Citi-Sense-MOB

Monitoring air quality on mobile platforms

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Citi-Sense-MOB www.citi-sense-mob.eu

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cost

cost
EUROPEAN COOPERATION IN SCIENCE AND TECHNOLOGY

EuNetAir

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

Sensing Oslo… two EU co-funded projects

CITI-SENSE

Start: 01/10/2012

Duration: 48 months

Budget: 12M €

28 partners, 12 countries

Call: FP7-ENV-2012.6.5.1

Citi-Sense-MOB

Start: 01/09/2013

Duration: 24 months

Budget: 700K € (500K EU)

5 partners, Norway

Call: EMMIA / DG Enterprise

Pilot campaign: October 2013 – October 2014
Full deployment: October 2014 – October 2015

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CITI-SENSE and Citi-Sense-MOB Vision

Important problems:

Quality of life in cities
Health effects from traffic pollution

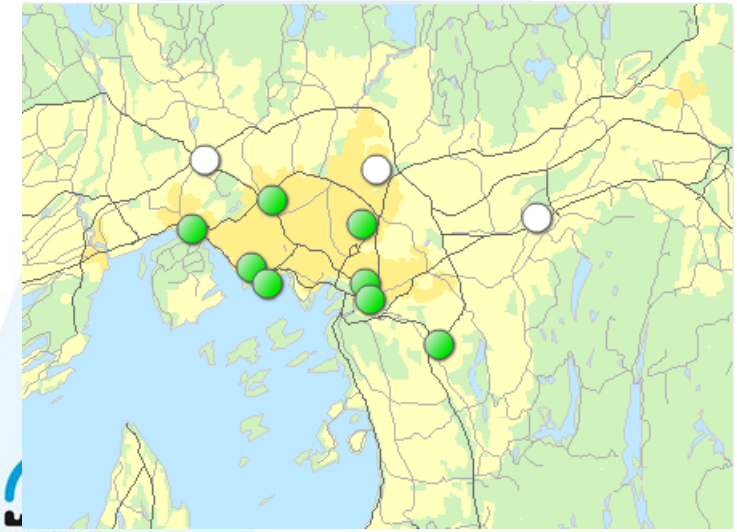
Decreasing air pollution
Increasing quality of life

Opportunities and challenges:

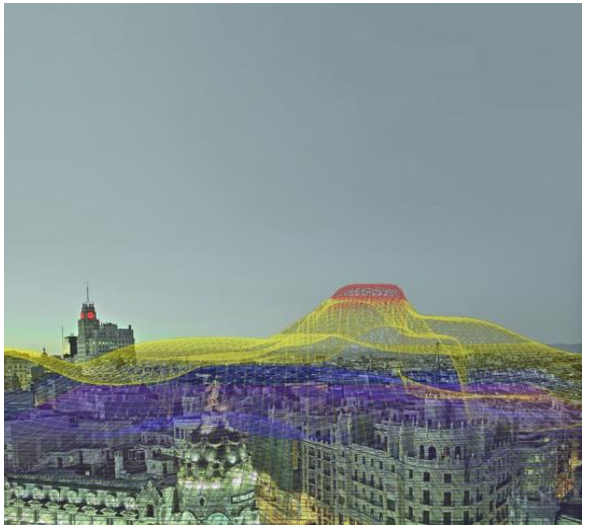
Small, low-cost sensors
Information and Communication Tech.

Participatory Urbanism
Citizens' Empowerment

Few monitoring stations
No real-time data where people are
Absence of personalized data



Increased spatial coverage
Complementary air quality data
Personalized data



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Our questions

Can information from sensors complement other information sources?

Will sensors lead to a greater involvement of citizens?

Can citizens provide valuable information?

What will happen when citizens can measure, sense and be aware of consequences of living in a polluted city and their own contribution to the pollution?

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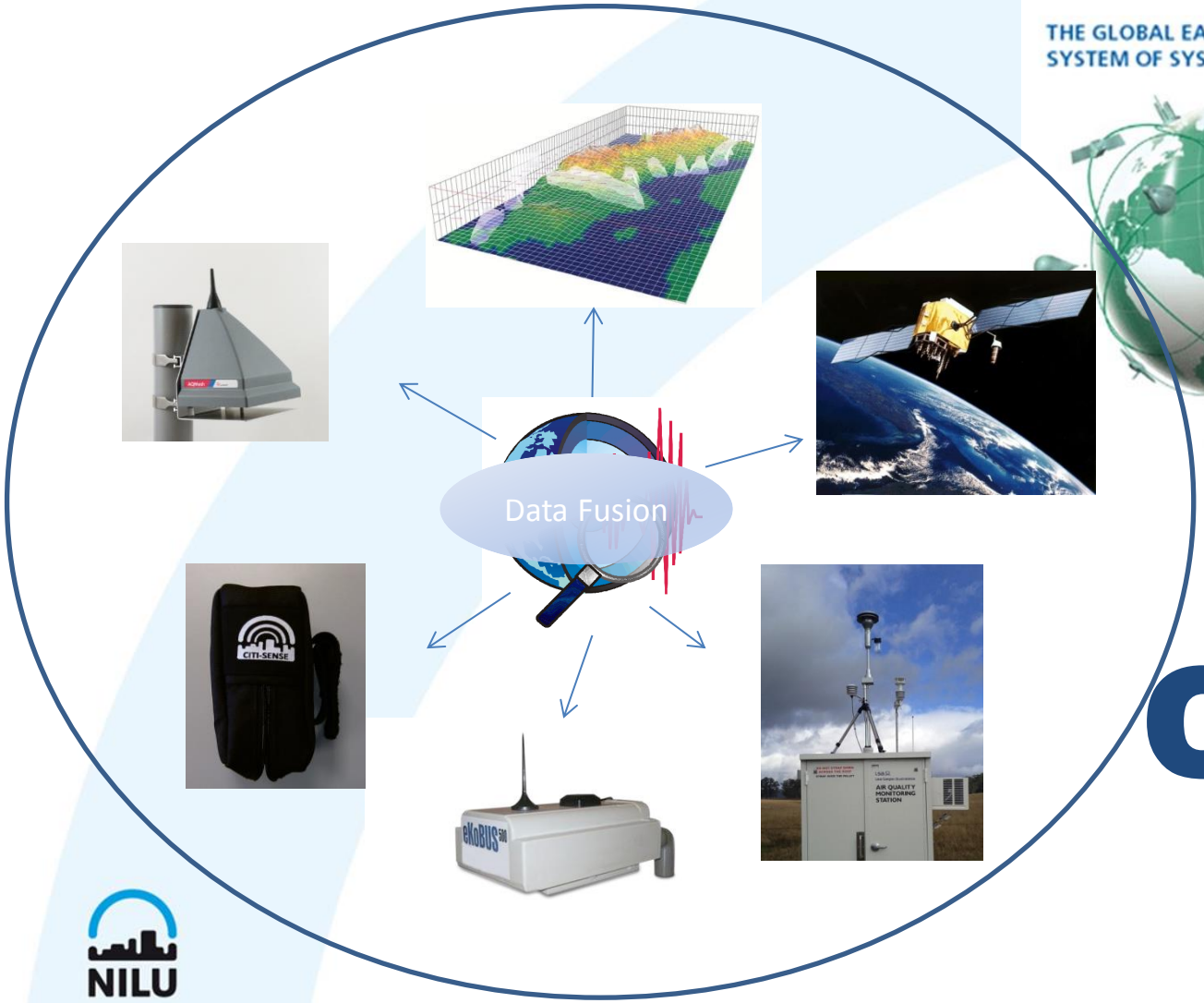
Our approach

