5G for Connected Automated Vehicles
Vienna, 20 September 2016

5G and Mobility: Connected Vehicles

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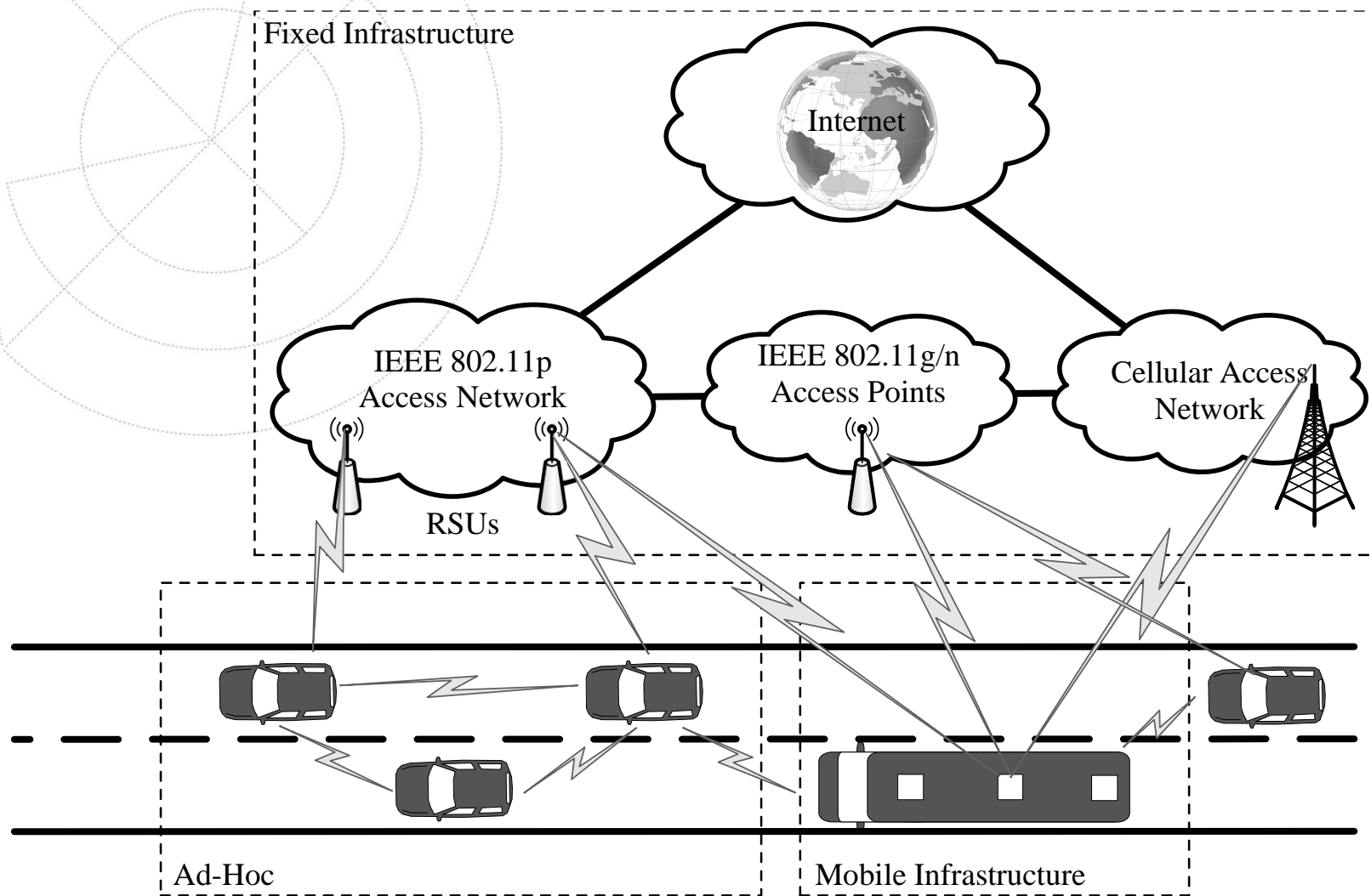
Smart City → Connected City

How?

Turn cars, boats, bicycles, drones into mobile WiFi hotspots

Network in the roads, cycle lanes, river, air: connect everything!

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# Vehicular Networks: How?

Network Mechanisms

- GPS + IEEE 802.11p + WiFi + GPRS + 3G/4G
- Smart connection manager for heterogeneous networks
- Seamless handovers
- Multi-hop vehicular mesh networking
- M2M Delay tolerant data management
- Security mechanisms for connected vehicles.

