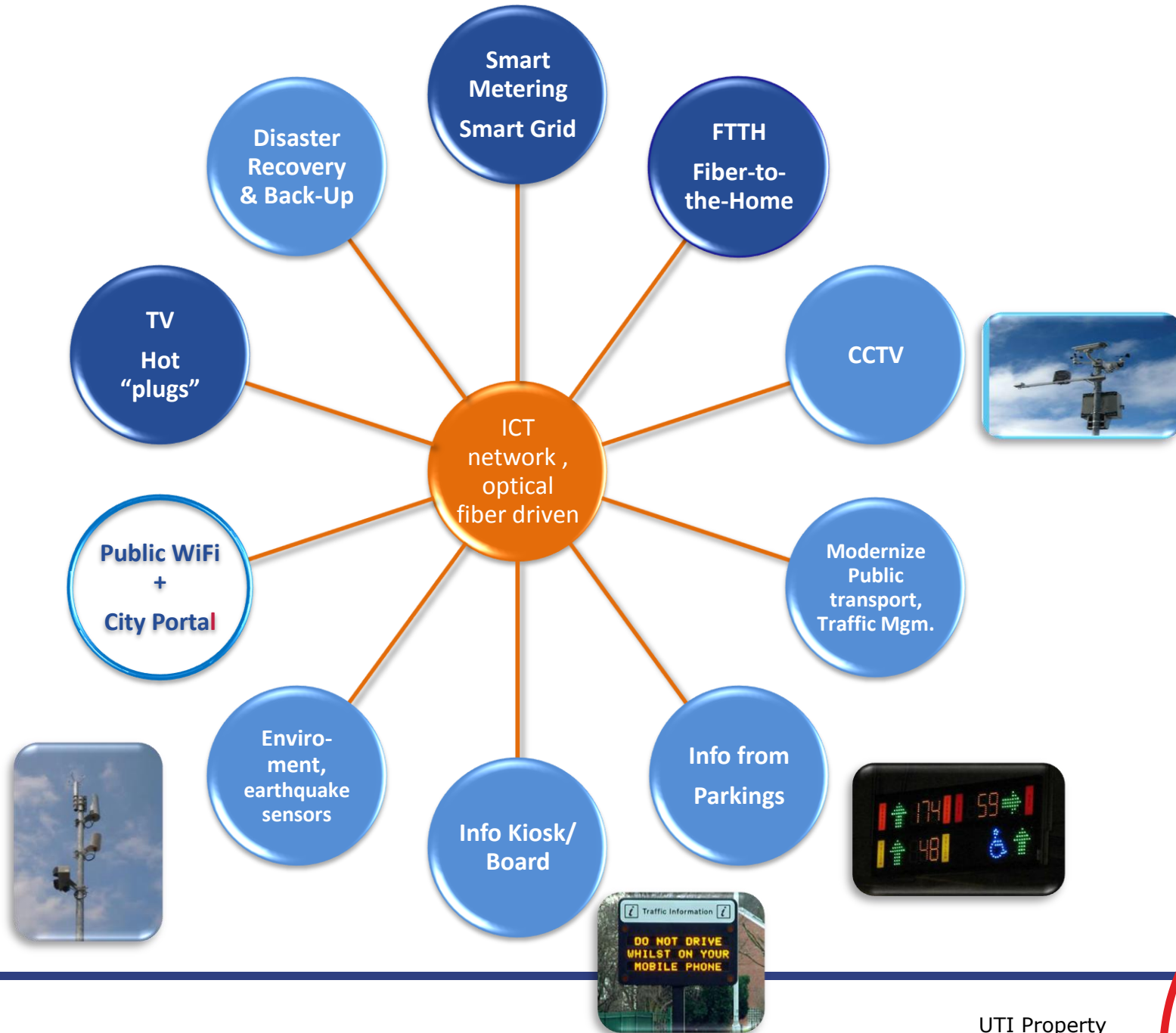
Conclusions

Smart Cities

- The concept gained **importance** in the last years

- Aims at increasing citizens' **quality of life**

- Improves the **efficiency and quality** of the services provided by governing bodies

- **Citizens**, **companies** and **authorities** that are part of a city's system

- This concept requires an **integrated vision of a city and of its infrastructures**

- **ITS** and **ICT** related solutions and applications lead the Smart City developments

- Smart City solutions are already **available**

Cooperation between the ITS/ICT industry, other related sectors and public authorities should be stimulated to accelerate development of wide-scale roll out of Smart Cities!