Citi-Sense-MOB

Innovative technology to continuously sense, measure and communicate environmental data

Dynamic city infrastructure for real-time city management and sustainable progress



COT

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COT: Citizens' observation toolbox

The COT will comprise a series of applications and services for informing the public on current environmental conditions and obtaining VGI input from them.

Personalised data

Air Quality

Meteorology

UV

Personal threshold limits

Alerts

VGI

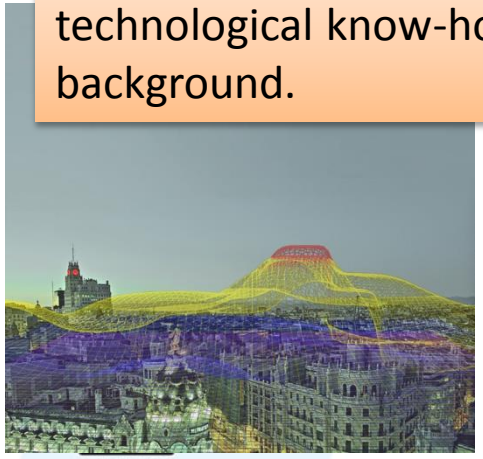
Forecasting

Pollen

Real-time

Exposure

Challenge: It requires an inter-disciplinary approach, merging scientific knowledge with technological know-how and participatory governance against an inter-cultural background.



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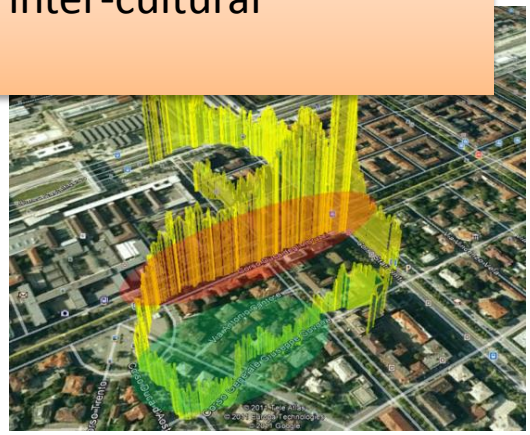
Visualizations might be helpful for making sense of data.



CITI-SENSE and Citi-Sense-MOB Impacts

Behavioural change

Greener Oslo

Public awareness

Environmental governance

Urban planning

Education

Mobility map

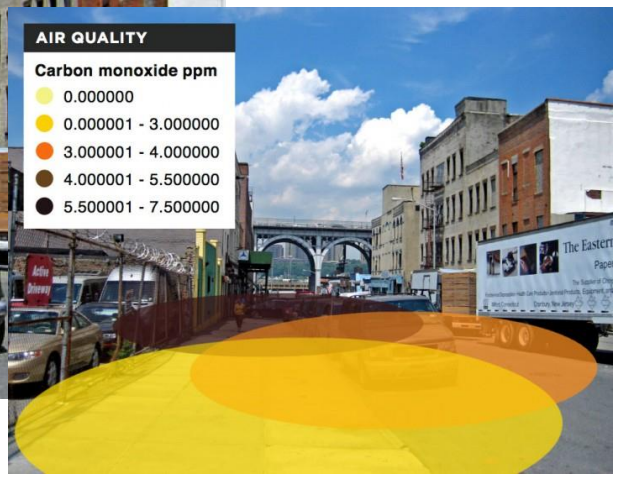
City management

Citizens empowerment

Public participation

Eco-driving

Participatory urbanism



How are we going to do it?

Citi-Sense-MOB

Sensor platform
NO_2NO, O_3, , CO, PM, CO_2, RH, Temp.