What we achieved: harbor network!

A network of connected trucks, cars, tow boats and vessels:

- Secure, reliable and **low-cost** way to integrate information from containers, trucks, ships, drivers, etc. and improve harbor logistics

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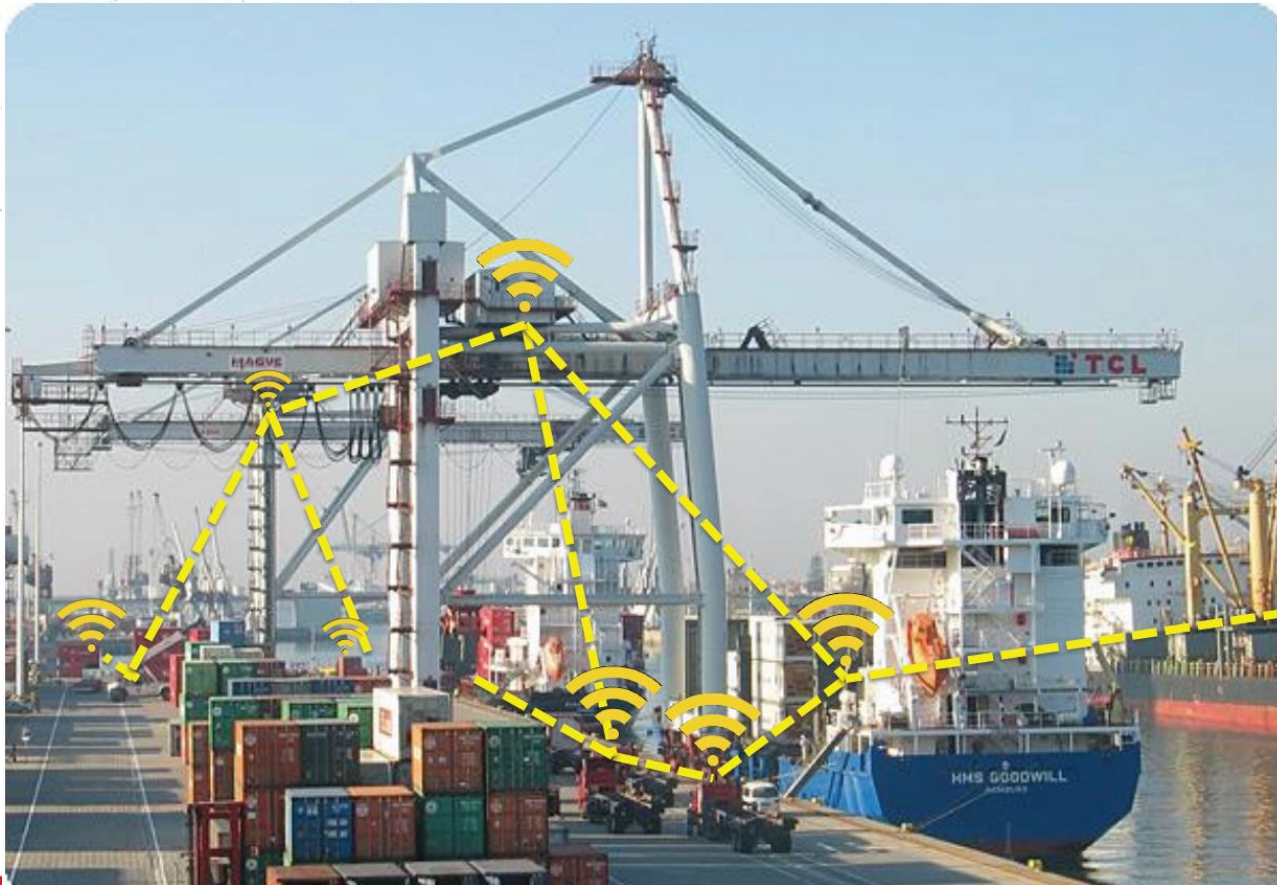
Harbor Pilot: the network

25 trucks, Tow boats, Patrol vessels
Road side units
Plug and play units for vehicles

