

Ciência 2018, 4 Julho 2018

# Cidades Sustentáveis

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Faculdade de Ciências  
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Universidade de Coimbra



Inovação



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telecomunicações

*creating and sharing knowledge for telecommunications*

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# Instituto de Telecomunicações



**Networks  
&  
Multimedia**



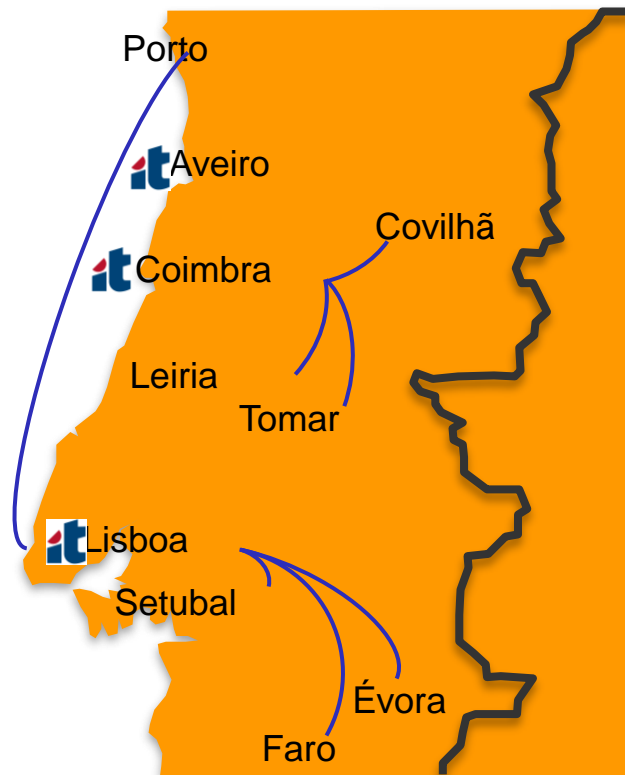
**Wireless  
Comm**



**Optical  
Comm**



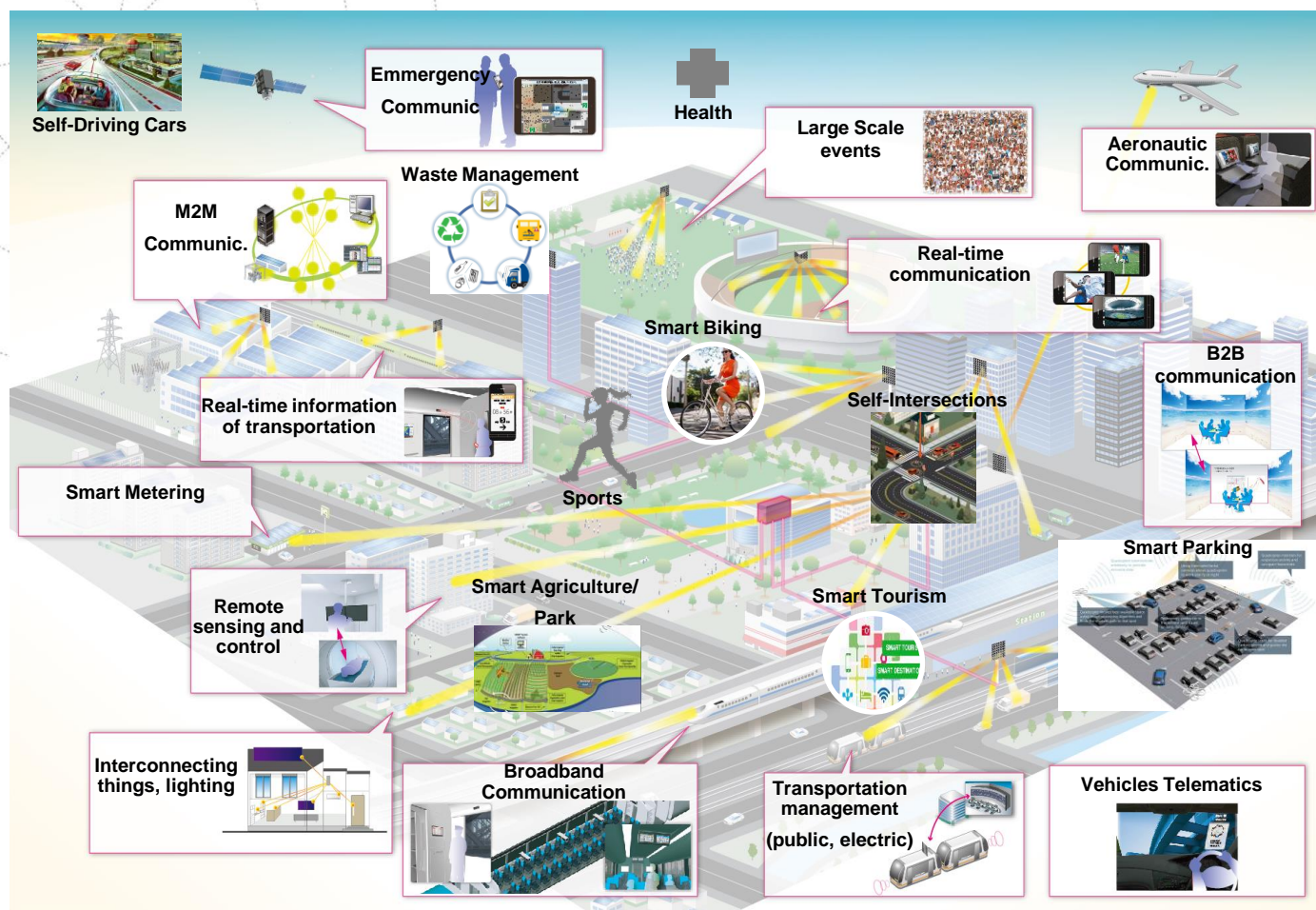
**Enabling  
Tech &  
Basic  
Sciences**