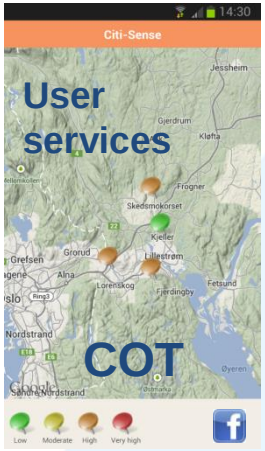
Ruter#

Public & Private Sectors

GNSS

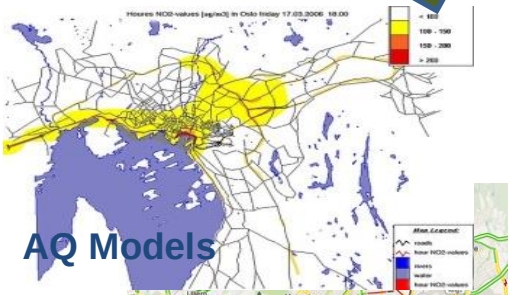
Data Services
Processing raw data, fusion, modelling

Cloud services



Data providers

VGI



Citizens Special Interest Groups

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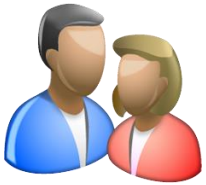

Citizen Participation
Participatory Governance through Social Media

Challenges

- Sensor data quality
- Information and Communication in real-time
- Data visualisation
- Engaging with the citizens

The challenge is our goal

Combining new sensing technology, ICT platforms and participatory methods into useful products.

→ Condition: GEOSS interoperability

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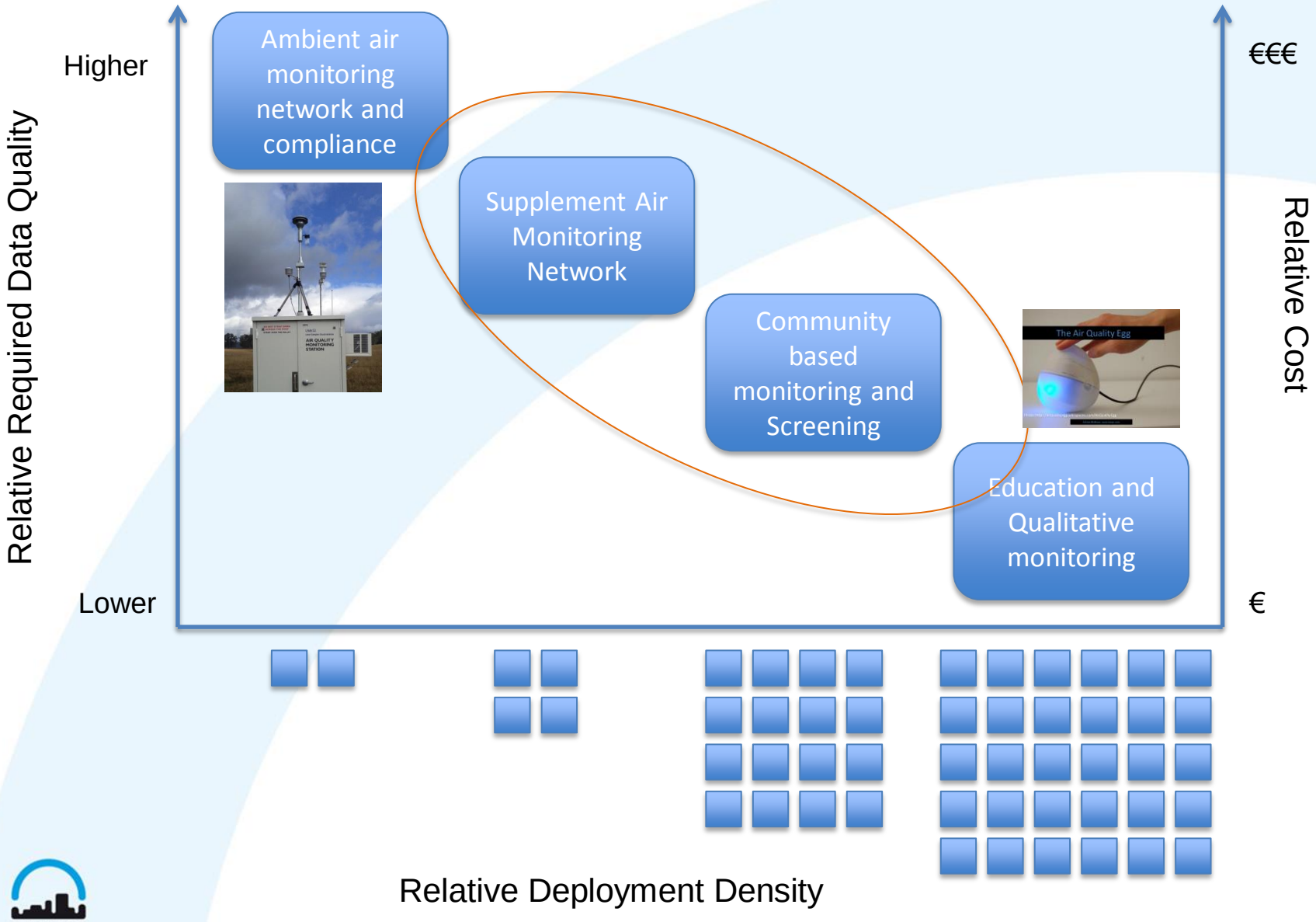
What data quality do we need?



Snyder et al. Env. Sci. Tech. 2013

Sensor performance

- Information on performance is only beginning to be available.
- Studies show promising performance for O_3 and NO_2 sensors.
- Performance of most sensors is unknown.
- Long-term reliability is unknown.
- Real-world evaluation necessary.

Need to assess the uncertainty

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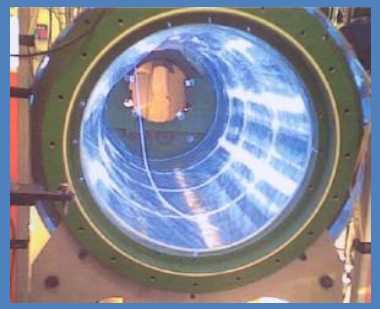
Challenge: Sensor performance and uncertainty

Validation and Calibration

Laboratory & Field



Provide accurate and scientifically defendable information.
Otherwise data is useless.