Latency in the order 10 msec
Wireless coverage larger than 600m

09-Nov-2013 13:07:45
Back to work...
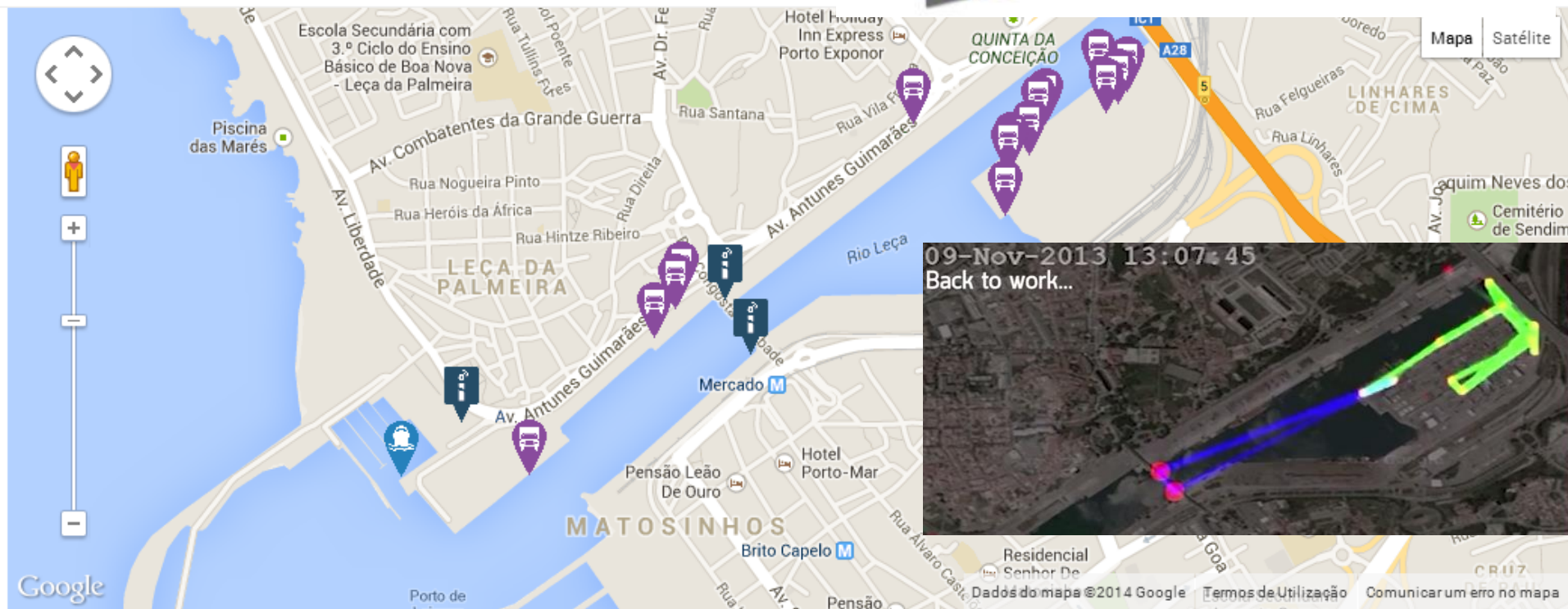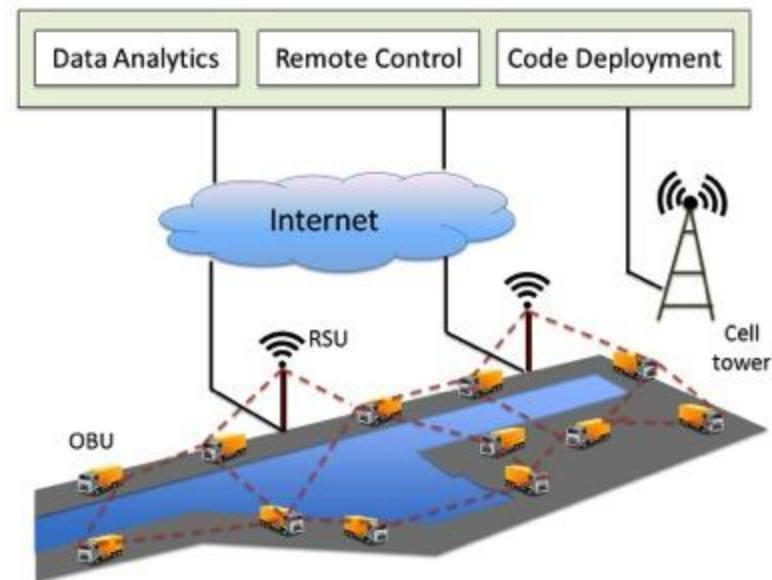
Total vehicles displayed (online in the last 2 minutes): 18

What we achieved: city network!

