



# **IoT as a Basic Ingredient of Smart Cities**

**Cities as Platforms**  
**Thessaloniki, 13 November 2015**

**Nikos ISARIS, European Commission**



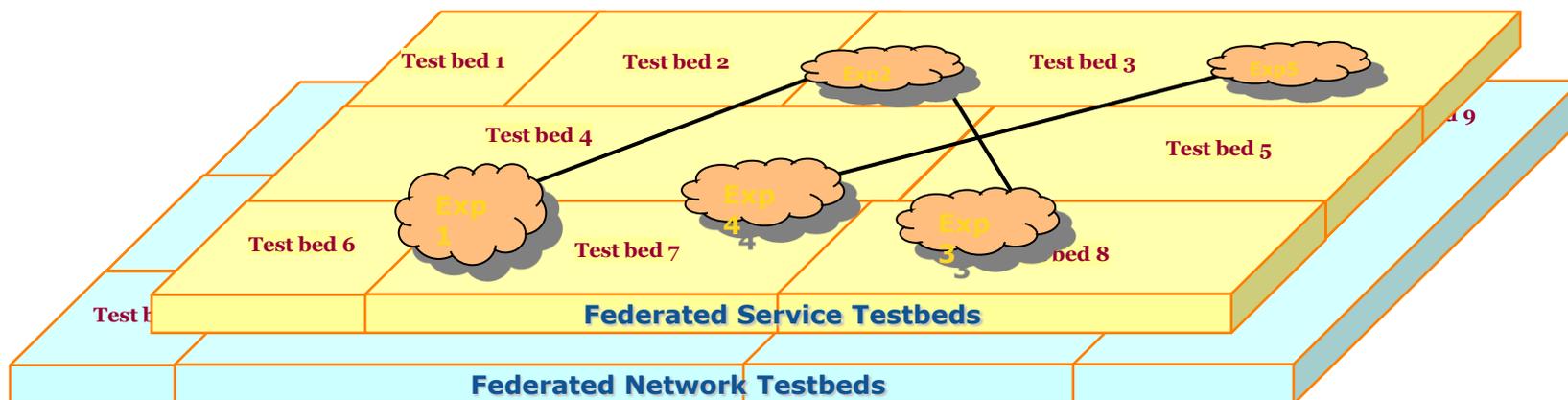
# FIRE at a glance

- Supporting research and innovation on new network and service architectures
- Through large scale experimentation, predict behavior and assess non-technical impact

## FIRE Research



## FIRE Experimental Facility



# Experimental platforms approach

clouds

sensors

FIRE provides an open environment and the necessary tools for large scale realistic experimentation so that research transforms to innovation through rapid prototyping and continuous feedback



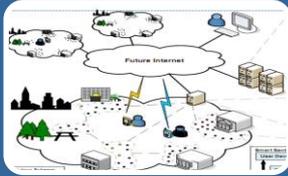
networks



Cities are ideal ecosystems for deploying an experimental platform addressing the full chain of actors: local government, utility services, large IT companies, SMEs, innovators, **citizens**



# SmartSantander main activities & challenges



Architectural reference model definition  
Specification and design of the facility



Implementation of the system  
Infrastructure deployment



Services & applications: Use cases for both  
the research community and the end-users



Business models and sustainable exploita-  
tion combining research & service support



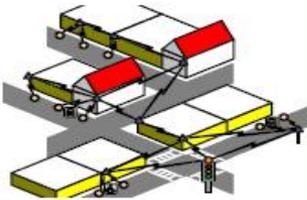
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# SmartSantander facility



10.000+ IoT nodes, 4 sites  
(Santander, Guildford, Luebeck, Belgrade)

## Smart traffic & parking



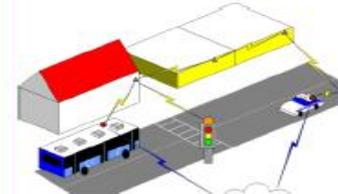
## Smart lighting & environment



## Smart parks



## Mobile env. monitoring



## Smart buildings & energy





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# City-scale deployment



From the lab to the hostile outdoor scenario!!



# Smart Santander

examples with tangible impact



## 1. City response (pulse of the city application)

Citizens (participatory sensing) use an app (IOS/Android) to geo-locate and report incidents: 8.000 citizens using the app: total reports/day increased by 5X, time to solve the incident decreased by 7X



**2. Waste management:** Public procurement (120M€ for 12 years) requests the use of IoT/ICT for improving the efficiency of the service. Waste bins are "smart" communicating info about level of waste. Collection trucks optimise routes and schedule based on info



## 3. Street lighting system

Light intensity adaptation upon pedestrian detection with sensors in parks demonstrated an approximate consumption reduction around 30%. The city will invest 13M€ in LED technology, light intensity adaptation and control on more lamp posts in the city expecting an overall of 40% consumption reduction



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# Smart Santander

examples with tangible impact



## 4. Municipality refurbishment of social housing buildings

Combined refurbishment of existing social housing buildings with IoT connected to SmartSantander platform reduced the energy demand per m<sup>2</sup> by 30%: 50,000 m<sup>2</sup> of apartment refurbishment with a total cost ~20 M€.