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Challenge: Near real time data communication

Data Storage
Data format

Data Services
Processing raw data, fusion, modelling

Products
Web, Apps

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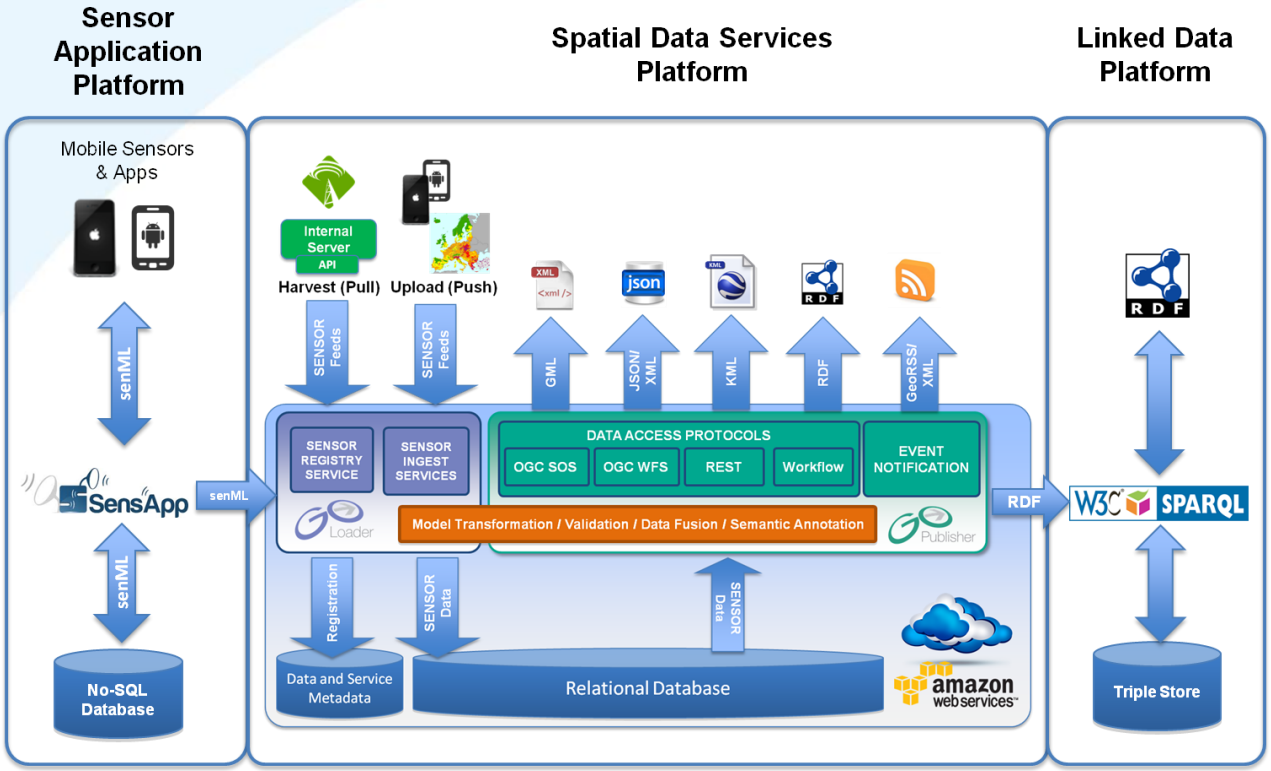
Communication testing → Server trial → Road trial

Data streaming and real time handling of data



Challenge: Engaging citizens in science

Gamification – increasing motivation in environmental issues

- Translate the engagement that happens with games to reality
- Apply game design techniques to non-game experiences to drive user behavior.

Augmented reality – enhancing current perception of reality

- Information becomes interactive
- Information can be overlaid to the real world

