CITI-SENSE Citizens' Observatory as Research Infrastructure

IoT Week Belgrade

Session #A3 " "IoT Research infrastructure and Testbed as a Service"".

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THE CITI-SENSE CONCEPT

CITI-SENSE is FP7 project funded by EU, developing "citizens' observatories" to:

- ✓ *empower citizens to contribute and participate in environmental governance*
- ✓ *enable them to support and influence community and societal priorities and associated decision making.*

First note the spelling: CITI as in Citizen => project is oriented toward citizens and their involvement in environmental issues.

We are not only aiming toward ordinary citizens, but also scientists, software developers

The concept of CITI-SENSE rests on three pillars:

(i)   *technological platforms for distributed monitoring;*

(ii)   *information and communication technologies;*

(iii)   *societal involvement*

THE CITI-SENSE CONCEPT

It is not enough to just develop technology, it is necessary to raise awareness of the citizens by involving them in environmental issues.

This is why *3* multi-center case studies focus on a range of services related to environmental issues of societal concern:

> *combined environmental exposure and health associated with ambient (outdoor and indoor) air quality,*

> *noise and development of public spaces,*

> *indoor air at schools*

>> *kids and teachers are great, our most excited participants* ☺

CITI-SENSE CONSORTSIUM
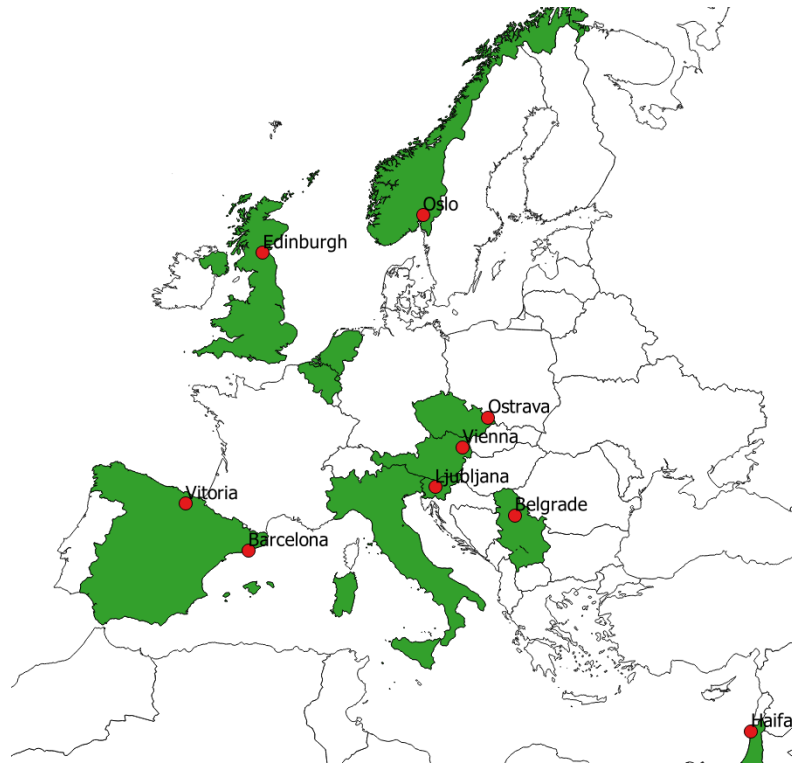
Around 30 partners in consortium, majority from Europe, several partners are from Israel, South Korea, Australia, 2 partners from Serbia (Vinca Institute, UoB and DunavNet) Norwegian Institute for Air Research is Project Coordinator). Some partners are from academia, some are SME, this has influence on life of developed products (some will be open sourced and some will remain proprietary)
Map also shows 9 cities in which pilot campaigns were conducted, using tools developed by partners in project.

What is Citizen Observatory Toolbox?