## 5. Parking/Traffic

Sensors under the tarmac detect presence or passage of vehicles at critical areas (centre of the city, bottleneck entry points) and guide users.

400 parking sensors already installed in city centre, two main city entries (motorways) monitored with 59 sensors buried under the asphalt.

In 2015 a public procurement for the outdoor parking service included the extension of the IoT infrastructure to other areas in the city.

**(plus others like park irrigation, environmental monitoring, sound pollution etc.)**



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# Co-creating smart cities of the future



# Needs of mature smart cities

- Community and stakeholder engagement
- Experiments (urban prototyping)
- Experimentation-as-a-Service
- Co-creation tools
- Governance and sustainability models



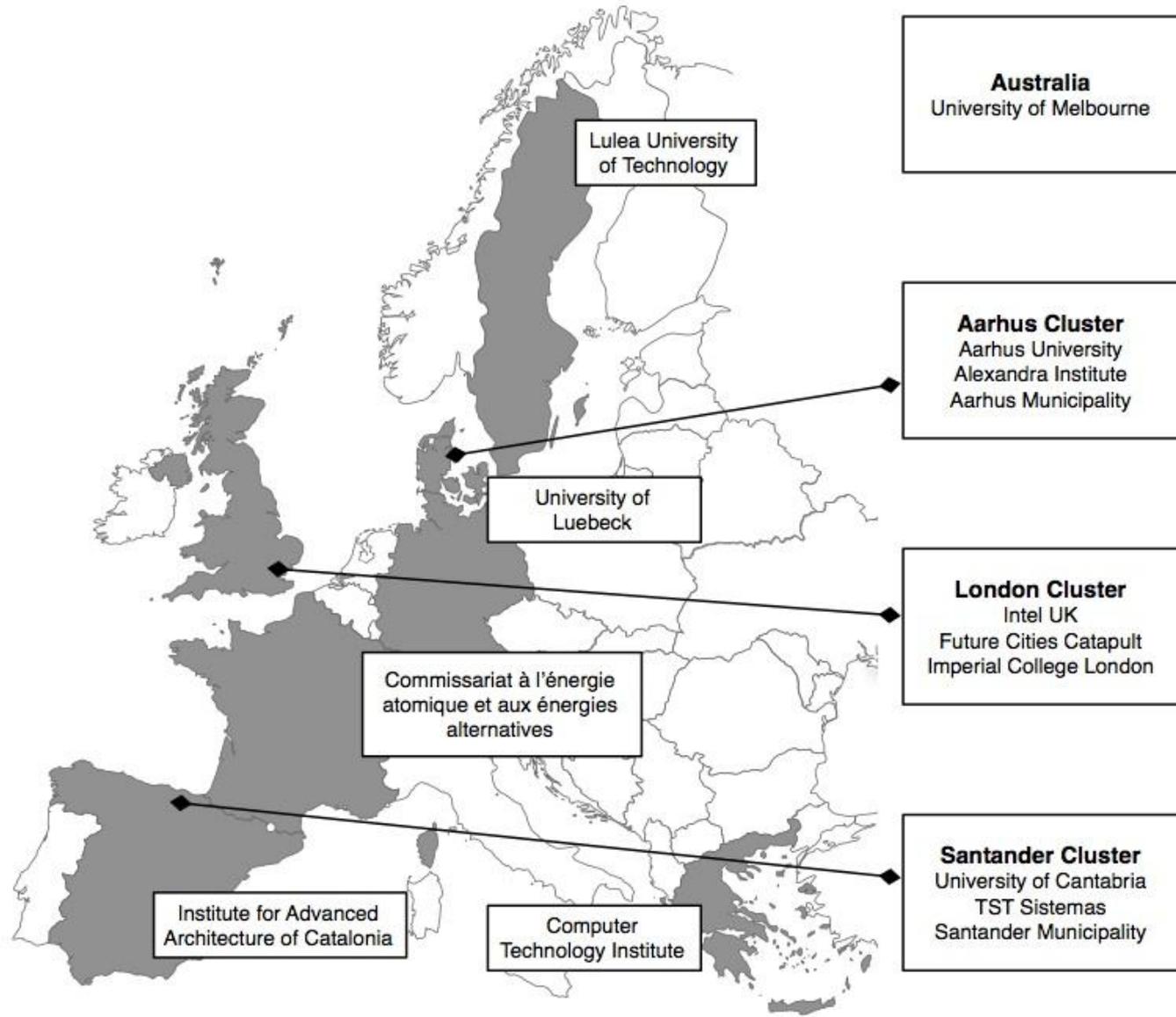
ORGANICITY



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(15 partners)  
(€7.2 M)  
(€1.8 M)