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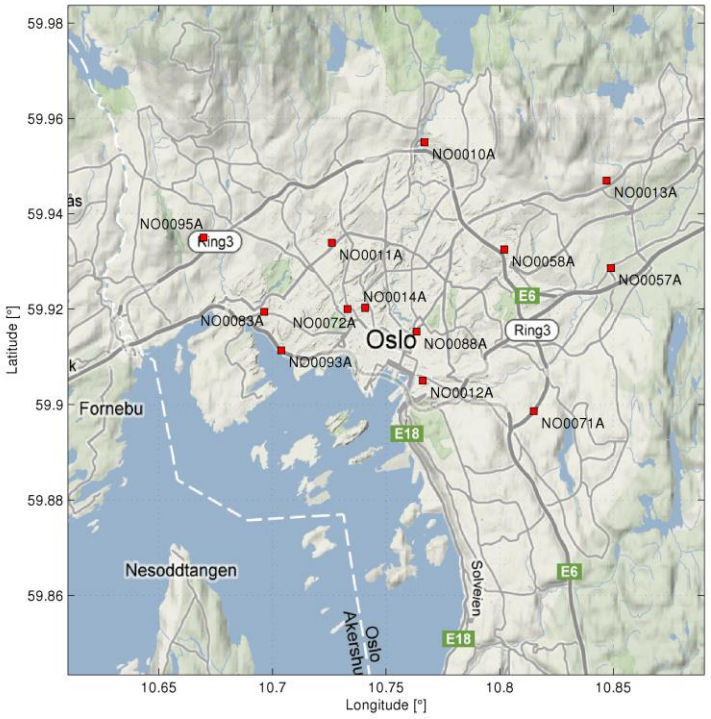
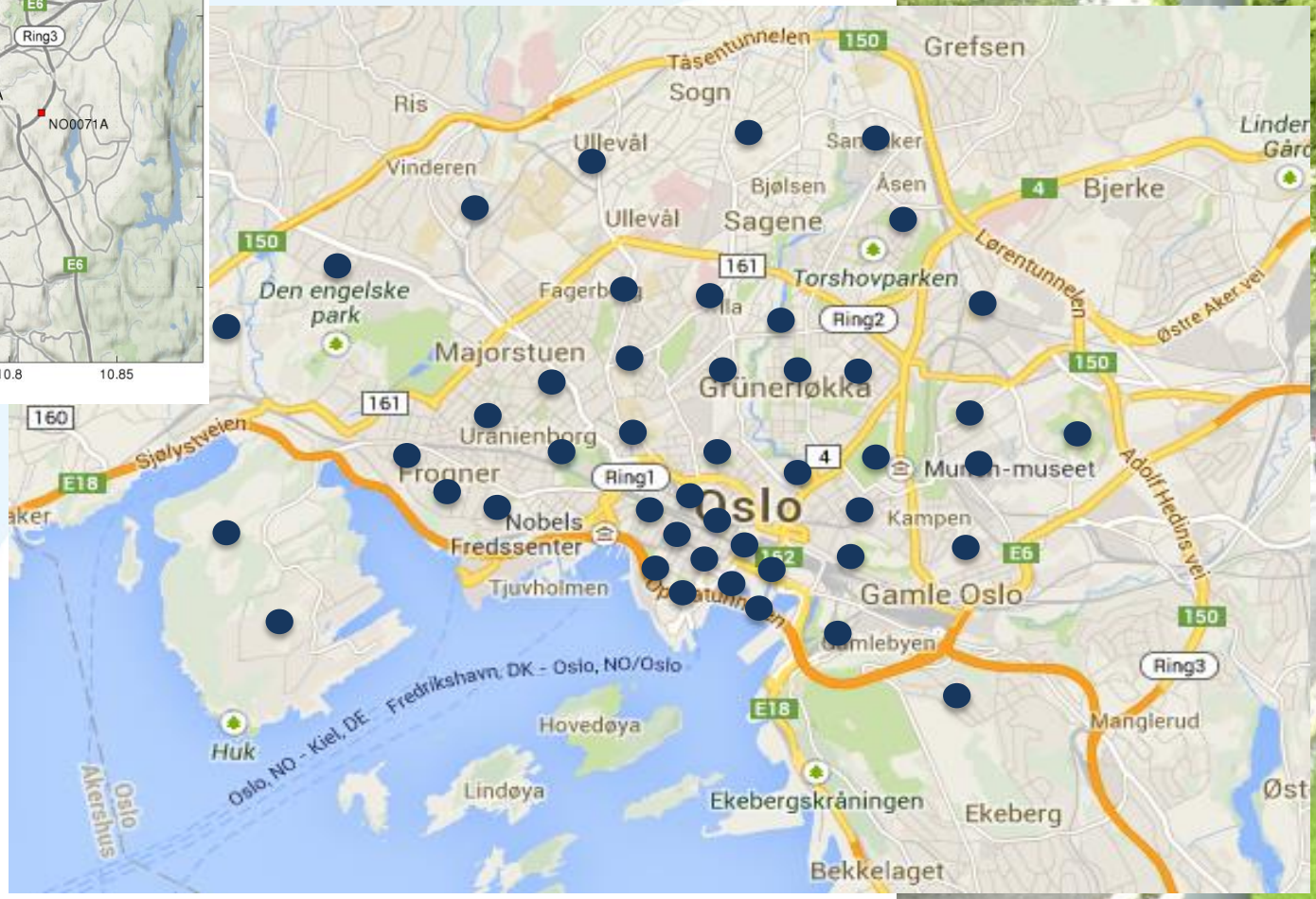
Sensing the city with static nodes



Information at citizen level



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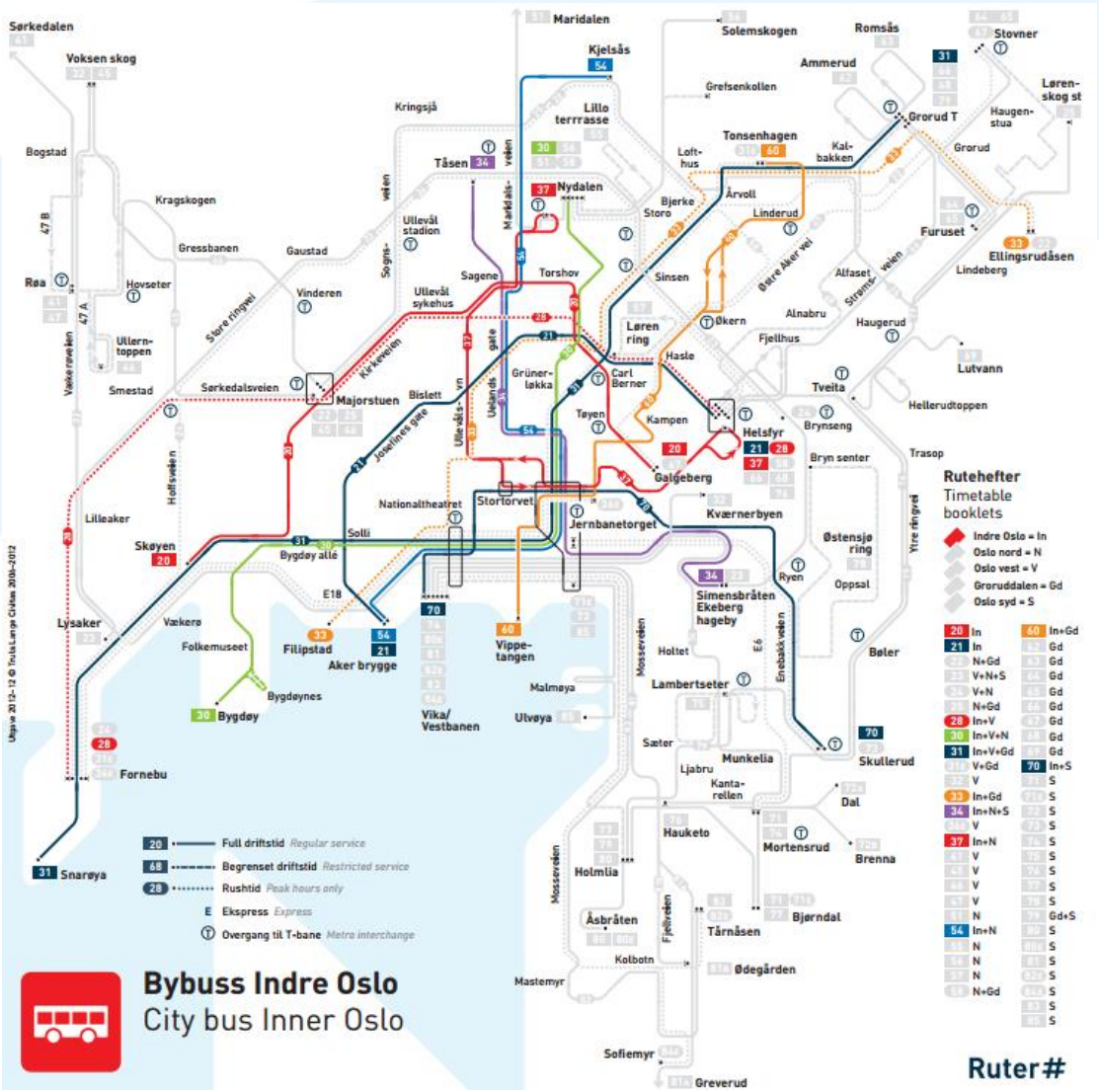
Sensing the city with buses

