

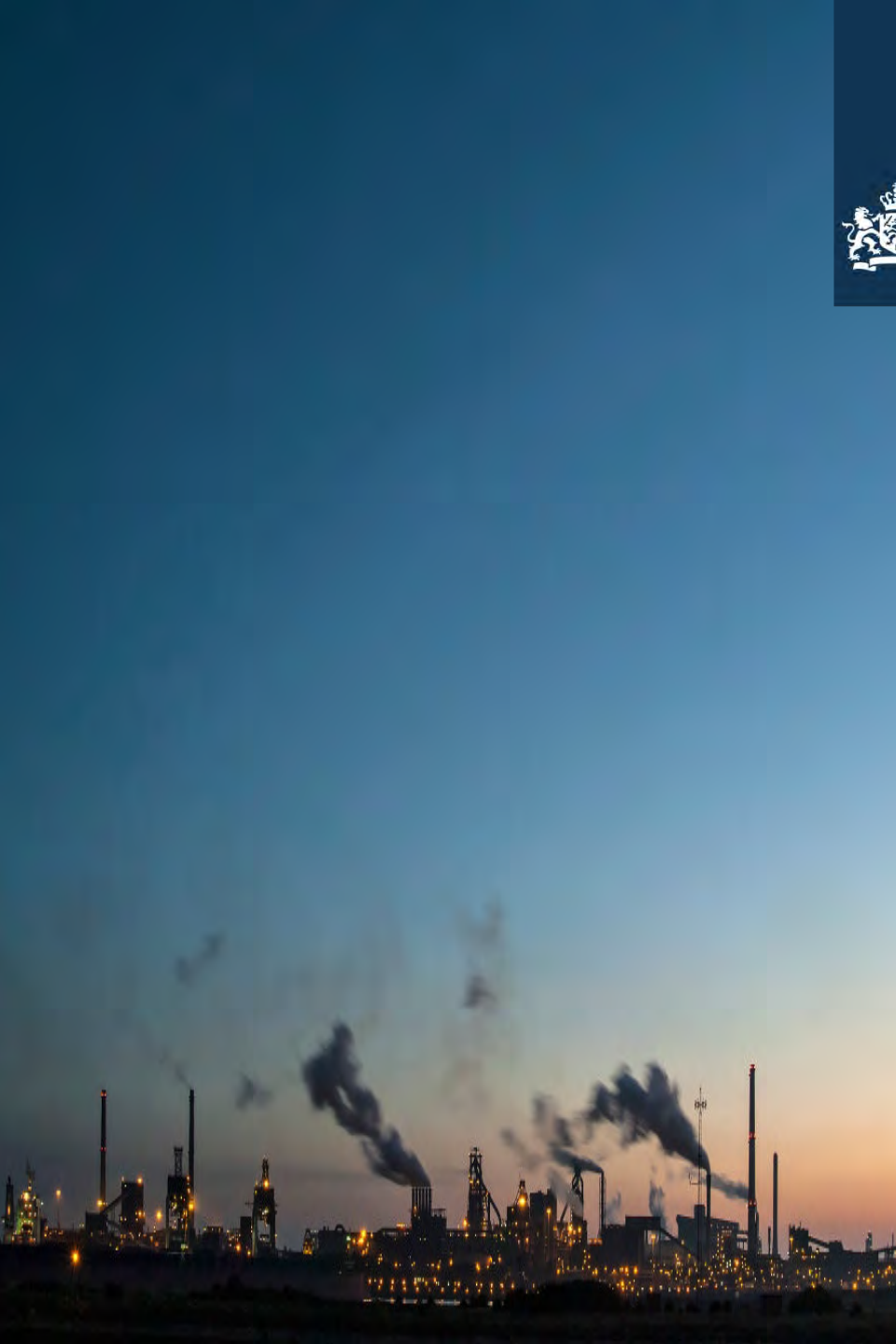


Rijksinstituut voor Volksgezondheid  
en Milieu  
*Ministerie van Volksgezondheid,  
Welzijn en Sport*