A network of connected vehicles:

- Secure, reliable and **low-cost** way to **expand wireless coverage** for everyone: Internet access in the STCP buses
- Enable the **Internet of Things** and **improve urban life**: transmission of information from sensors in the street, garbage containers, cameras
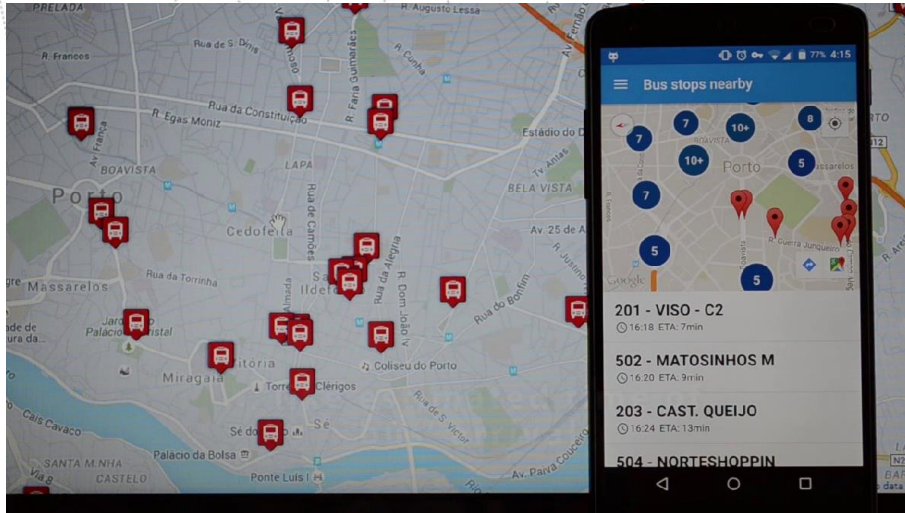
Pilot in the City of Porto (1 year results)

608 vehicles, 57 road side units, 23 sets of sensors

>400,000+ unique users (2.5TB/month)
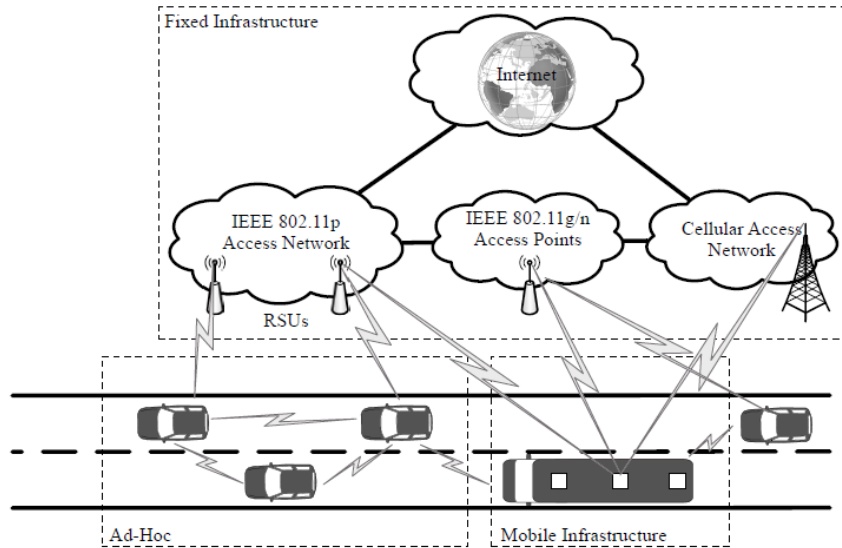
Bus/Fleet Information

Online Dashboard – Bus Stats

Sensors

O3, NO2, CO, particles, temperature and humidity sensors

Wind direction and speed sensors

Pluviometer

Solar Radiation sensor

WiFi interfaces

Noise

storage and control

Roof of Buses
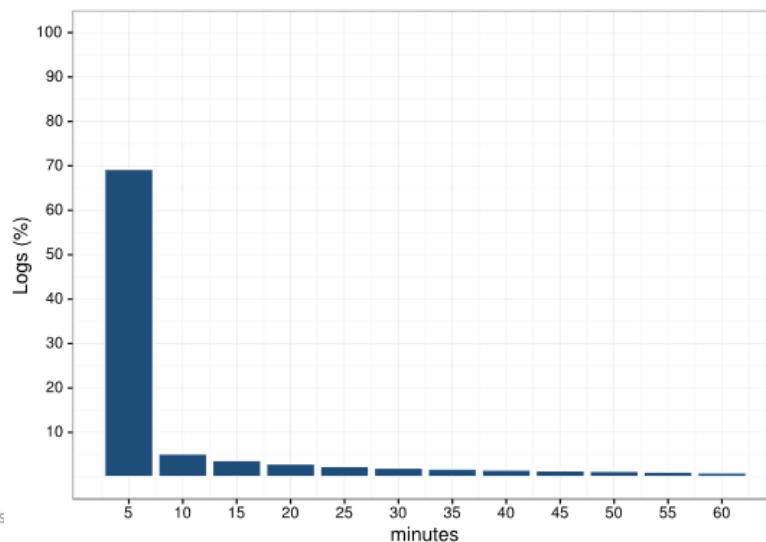
Traffic Lights

Balconies

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City Pilot: IoT network results