Industry solutions supporting SmartCities

- Smart Metering Smart Grid
- Disaster Recovery & Back-Up
- FTTH Fiber-to-the-Home
- TV Hot "plugs"
- CCTV
- Public WiFi + City Portal
- ICT network, optical fiber driven
- Modernize Public transport, Traffic Mgm.
- Enviro-ment, earthquake sensors
- Info Kiosk/Board
- Info from Parkings

Solutions for city traffic

Urban Traffic Control System (UTC)

- Provides adaptive functioning of traffic lights according to current traffic values working in centralized or local adaptive mode.

- The adaptive regime consists in changing the traffic lights timing in each intersection, according to the traffic values determined at intersection level, but also according to the traffic condition within the entire system.
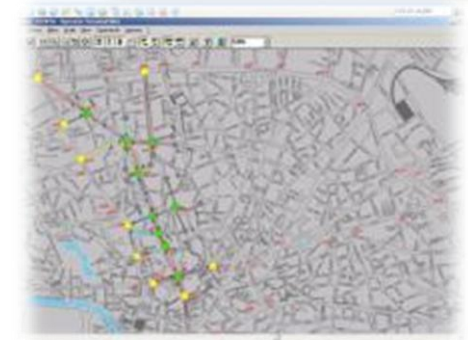
Public Transportation Management System (PTM)

- Management of public transport vehicles in order to observe the established schedule

- Integration with the UTC subsystem so that the public transportation vehicles get green light priority

- Emergency vehicles – the systems provides the police, fire fighters, ambulance vehicle high priority in intersections

Solutions for city traffic

Traffic information systems

- Variable Message Signs (VMS)
- VMS for transport stations
- Web portal for information on the traffic

Traffic enforcement

- Red light violation
- Speed violation
- Cars access restriction in certain areas
- Overweight offenses

Solutions for city traffic

Traffic Incident Detection Systems

- Incident detection is the process by which an incident is brought to the attention of those responsible for maintaining the traffic flowing and operations at the scene.

- Quick response minimizes the exposure of those involved in the incident, speed up the implementation of traffic control, reduce travel time and reduce the overall impact of the incident.

Obiect pierdut

Solutions for city traffic

Variable Message Signs - VMS

One of the most important system is to inform traffic participants for:

- Main routes and estimated travel time in real time

- Possible work, accidents, speed limits, weather conditions

- Centralized management of traffic signs and parking systems integration in the city

EXAMPLE OF TRAFFIC MANAGEMENT SYSTEM

Urban Traffic Control

- Management of signalized junctions

Public Transportation Management

- For public transportation vehicles. Special extensions for the Police, Fire Fighters, Ambulance vehicles

Video Surveillance

- In each signalized junction covering all arms of the junction

Control Center

- Covering all the functions of the traffic management system

Communication Infrastructure

- Interconnecting all equipment

Urban Traffic Control - UTC

Adaptive

- adaptive on splits, cycle and offset timings without human intervention
- minimise the delays and number of stops
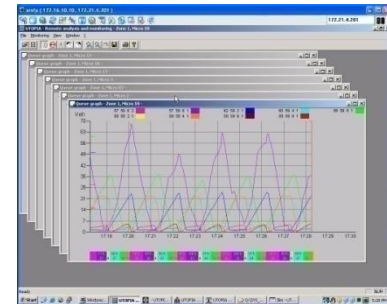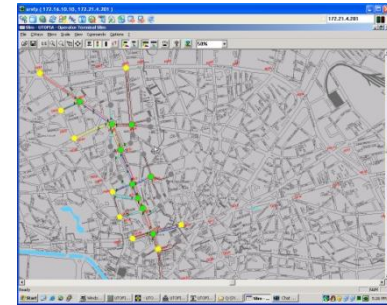
Hierarchical

- central level and local level
- global coordination and co-operative control

Open

- integration in wider management schemes
- connection to other systems

Distributed

- intersection controllers/central level
- reduced communication requirements

Urban Traffic Control - UTC

Functionalities and benefits

- **Full automated mode, no need of human intervention on street**
- **Large scale of available input sensors**
  - Vehicle counting sensors
    - ✓ loops,
    - ✓ CCTV cameras
    - ✓ Electromagnetic sensors & other
  - Priority inputs
    - ✓ Public transport
    - ✓ Special vehicles (Police, ambulance, Fire
- **Integration with external system**
  - City CCTV: traffic surveillance
  - Traffic enforcement: red light crossing, speed
  - Phisical security for traffic elements (e.g. traffic controller cabinet)
  - City Parking