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# SmartCities Vision



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# Largest Vehicular Network Worldwide!

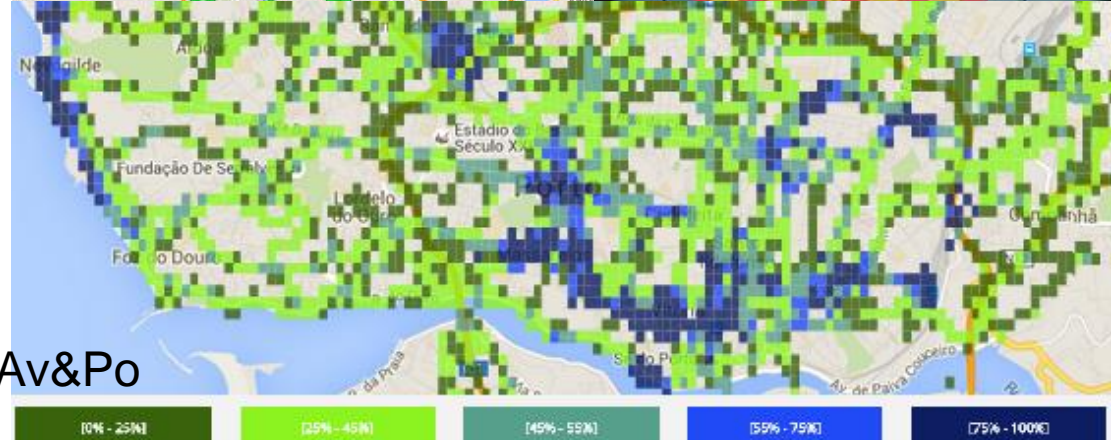
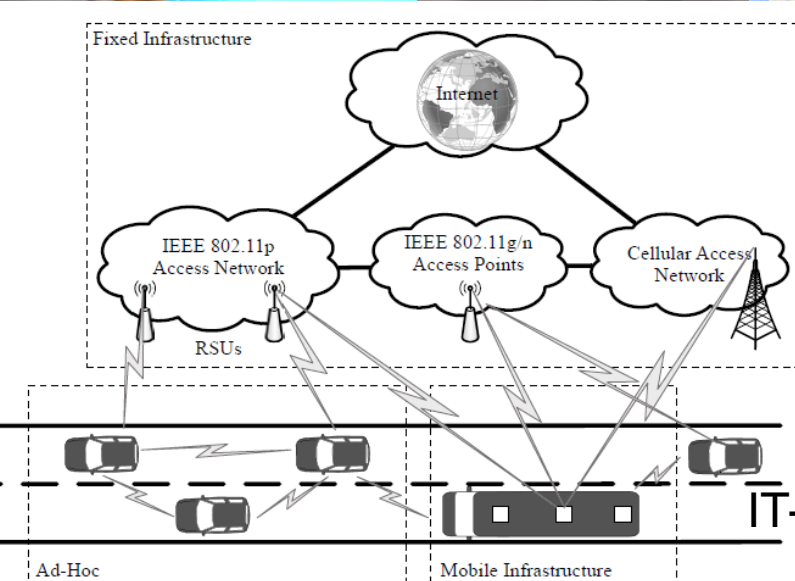