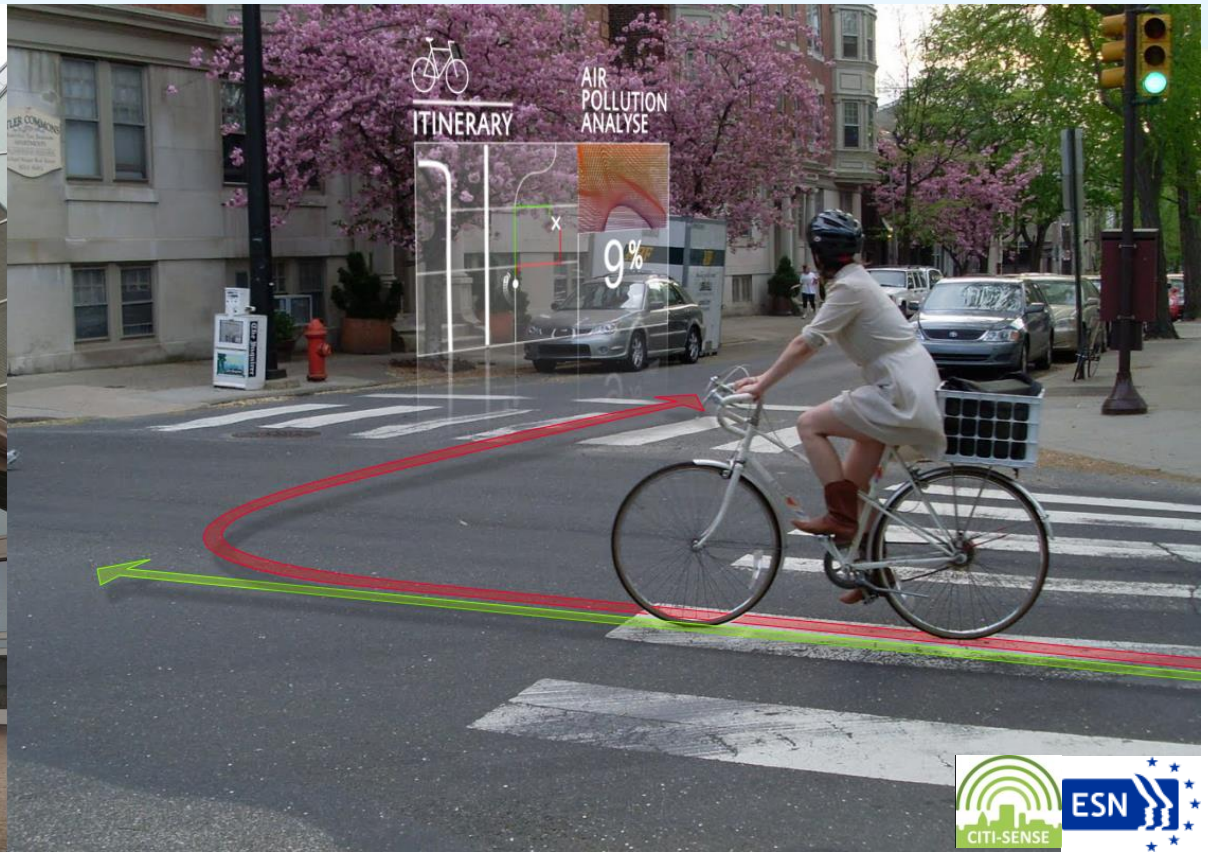
- We will employ “regular” lines
- Lines 20, 21, 31, 37 and 54 are the ones that run with higher frequency.
- 20s: are ring lines that bypass the city center.
- 30s: are radial lines through the city center