- The CITI-SENSE COT includes any resources and guidance, procedures, software, hardware or services developed by CITI-SENSE that can be used to support citizens to participate in environmental monitoring, and enable citizens to contribute to community based environmental decision making.
- Can access via http://co.citi-sense.eu
- To support anyone in designing, setting up and carrying out their own Citizens' Observatories

- Each of the presented tools can either directly enhance research infrastructure or enable data for further analysis

Our tools can help you to be healthier, help you and your kids avoid polluted areas, and help policy-makers make decisions to improve the air quality in Cities, Schools and Public Spaces, etc.
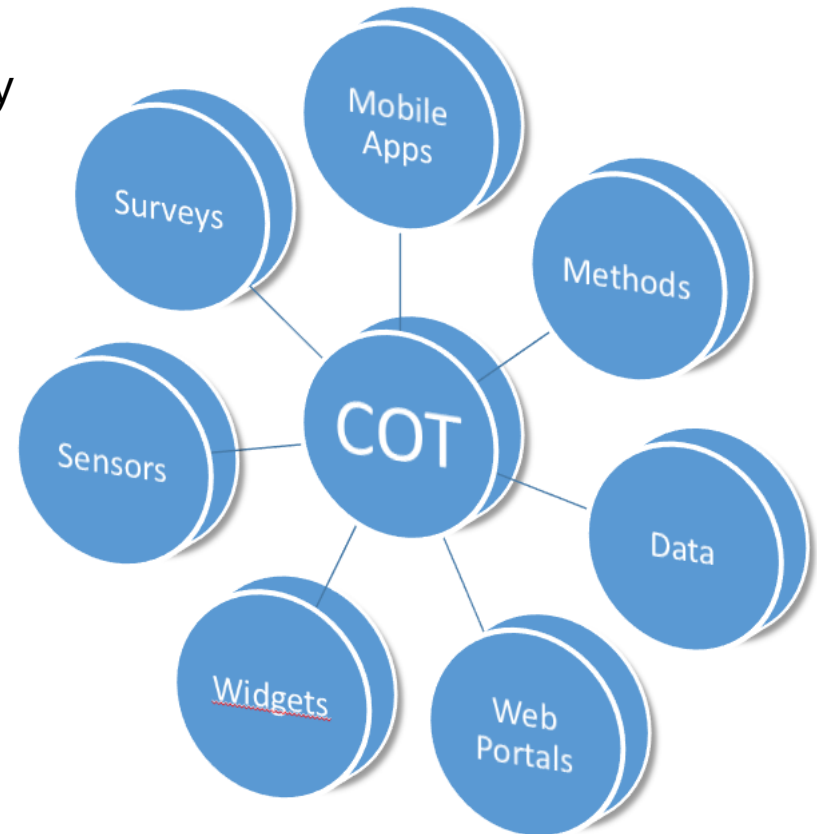
Sensors and sensor providers

- **Alphasense** CO, NO, NO2, O3, CO2, PM2.5

LoD* (ppb)	CO	H_2S	NO	NO_2	O_3	SO_2
A series	20	5	80	15	5	15
B series	4	1	15	12	4	5

*Limit of Detection (LoD)

Long term stability (22 months)

	Stability (% of original sensitivity)
CO	63 to 89
NO	80 to 105
CO_2	ND
SO_2	95 to 115
NO_2	30 to 41
O_3	63 to 91
VOC_S	To analyse
$PM_{2.5}$, PM_{10}	To analyse

- **Dylos, Sharp** light scattering(almost PM2.5)
- **SGX, Figaro** MO: NO2, O3
- **Obeo** Radon
- **Sensirion, Honeywell** Noise, T, RH
- **Vitoria WP2** RH, T, Airflow, Noise, Direct Radiation, UV
- **Testo** CO2

Sensor platforms

■ **Ateknea LEO** – mobile unit, measures NO, O3, NO2 Temp, RH in real time. Connects via blutooth to Android phone