## BusNet

WiFi Internet access in urban transport

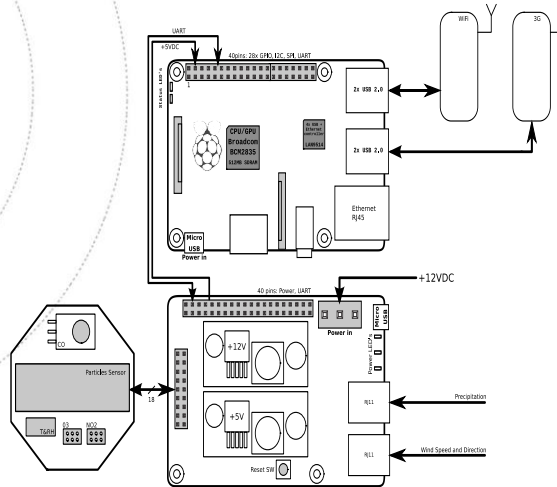
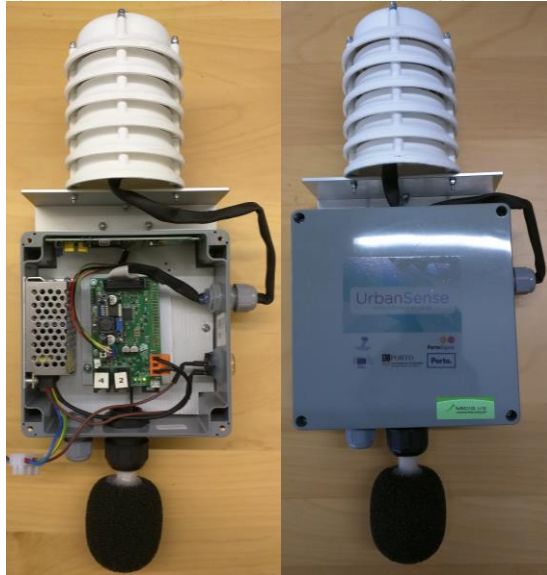
Acquire real-time data from WiFi sensors (e.g., traffic, pollution, waste collection)