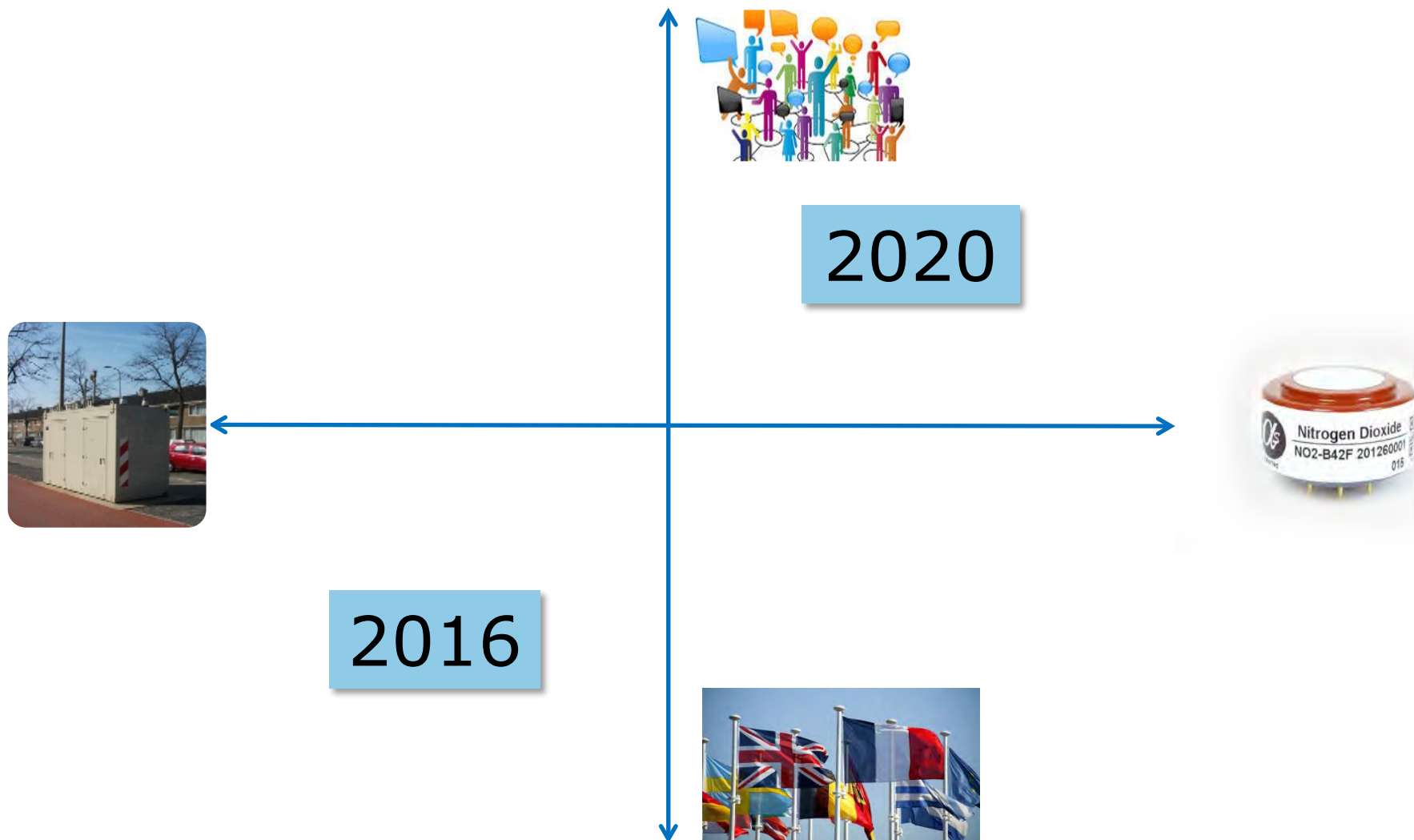
# Roadmap Air Quality monitoring and present activities in The Netherlands

Marita Voogt

13 February 2017



# Shifts in Air Quality Monitoring

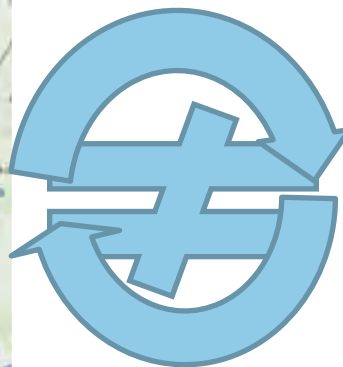


# Synergy

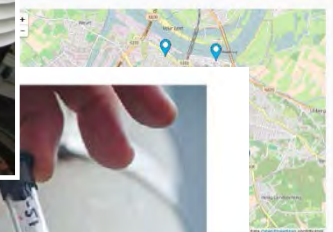
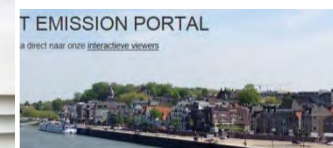