Temp/RH senzor

NO
O3
NO2

■**Geotech AQMesh** – static unit, measures gases NO, NO2, O3 and CO using electrochemical sensors. Particles are counted using a light scattering optical particle counter.
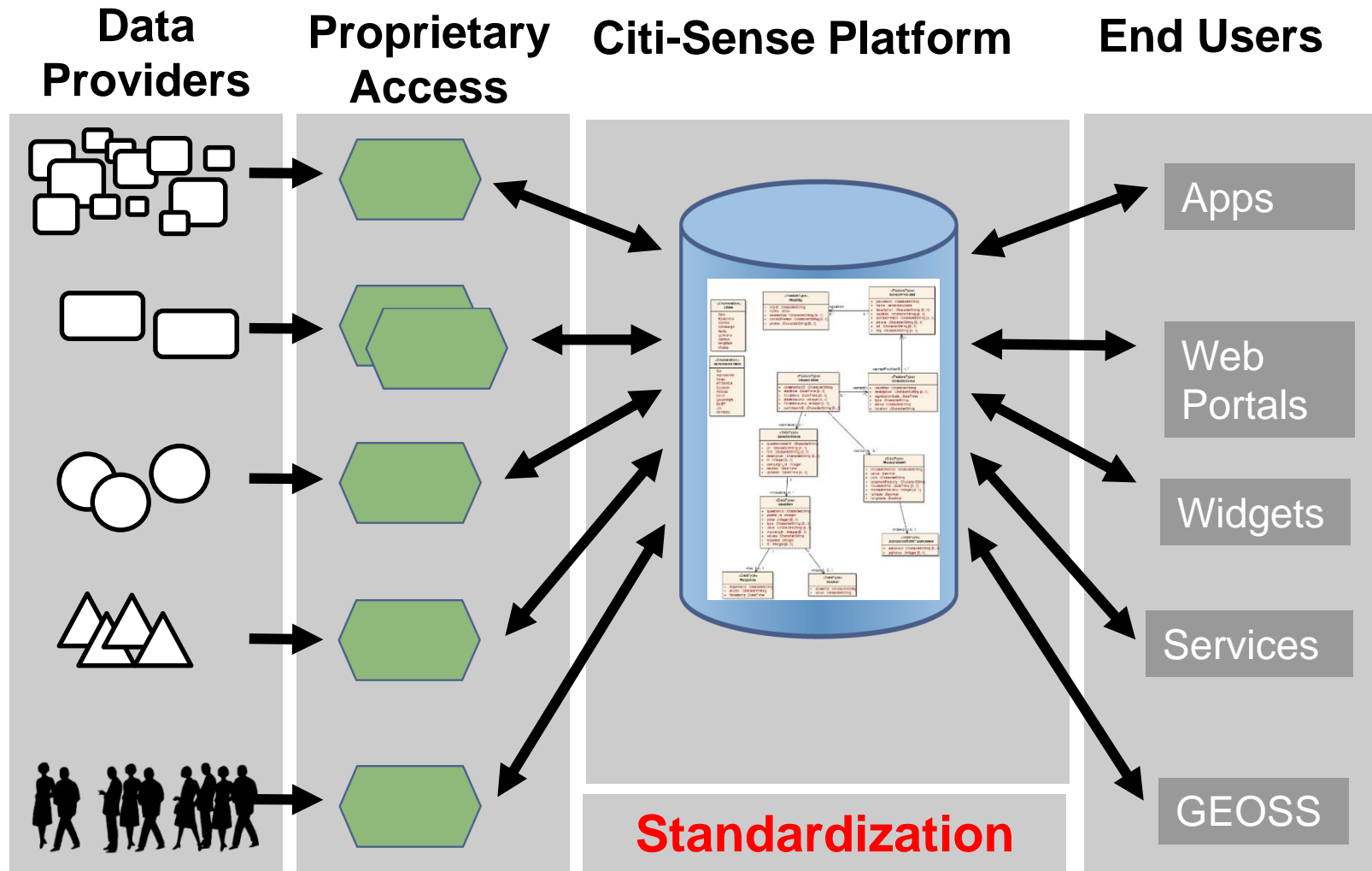
■ **Atmospheric indoor static air monitor** – measures CO, C02, Temperature, RH, PM1, PM2.5, PM10

■ **CityAir app –** not measuring air pollution parameters but recording user perception of air quality at current location

