

European Network on New Sensing Technologies for Air Pollution  
Control and Environmental Sustainability - *EuNetAir*

COST Action TD1105

**Final Meeting at PRAGUE (CZ), 5-7 October 2016**

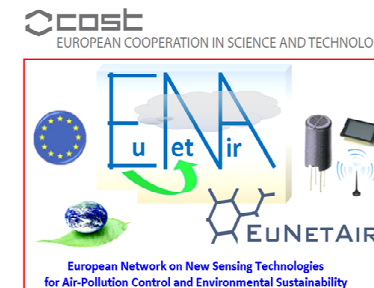
***New Sensing Technologies for Air Quality Monitoring***

Action Start date: 01/07/2012 - Action End date: 15/11/2016 - EXTENSION:  
**15/11/2016**

**LIFE AFTER EuNetAir**



**John Saffell**  
**Alphasense Ltd.**  
**[jrs@alphasense.com](mailto:jrs@alphasense.com)**



# How do AQ networks help us?

- **City planners** traffic control, hybrid buses
- **Politicians** identify local needs (SO<sub>2</sub>, CO, BC or NO<sub>x</sub>)
- **Urban investment** a metric to monitor progress
- **Citizens** engagement, educating the next generation, supporting at-risk persons
- **Scientists** modelling, toxicology, epidemiology
- **Infringement** source attribution locates polluters

# The future

AQ networks in Africa and Asia

Citizen scientists, citizen hackers and schools

Machine learning and Bayesian statistics

Drones

Integrated chemical sensors plus plastic electronics

Security and data access

# Asia and Africa and UNEP

Air quality is the largest non-communicable health risk (WHO)- a greater risk than smoking or obesity

Asia and Africa: their risks focus on Black Carbon,  
NO<sub>2</sub>/ O<sub>3</sub> and SO<sub>2</sub>

City infrastructural improvements will be monitored by the World Bank through AQ Networks- improve your air quality and funding continues

# Citizen Scientists

**South Coast Science:** a new company providing circuits to turn a Raspberry Pi and Beaglebone into AQ monitors for three markets:

*Citizen scientists*

*Citizen engineers/ hackers*

*Schools*

# Machine learning and Bayesian statistics

**We must validate our results.**

**Lab:** controlled environment, degrees of freedom are understood.

Good correlation and **Bayesian networks** work well

**Field:** more degrees of freedom, no variables control.

Need to go to **machine learning/ Deep Belief Networks**

(G Hinton 2007).

**Watch this space.**

# Drones

- Berkeley: mapping forest fire plumes
- Naval Research Labs Virginia- chemical and biological plumes
- Mapping emergencies
- Urban emission mapping
  
- But- problems with turbulence, response time

# Security

## Eavesdropping

**Q: Can an unauthorised agent access stored or transmitted data?**

## Spoofing

**Q: Can a remote data upload or a data server be forged?**

## Data provenance

**Q: Can the source of the data be positively identified?**



**We need more data**

**We need better data**

**We need each other**