National monitoring

Calibration

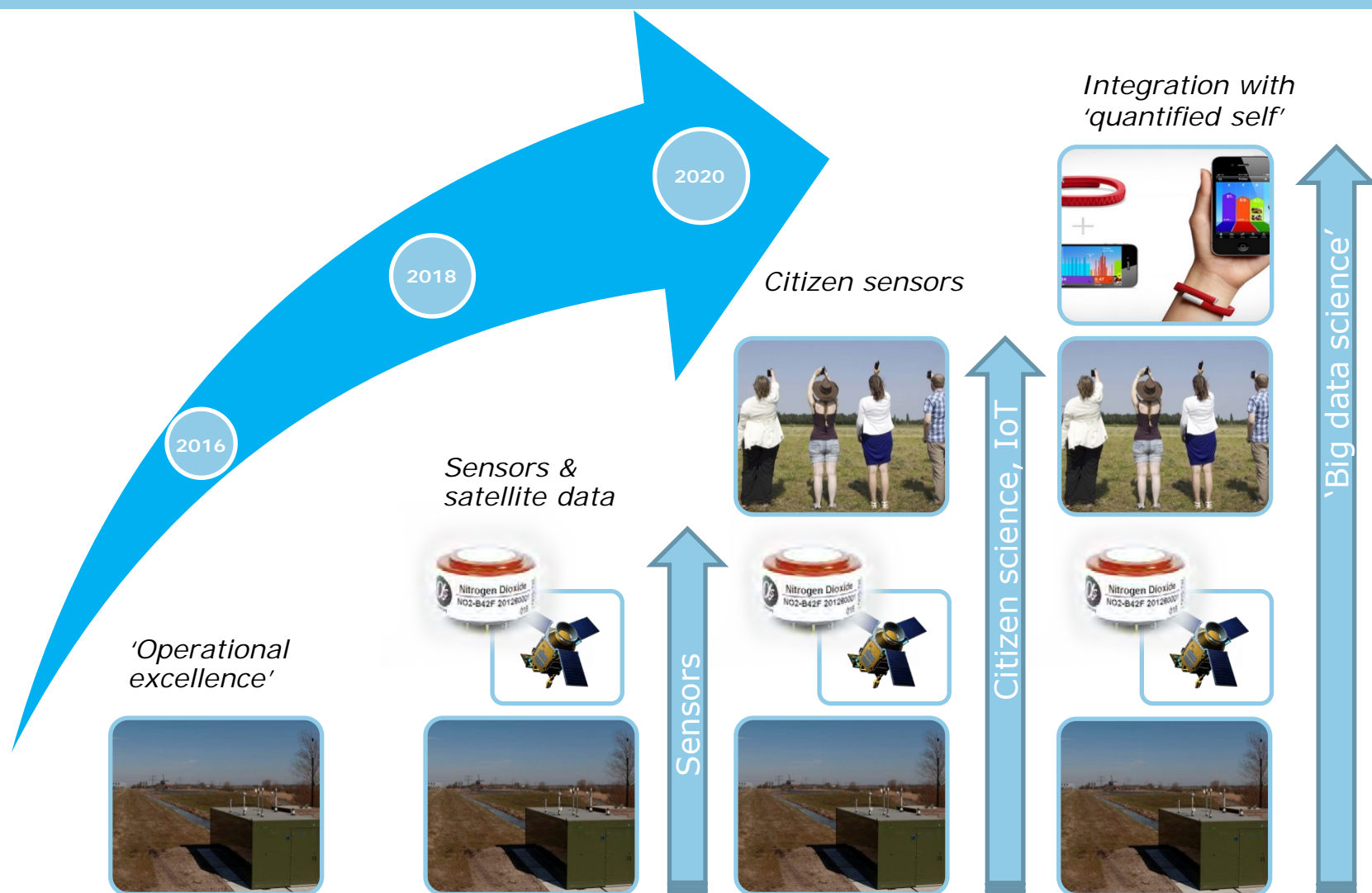


Densification



Sensors / Citizen science

# Roadmap innovation of AQ monitoring



# Monitoring network ammonia



Cost efficient monitoring network for ammonia in nature areas:

- ~300 diffusion tubes
- Calibrated against 6 advanced monitors
- Samplers are mounted by volunteers



Advanced monitor: DOAS

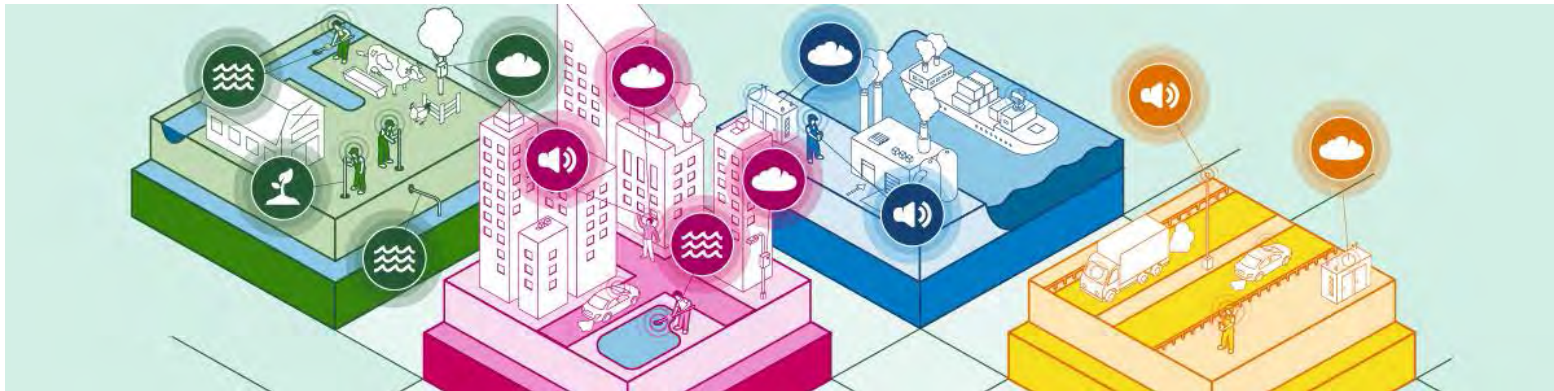




# Innovation program environmental monitoring

## Highlights:

- Validation of Sensors
- Citizen Science



# Validation of Sensors

Lab and field tests of PM and gas sensors

- AirSensEUR
- Shinyei sensors
- Alphasense OPC-N2



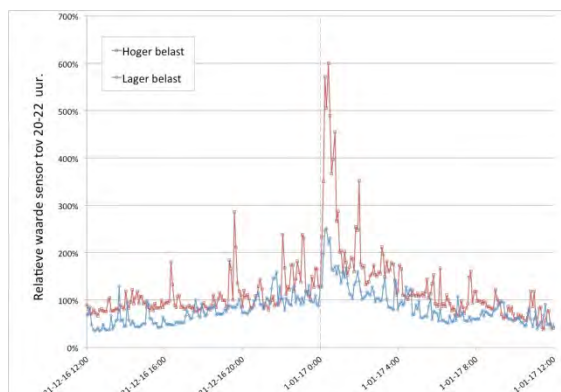
# Citizen Science

- Knowledge portal  
[www.samenmetenaanluchtkwaliteit.nl](http://www.samenmetenaanluchtkwaliteit.nl)
- Developing a data portal
- Pilot studies
  - Measuring PM peak due to fireworks at New Year Eve with PPD42
  - Pilots in cities



Welcome to the knowledge portal 'Samen meten aan luchtkwaliteit' / 'Measuring air quality together'.

Technological developments make it possible for anyone measure the quality of the air with increasing accuracy. But what do the measurements mean, how to best perform the measurements, and who else is working with these methods? To answer these questions, this (Dutch) website offers an overview of the materials, sensors and devices that are available. We also provide information about projects in cities and the sharing and use of data. Have you got nice projects and experience? Share it with us!