**600+ vehicles**



IT-Av&Po

# UrbanSense



## Sensors

### Meteorological

- Temperature
- Humidity
- Luminosity
- Rain
- Wind
- Solar radiation

### Air Pollution

- Ozone (O3)
- Particles

### Noise



## WiFi connectivity

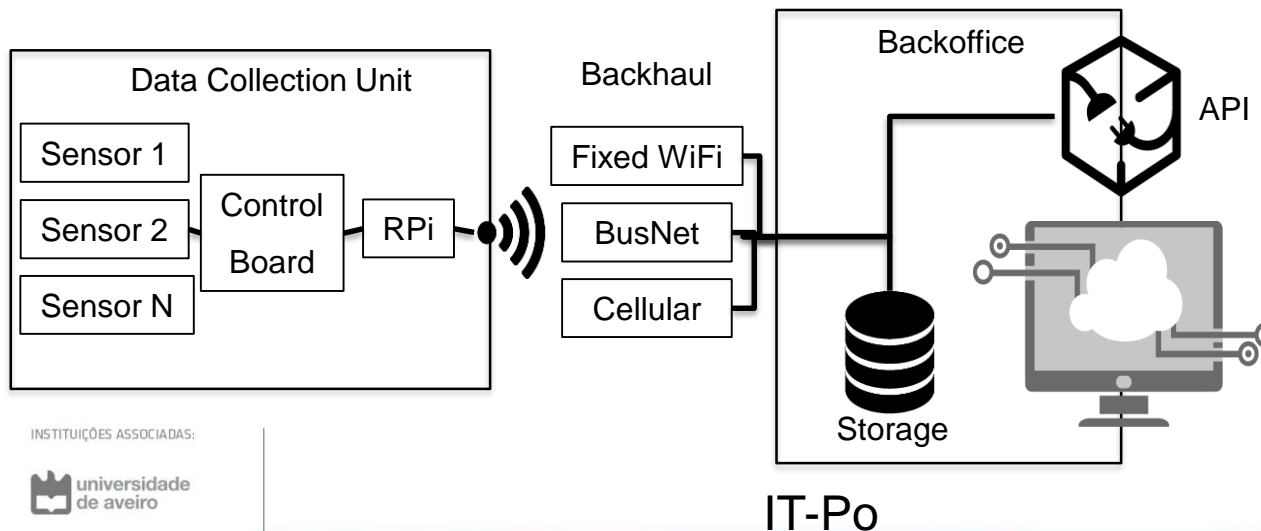
### Fixed hotspots

- Porto Digital

### Mobile hotspots

- Vehicular Network

### Cellular hotspots

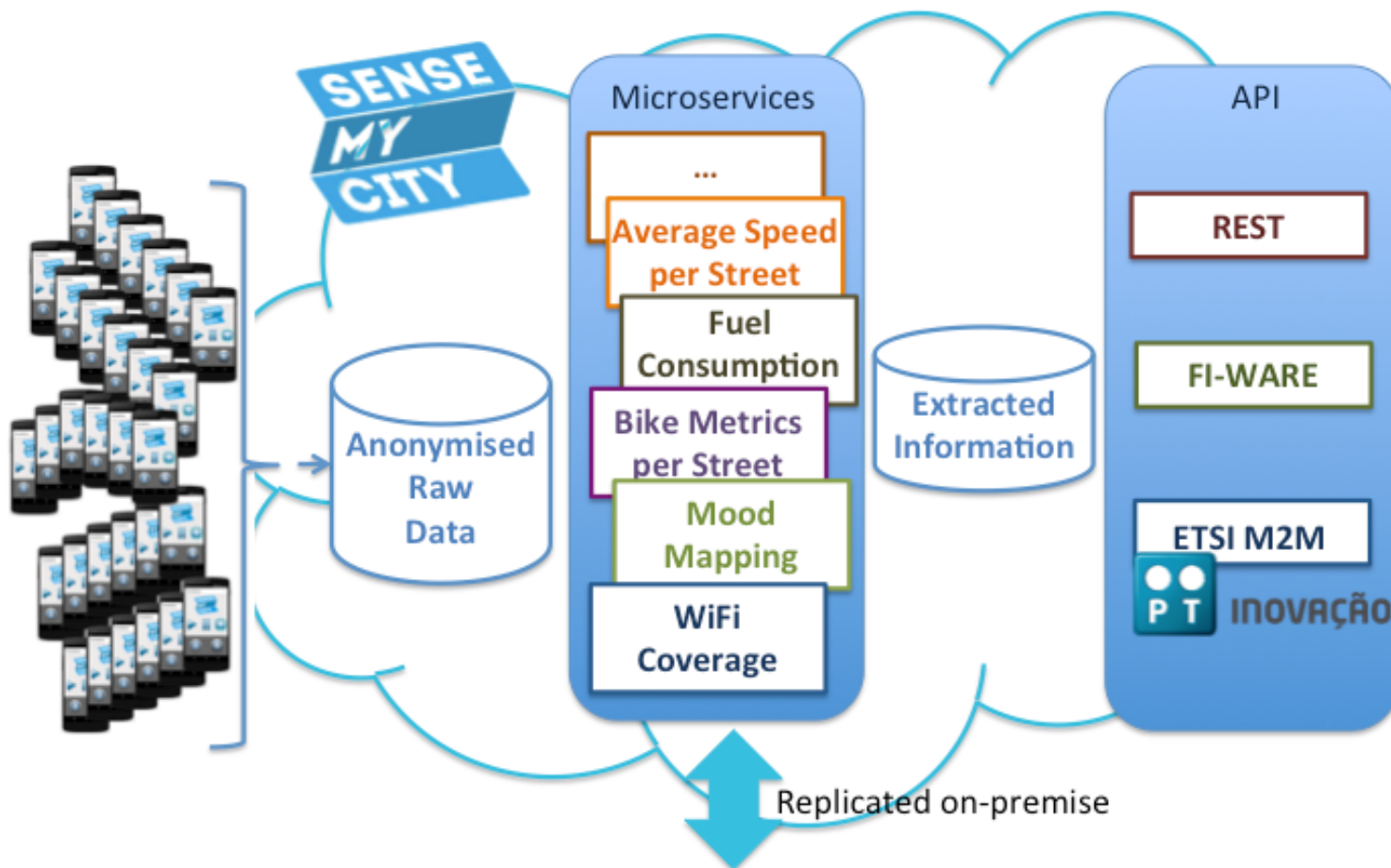


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# SenseMyCity: IoT Crowdsensing Tool