Smart Car Navigation

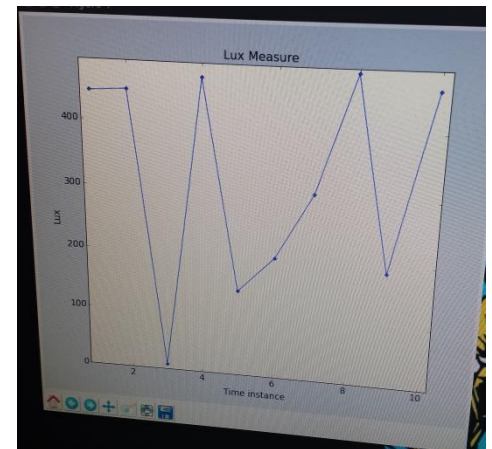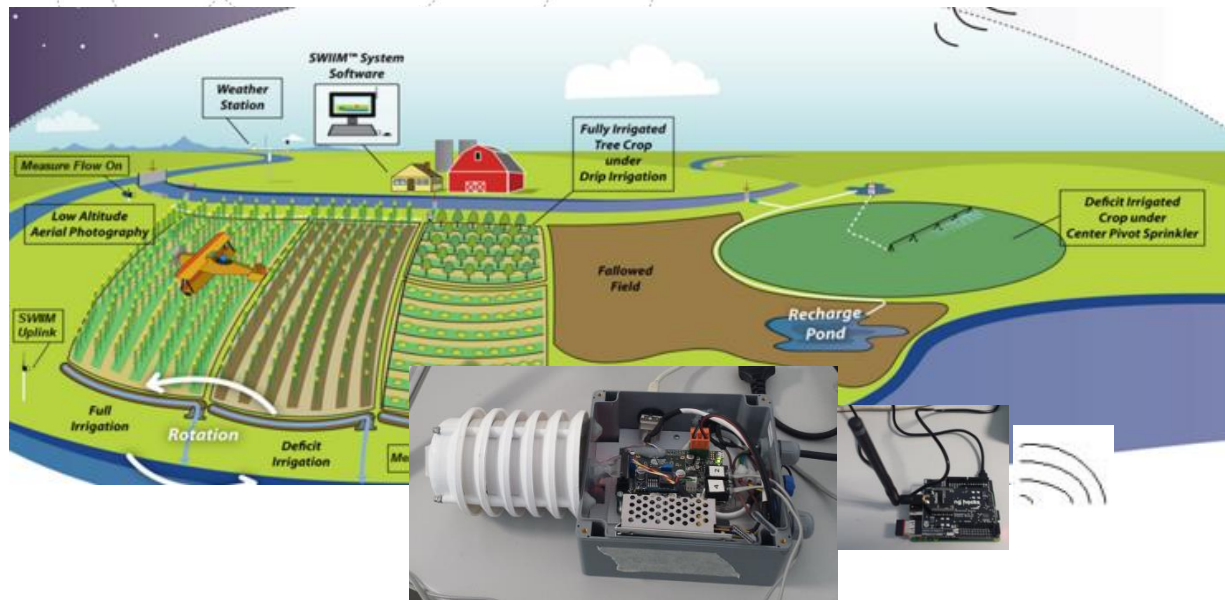Healthy Running Path

Garbage Collector

Smart Metering

sensors: 722MB/day; >100 garbage containers

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Integrating sensors and LoRa