# Dutch citizen pilots and city sensor networks

Waag Society

GGD Amsterdam

KNMI

TNO

Radboud  
University

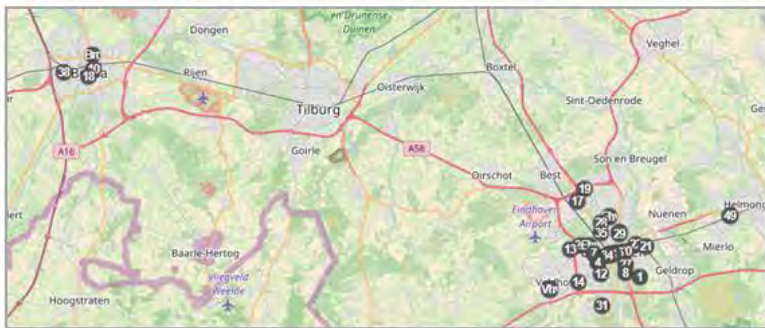
ECN

DCMR

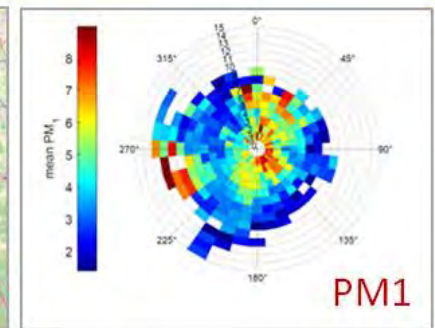
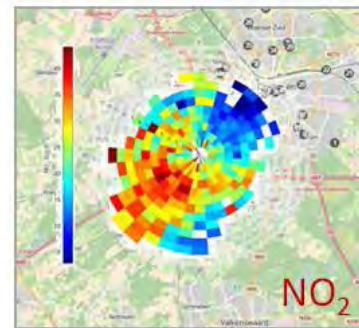




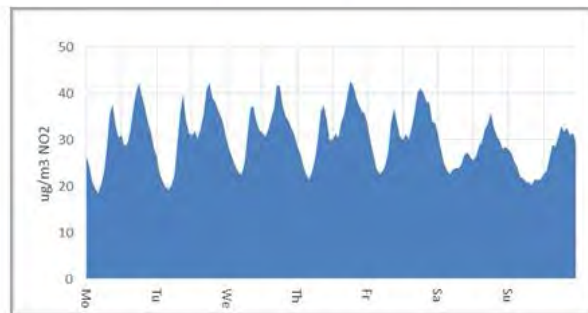
# First **Longterm** Urban Network (2013 – 2017)