For sensing large scale human processes



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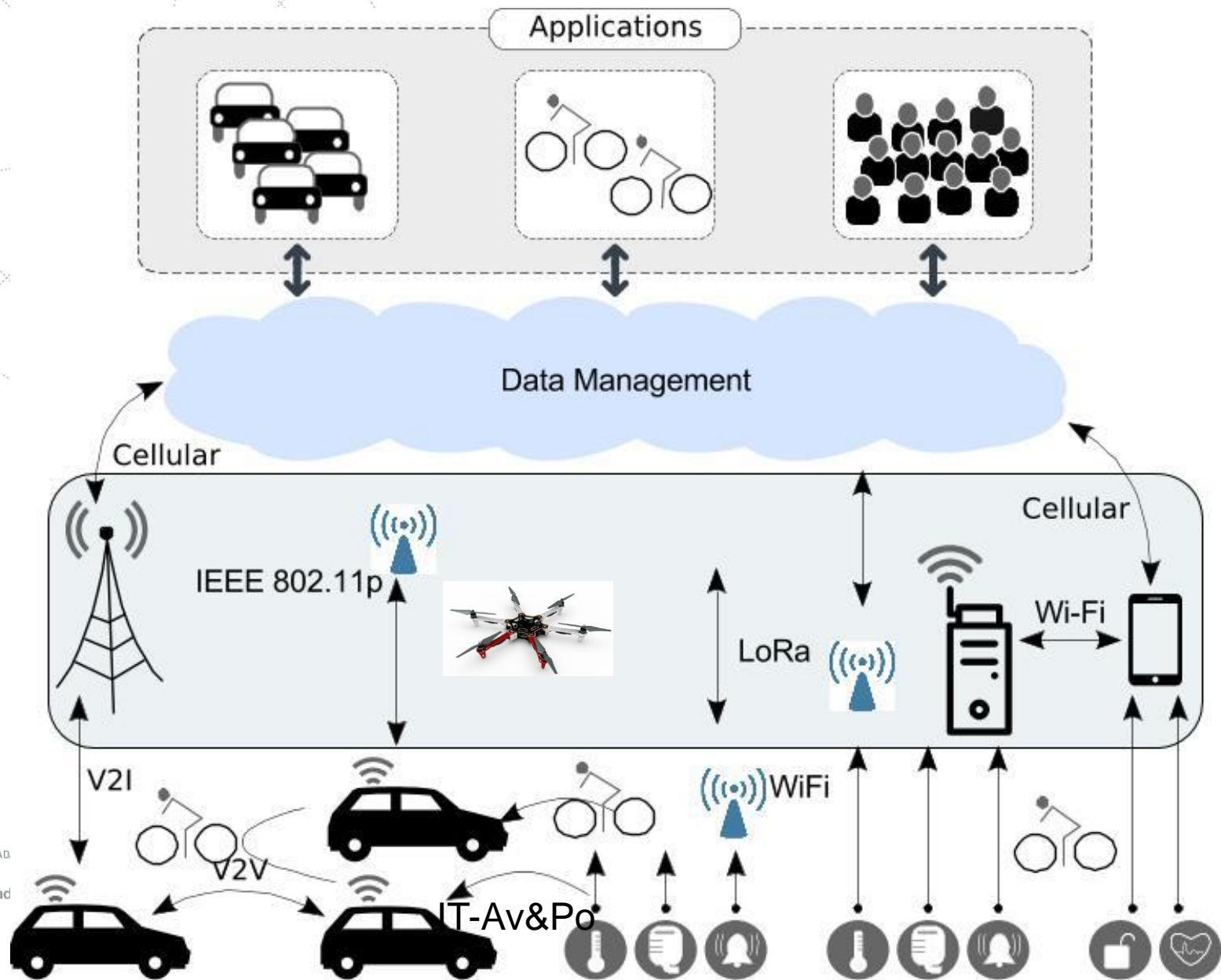
Implements EU data privacy guidelines  
IT-Po