Use more technologies in the smart city environment: parks, events

Working Infrastructure
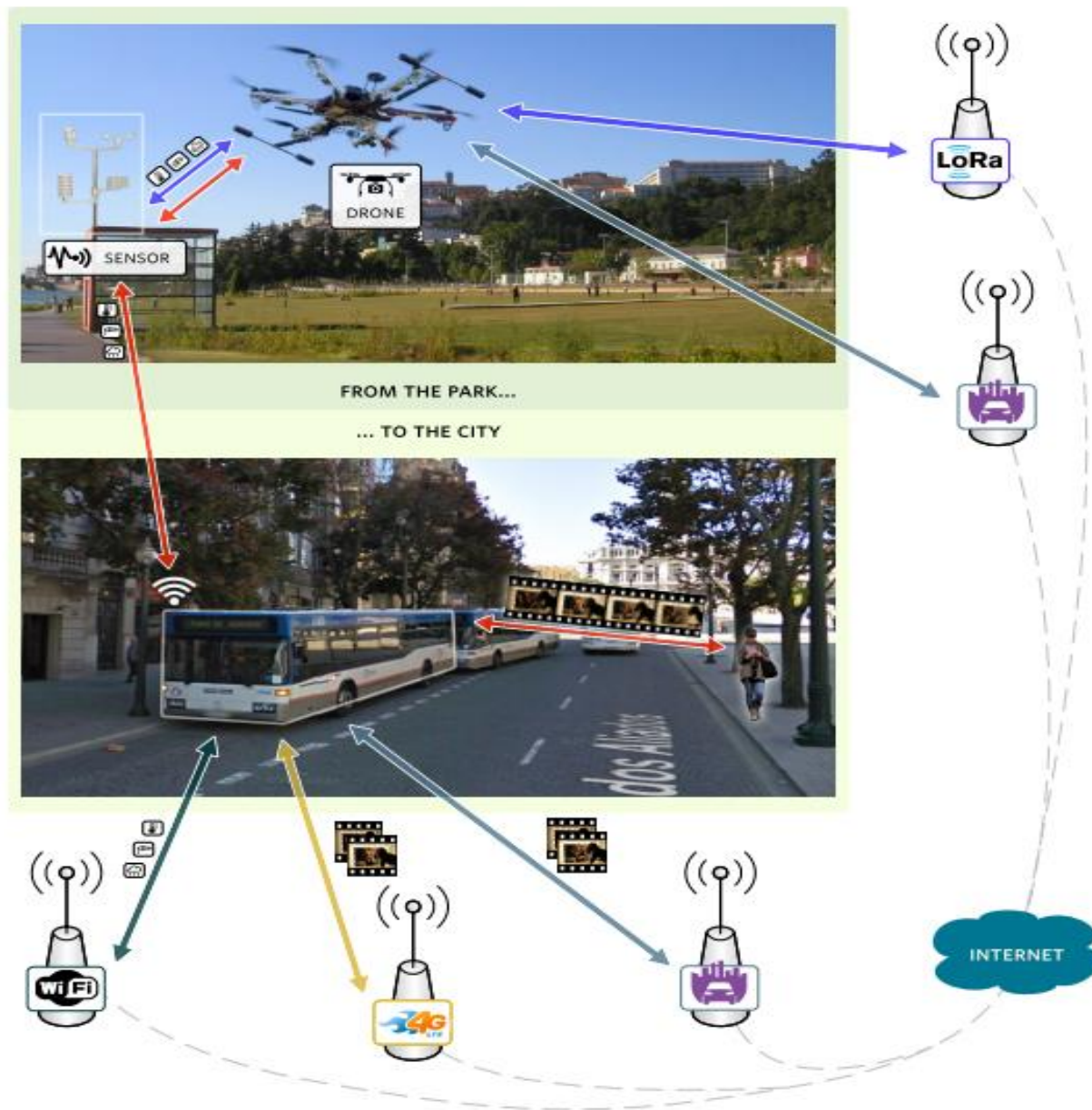
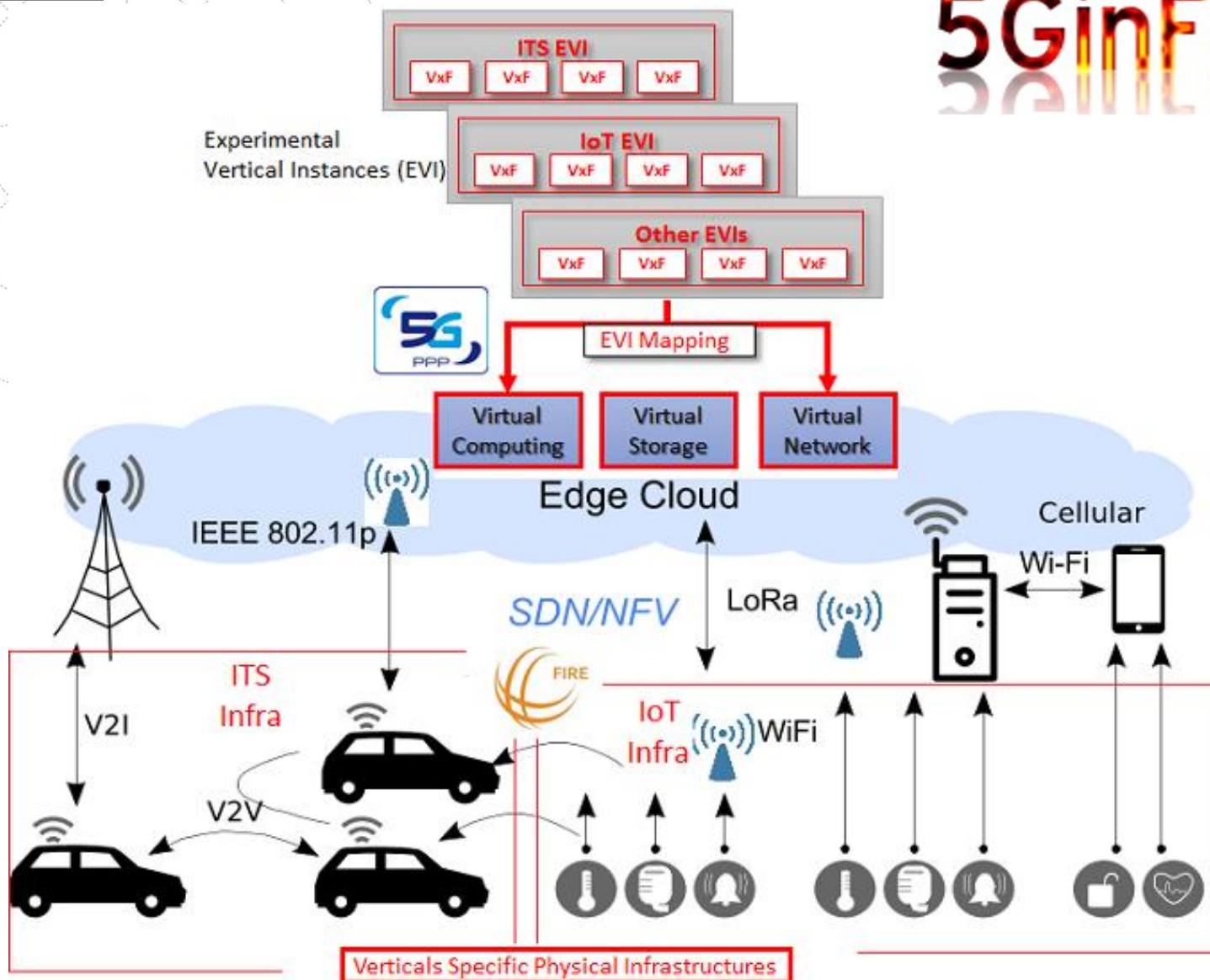# 5G