Data flow from sensor platforms

Data Providers → Proprietary Access → Citi-Sense Platform → End Users

Standardization

Although data may be consumed by a varied group of stakeholders ranging from large government organizations with enterprise systems, to SMEs and environmental scientists, ultimately it is the citizens in their home with consumer devices such as mobile phones or laptops that we wish to target.
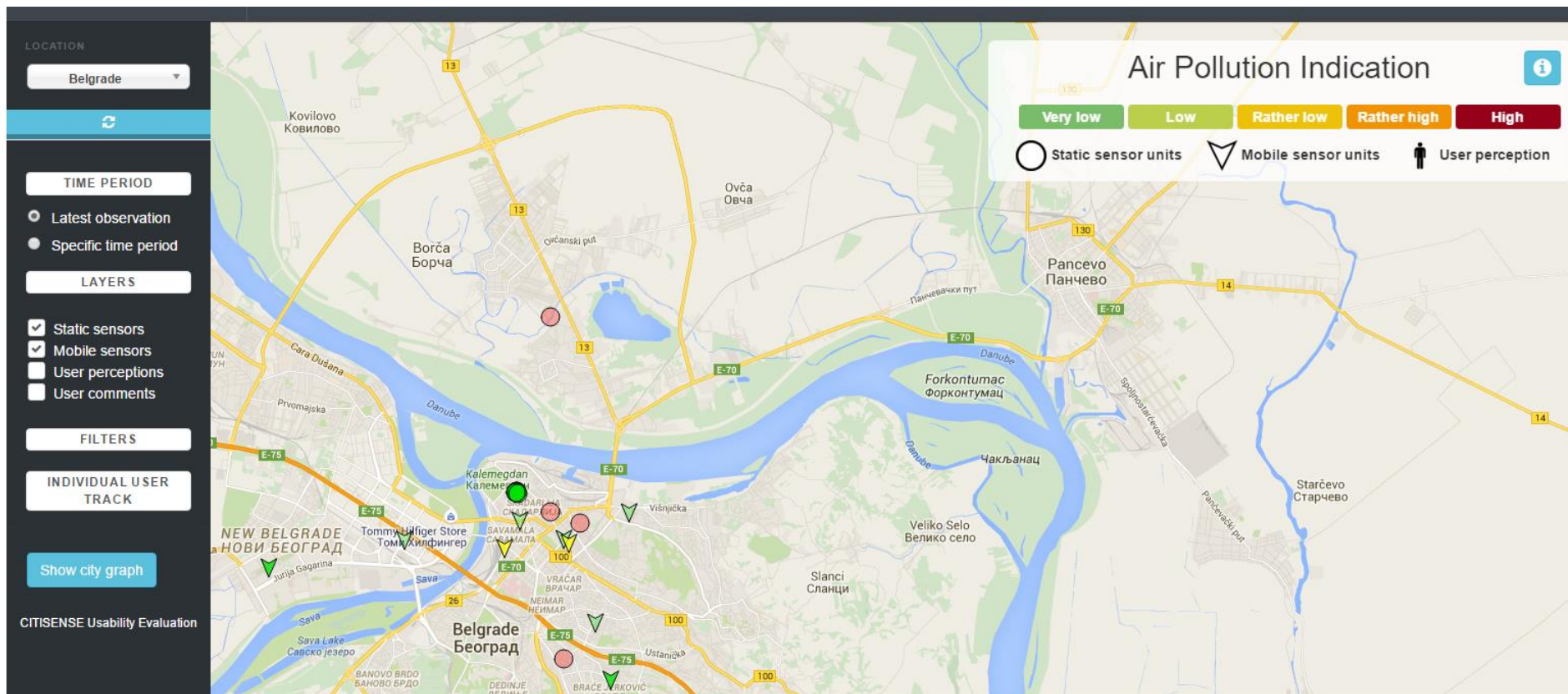
Fused map for Belgrade NO2
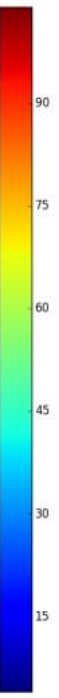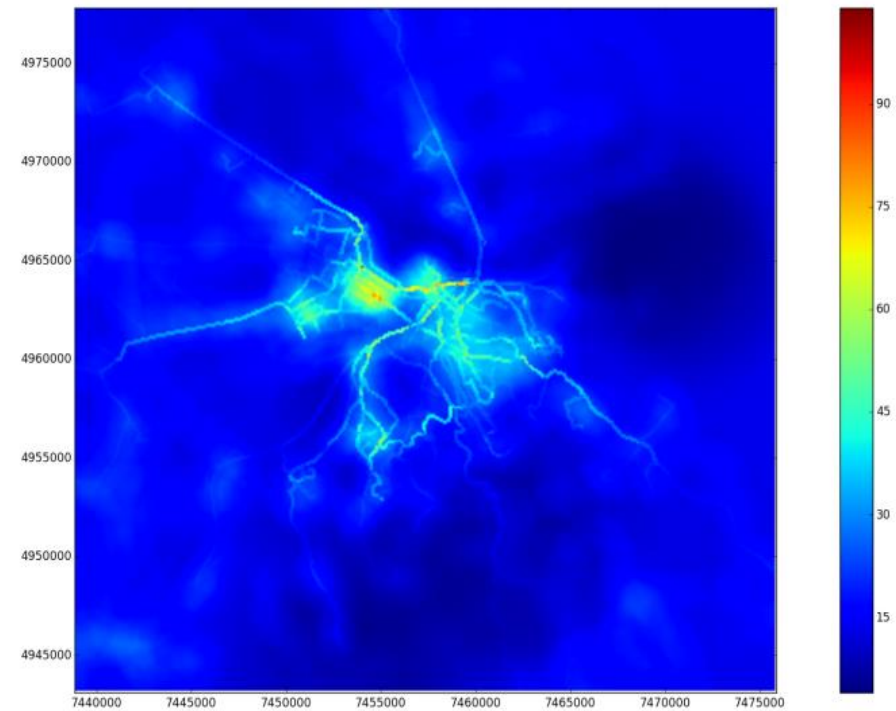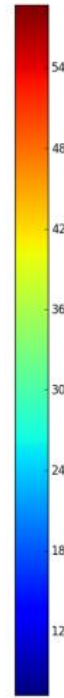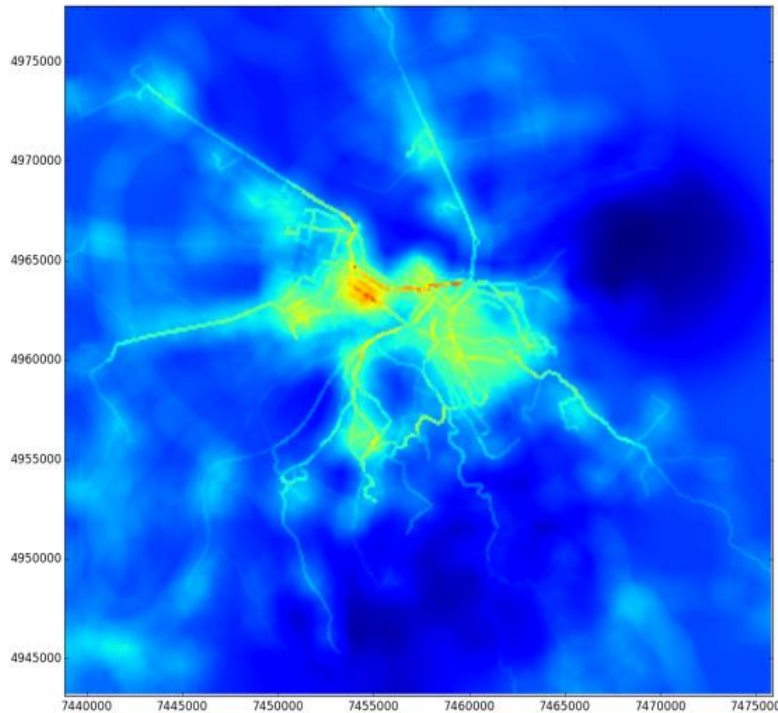
Basemap for NO_2 (estimate for average annual value) within area covered by Master plan of Belgrade. Range up to 60 μg/m3

Fused map for NO_2 average annual concentration. Unit is µg/m3. Range up to 90 µg/m3

Possible example of usage

Data portal for Belgrade

- belgrade.citi-sense.eu

How open is it?

- Data and information are open to everyone!

- Open source apps and widgets with good documentation for further use by SMEs

http://co.citi-sense.eu/

Thank you for your attention

For more Information, http://co.citi-sense.eu/

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