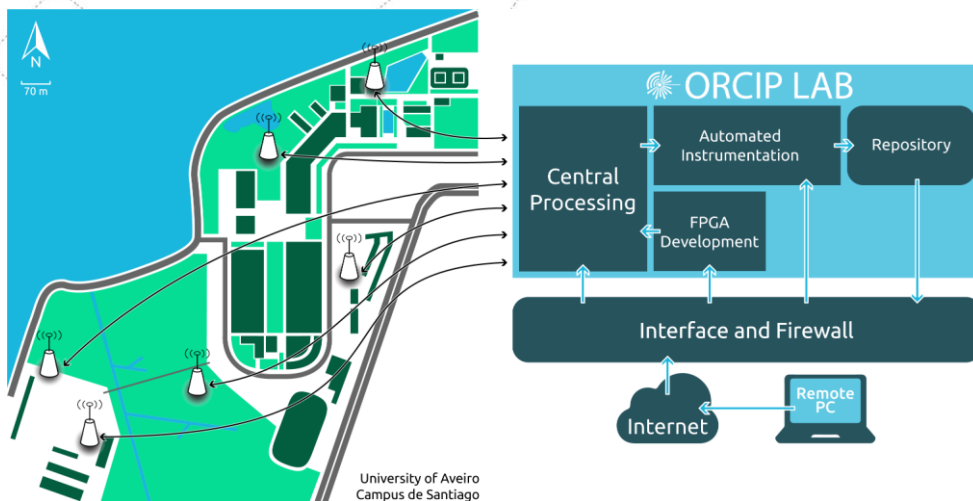
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# Extend the concept to Smart Spaces



# 5G infrastructures in IT: Campus



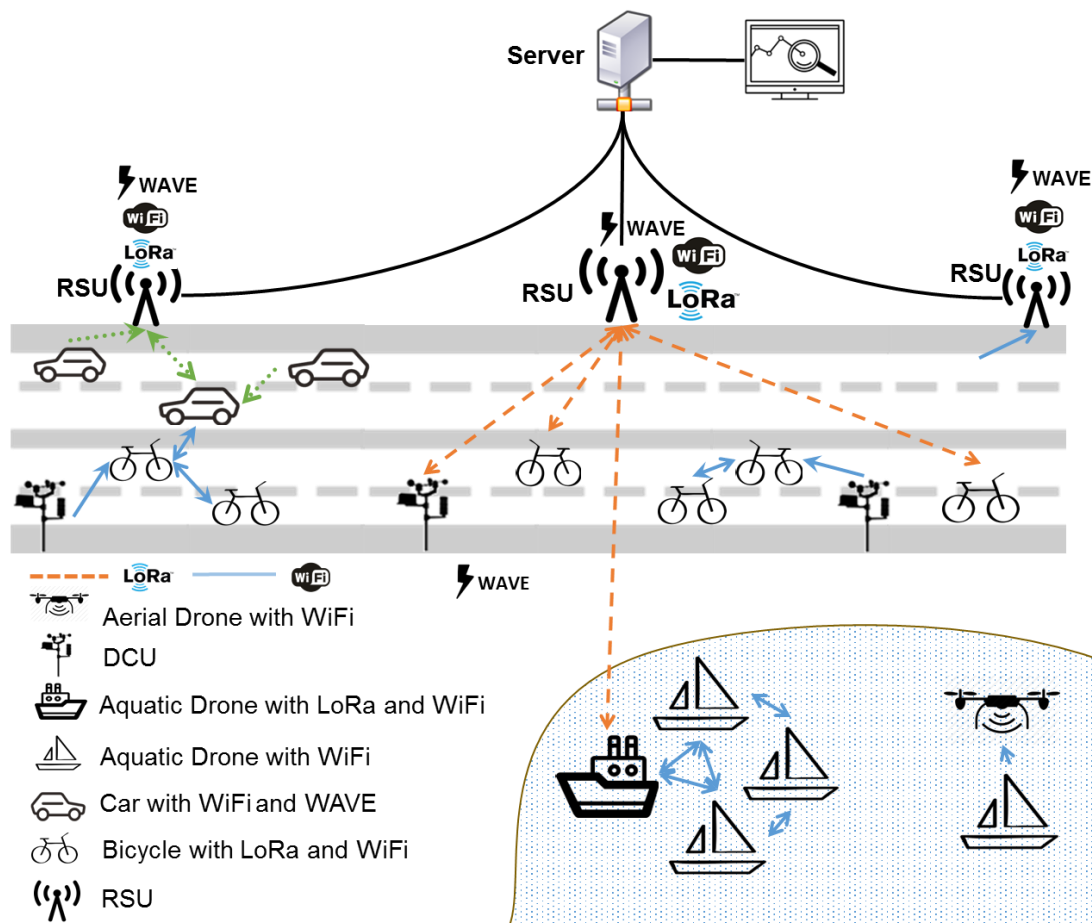
- 5G solutions based on Cloud Radio Access Networks
- Machine to machine communications
- Multi-gigabit wireless transmission using Millimeter Waves
- Wireless power transmission