2 open calls  
36 months  
2015-17



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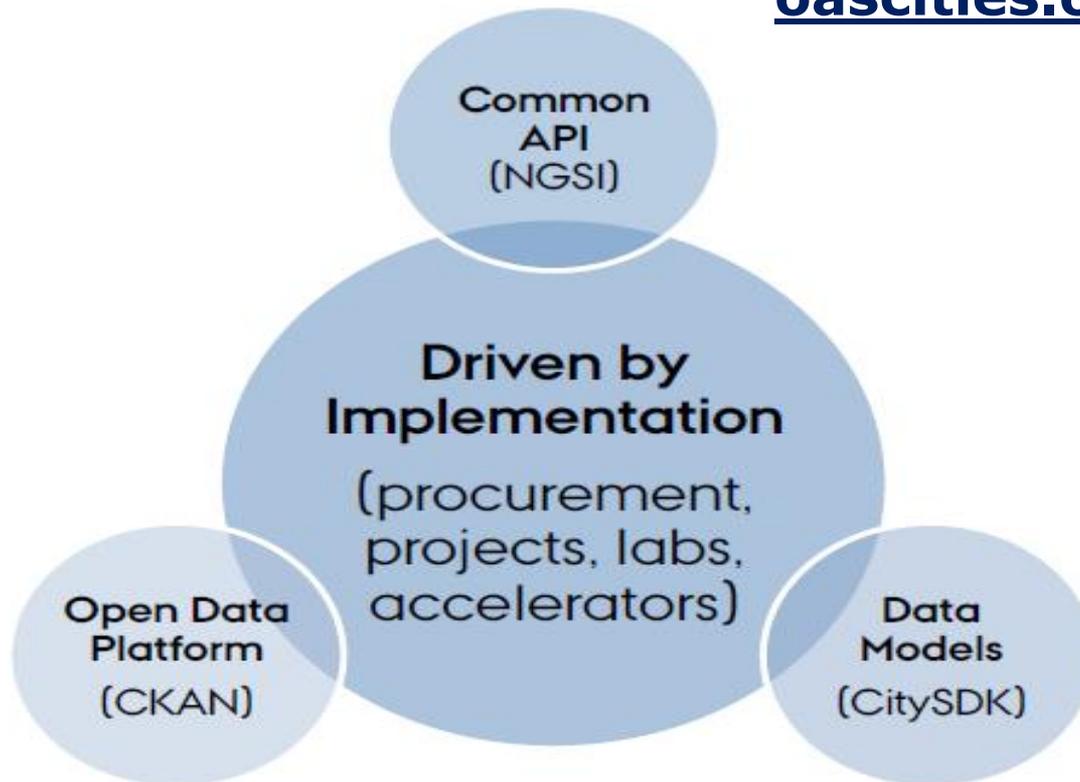
# Open & Agile Smart Cities (OASC)

- Network of National Smart City Networks (2+ cities / country)
- Driven by cities and focused on implementation
- Open and demand-driven standards
- Investment Plan:
  - **National, regional, local funding + EU funding:**
  - **H2020 Research and Innovation**
  - **European Fund for Strategic Investments (EFSI)**
  - **European Structural and Investment Funds (ESIF)**
  - **European Regional Development Fund (ERDF)**



# OPEN & AGILE SMART CITIES

[oascities.org](http://oascities.org)





# OPEN & AGILE SMART CITIES

## FINLAND

- Helsinki
- Tampere
- Oulu
- Espoo
- Vantaa
- Turku

## DENMARK

- Copenhagen
- Aarhus
- Aalborg
- Vejle

## SPAIN

- Valencia
- Santander
- Malaga
- Sevilla
- Sabadell
- Guadalajara

## BELGIUM

- Brussels
- Ghent
- Antwerp

## ITALY

- Milan
- Palermo
- Lecce
- Cagliari
- Terni
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## PORTUGAL

- Lisbon
- Porto
- Penala
- Fundão
- Palmela
- Águeda

## NETHERLANDS

- Amsterdam
- Rotterdam
- Eindhoven
- Enschede
- Utrecht
- Amersfoort

## IRELAND

- Dublin
- Galway
- Cork

## SCOTLAND

- Edinburgh
- Glasgow
- Aberdeen
- Dundee
- Perth
- Stirling

## FRANCE

- Saint-Quentin
- Valenciennes
- Amiens
- Arras

## AUSTRALIA

- Brisbane\*
- Springfield
- Gold Coast

## BRAZIL

- Olinda (Recife)
- Anapólis (Goiás)
- Porto Alegre (Rio Grande do Sul)
- Vitória (Espírito Santo)
- Colinas de Tocantins (Tocantins)
- Taquaritinga (São Paulo)
- Rio das Ostras

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**Thank you for your attention!**

**For more information:  
<http://ec.europa.eu/ict-fire>**