Monitoring at the source



Sensing the city with bicycles

We will measure where the people cycle



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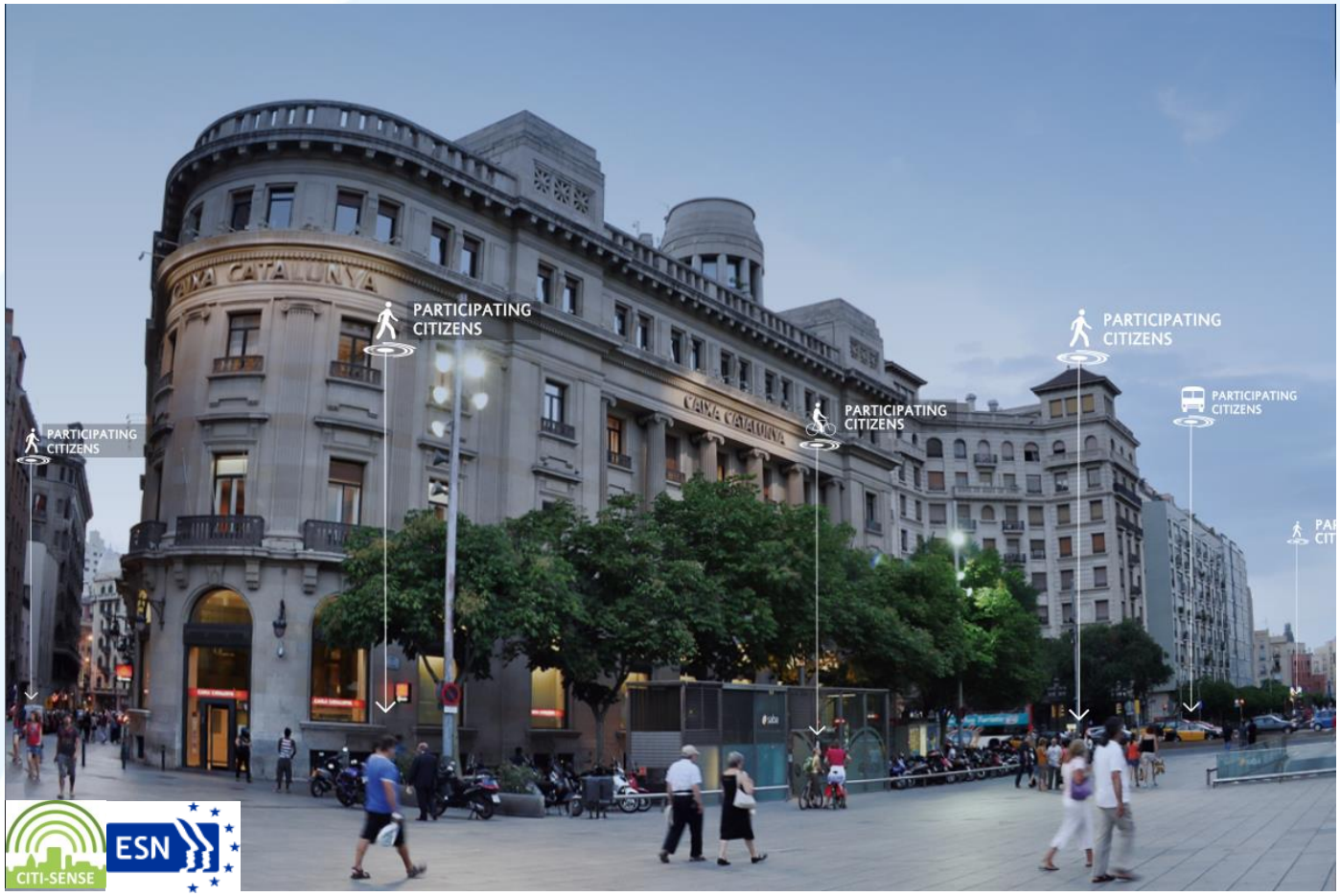
Sensing the city with people