# 5G infrastructures in IT: City



- Use the city as an open hardware and software LAB



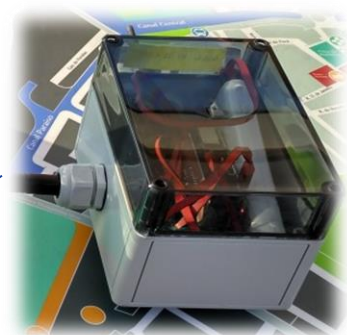
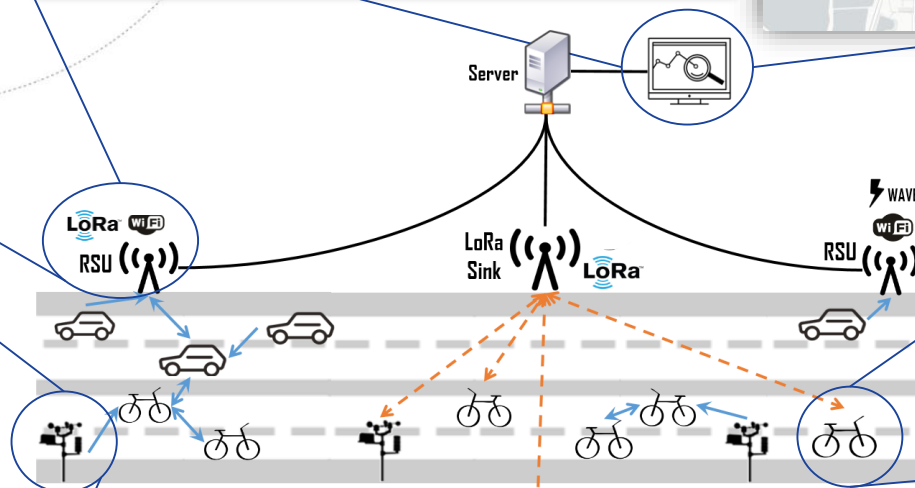
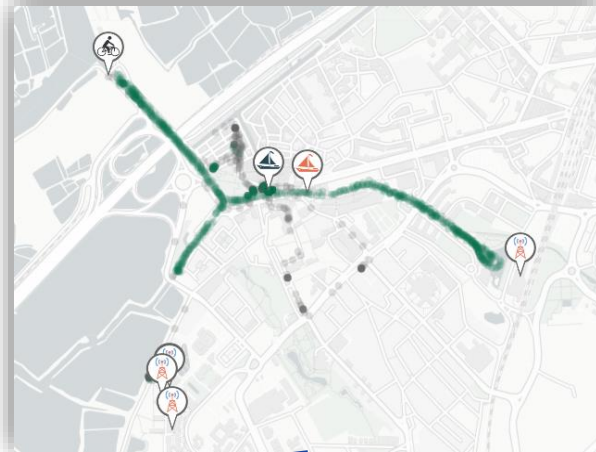
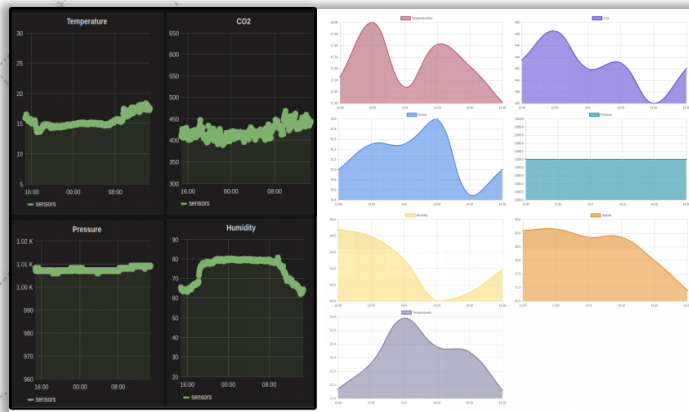
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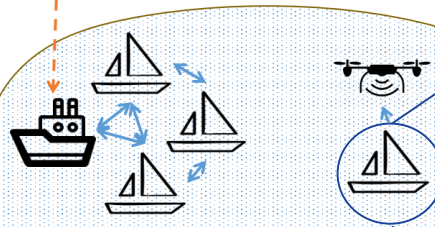
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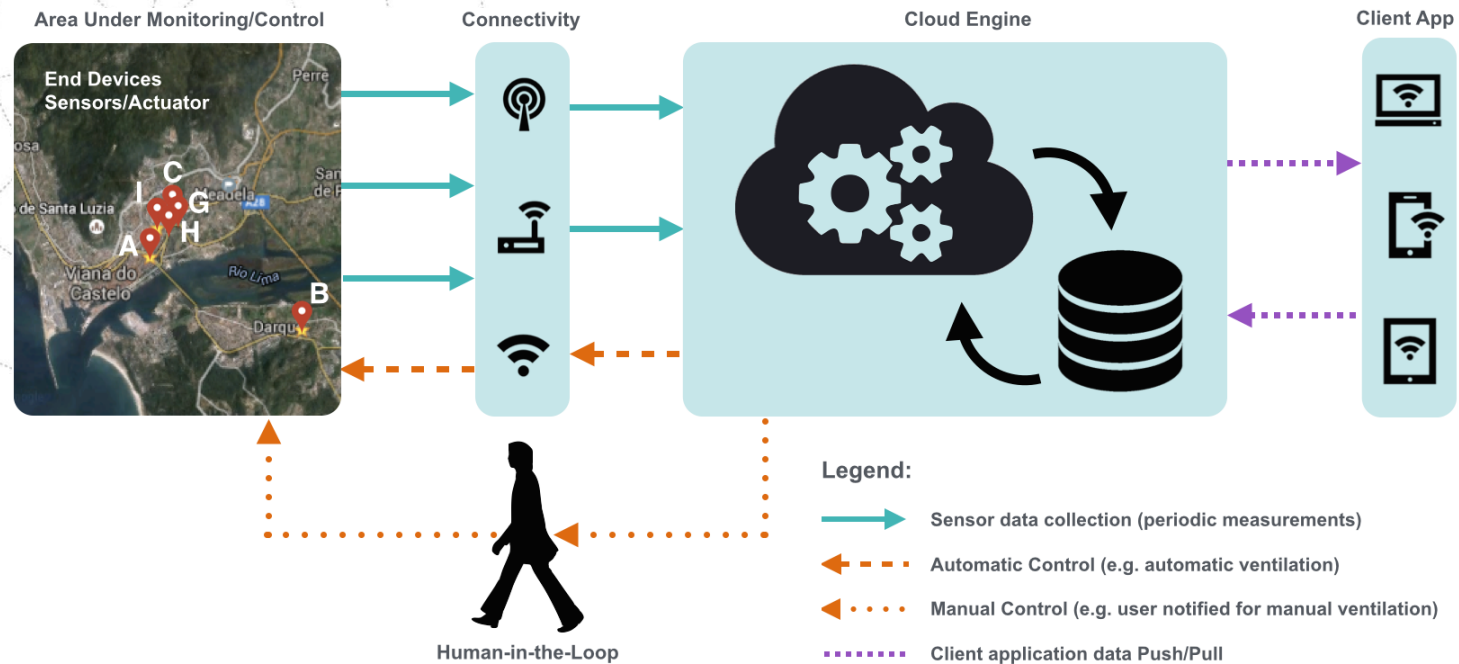
# Deployment in Aveiro



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# Extend to Other Cities, Cases: Monitoring Radan in Viana do Castelo



## How it Works:

- ▶ RnMonitor probe will push data to the RnMonitor Cloud Engine by means of wireless connectivity (i.e. LoRA and WiFi);
- ▶ The RnMonitor Cloud Engine will store and process data on-the-fly to notify users to take actions or by sending control commands to active ventilation systems;
- ▶ An App will be developed for on-line data visualization with data push/pull capabilities.



# Thanks!

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