Architecture (Nov 2016-Oct 2019)
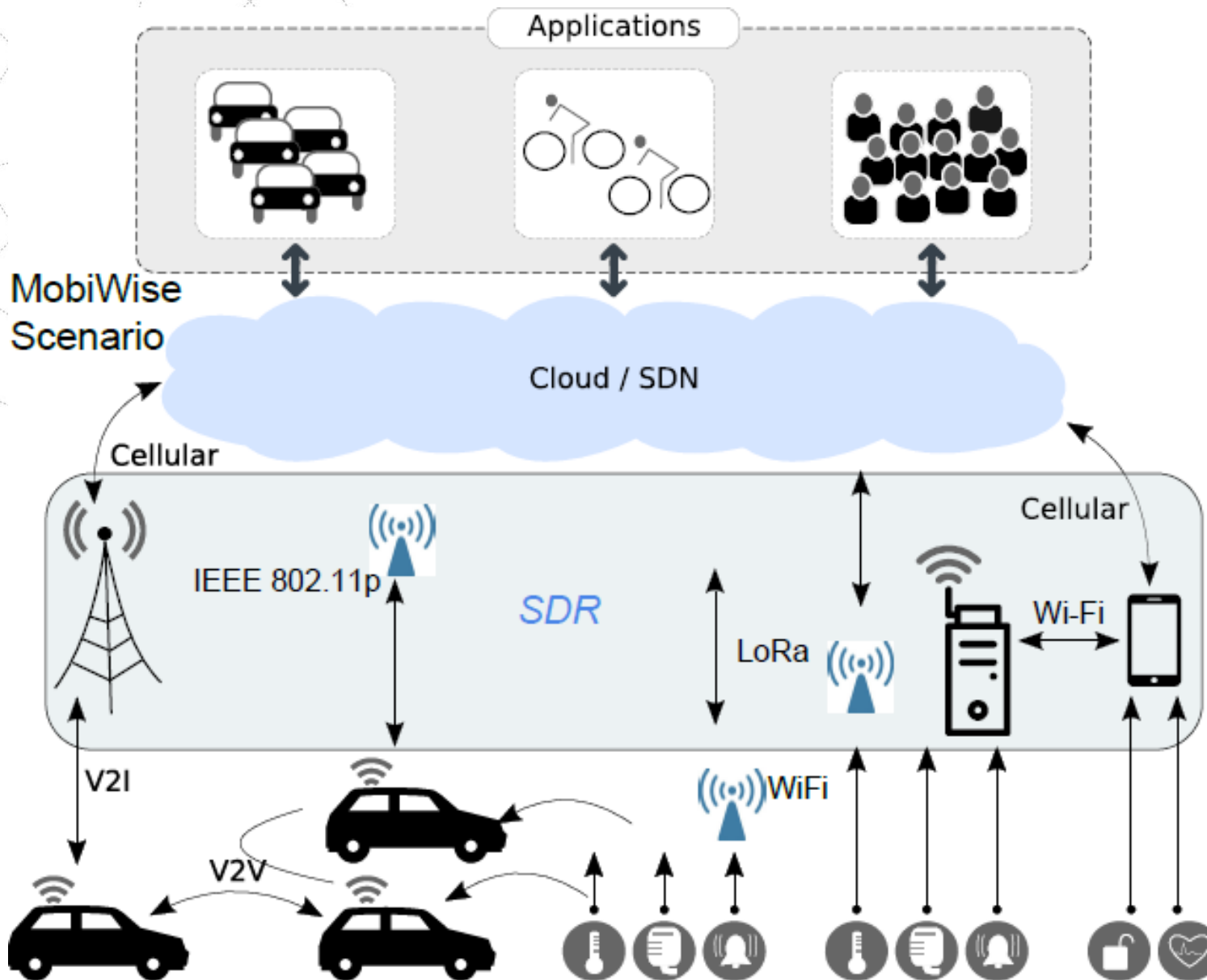
EU 5GinFIRE (Jan 2017-Dec 2019)
Evolving FIRE into a 5G-Oriented Experimental Playground for Vertical Industries