We will measure where the people walk

NO_2+O_3

AQ
Temp

UV



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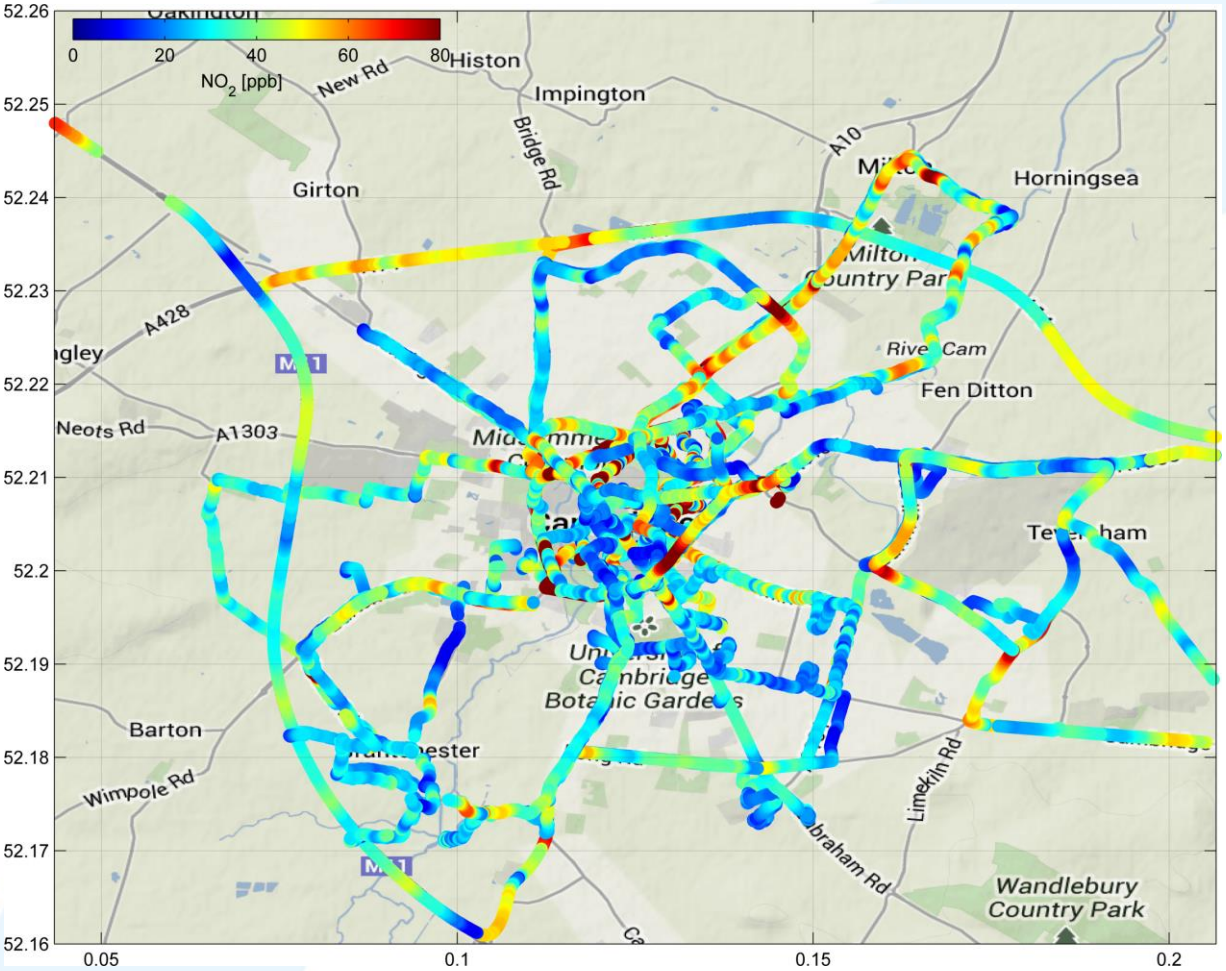
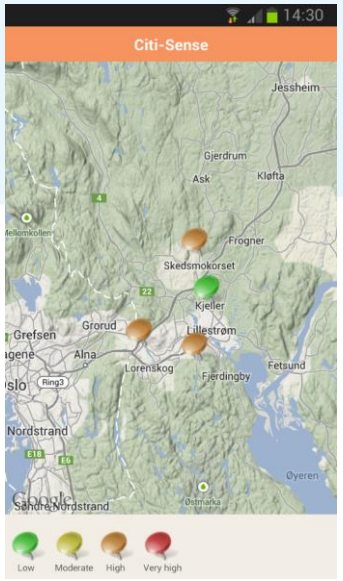
Challenge: Empower the citizens





End-user testing in real-world conditions

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Small, lower-cost sensors bring new challenges but along with these challenges come gigantic opportunities to improve air quality management and public health.

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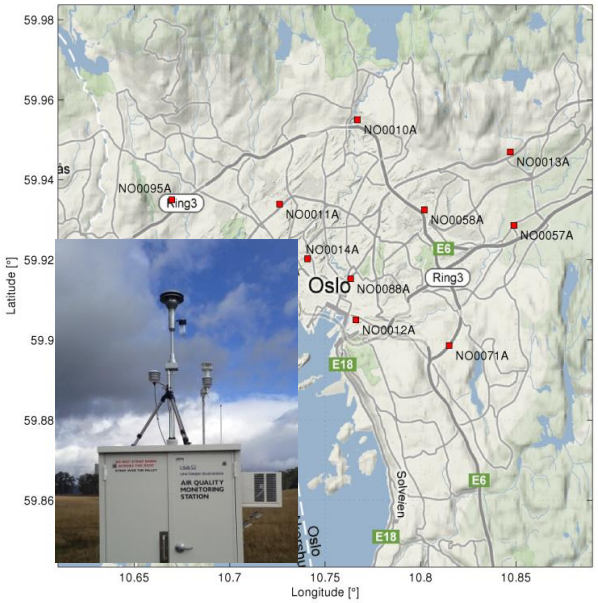
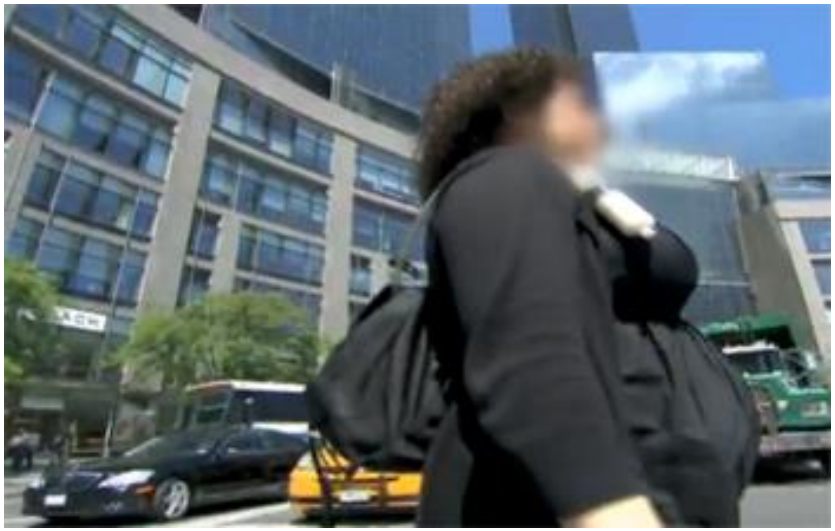
Opportunities



Supplementing routine ambient air monitoring networks

Monitoring personal exposure

Air quality sensors can be coupled with physiological sensors



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Opportunities

Monitoring at the source

Stimulate participation and encourage the dialogue

EUROPEAN GREEN CAPITAL

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Acknowledgements

CITI-SENSE and Citi-Sense-MOB consortium

Oslo Kommune

Ruter

NILU Team

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Thank you for your attention

It is not just about making the data public, but also the public making the data

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