Urban Traffic Control - UTC

Functionalities and benefits

- **On-line monitoring & <u>control</u> from Control Center**
  - Monitor the functioning of field elements
    - ✓ Traffic Controller,
    - ✓ Traffic Lights
    - ✓ Traffic Sensors
    - ✓ CCTV cameras & other
  - **Display real-time parameters of traffic flows**
    - ✓ occupancy level : traffic queues, available capacity per junction
    - ✓ gap between vehicles
    - ✓ traffic flows from adjacent junctions
  - **Adaptive traffic control**
    - ✓ Real-time change of the limits prolongation
    - ✓ Recalculation of signal plan synchronization point
    - ✓ Automatic definition of co-ordination parameters
    - ✓ Automatic switching of signal plans or groups of signal plans
    - ✓ Remote upload of the new traffic logic into the controller

Urban Traffic Control - UTC

Functionalities and benefits

- **Statistical reports based on on-line & historical data**
  - Intersection capacity calculation & monitor
  - Parameters of traffic flows (e.g. intensity, gap between vehicles, use of leave time, etc.)
  - Graphic comparison of intersection capacity: occupancy level
  - Monitoring of co-ordination effectiveness
  - Evolution & comparison of traffic on selected periods
    - ✓ Peak intervals on week days
    - ✓ Week-end flows
    - ✓ Comparison between months
  - History of events in the system (errors, control commands, etc.)

Urban Traffic Control – European tendencies

- **Migration to Centralized Adaptive Traffic Management**
  - ✓ Traffic Management Systems benefits from extended integration capabilities of Centralized Adaptive solutions and migrate from fixed plans and local adaptive to full Centralized Adaptive Traffic Management
  - ✓ Adaptive Centralized Management reduces direct involvement of traffic officers on the street with benefits for both security of traffic offices and traffic participants

- **Integration between Adaptive Traffic Management and Public Transport Management**
  - ✓ Efficient Public Transport is a vital component of any major city
  - ✓ Integration between Adaptive Traffic Management and Public Transport provides on-line priority to public transport and enhance the use of public transport in major cities

- **Integration between Traffic Management and Traffic Enforcement**
  - ✓ Indiscipline of traffic participants can cause accidents with lost of human lives and traffic jams
  - ✓ Traffic enforcement solutions improve the discipline of traffic participants in dangerous areas (dark zones)

# Public Transportation Management - PTM

Native integration with UTC, could provide priority for public transportation and intervention vehicles (police, ambulance, fire fighters)

Distributed system with components installed at vehicle and central level

Monitoring of different public transportation fleets

Localization of vehicles and direct communication channel (data/voice) between the driver and the central component

Integration with passengers information systems
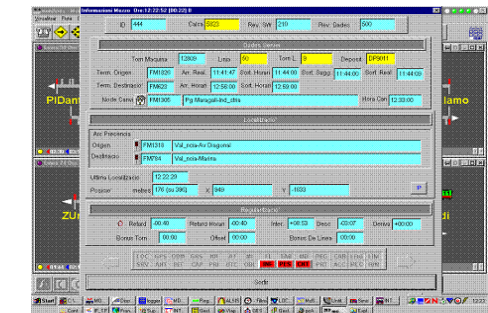
Video Surveillance System - CCTV

Could offer live video stream from junctions using PTZ cameras

Predefined positions, tours and privacy zones could be define for each camera

Automatic tracking of public vehicles with automatic handover to the next camera.

24/7 live feed from all the monitored junctions. The video streams could be stored for unlimited periods of time.

Automatic positioning of the camera when a fault of another equipment is detected at junction level.

Control Center and Supervisory System - CCSS

CCSS provides the integration among all the subsystems of the solution.

Centralized management of all traffic activities through video streams, data for traffic control sensors, location of public vehicles and data analyses

CCSS components

- Common Graphical User Interface
- Fault Management System
- Network Management System
- Strategy Supervisor System
- Performance Monitoring
- Traffic and Travel Information Interface

Thank you!

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