What's Next?

Self-Driving Cars
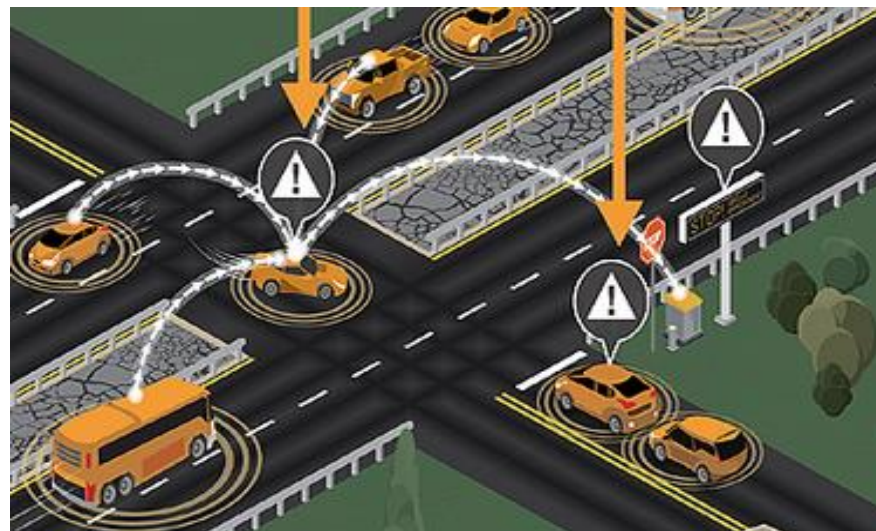
Emmergency Communic

Large Scale events

Aeronautic Communic.

Waste Management

M2M Communic.

Real-time communication

Smart Biking

B2B communication

Real-time information of transportation

Self-Intersections

Smart Metering
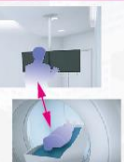
Smart Parking

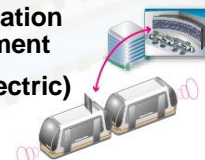Remote sensing and control

Smart Agriculture/ Park

Smart Tourism

Interconnecting things, lighting

Broadband Communication

Transportation management (public, electric)

Vehicles Telematics

Thanks!

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