Multi City Network



Source tracking



Rush hours per weekday



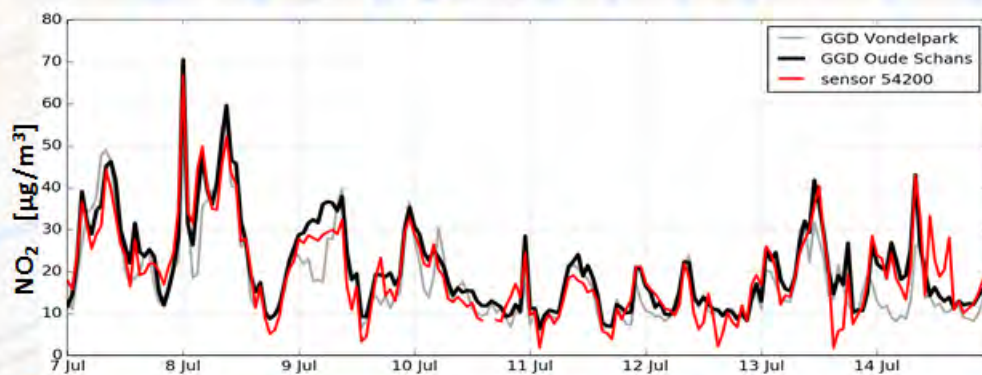
AirBox mounted on streetpole



# Urban AirQ campaign (June-August 2016)

Waag Society • GGD Amsterdam • ECN • Longfonds • Alterra • KNMI

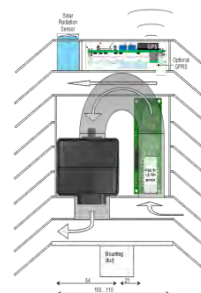
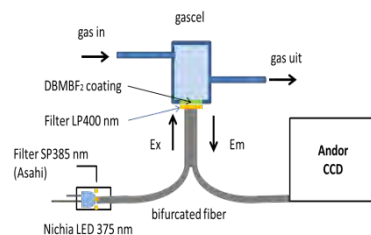
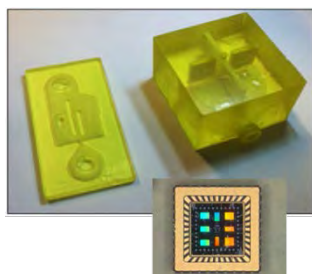
- 16 low-cost sensors built with AlphaSense NO2-B series
- Distributed among residents in Amsterdam living close to busy streets
- Calibration by comparing onsite to an official monitor;
  - Improvements by including temperature and humidity
  - Different before and after the campaign and for each sensor
  - $R^2$  ranging
    - from 0.3 to 0.7 raw
    - from 0.6 to 0.9 including T, RH and drift corrections



Calibrated at GGD Vondelpark station, but validated against GGD Oude Schans

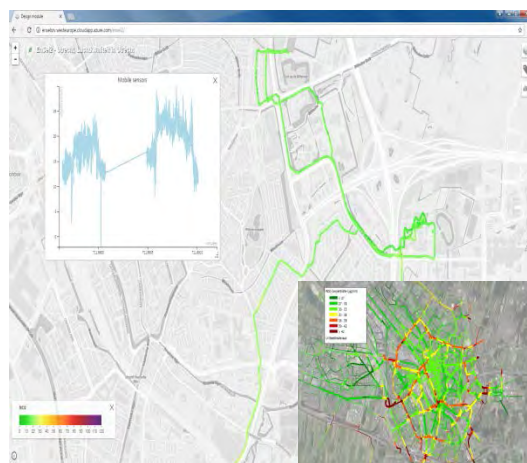


More info: Bas Mijling, [mijling@knmi.nl](mailto:mijling@knmi.nl)

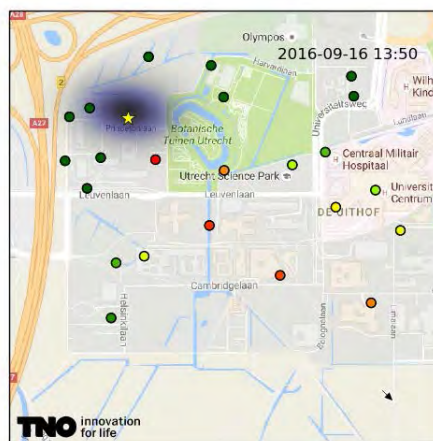


**Platforms:** plug and play  
Standard transfer (WiFi, LoRa,  
GPRS) and control with smart  
phone

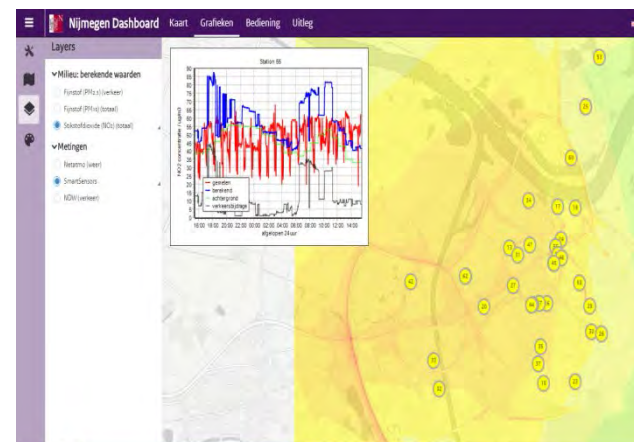
**Sensor development:**  
Wearable disposable PM and  
benzene prototypes



**Personal Exposure:** RT tracking  
exposure to NO2 of individual bikers



**Industry:** Early warning by real-  
time source detection (simulated  
case)



**TNO** Smart Emission

**Urban AQ monitoring:**  
RT traffic data and meteorology feeds urban air quality models  
calibrated with LML NO2 observations  
Comparison of simulation vs low cost sensor readings  
<http://vps52331.public.cloudvps.com:3005/>



# Thank you

Questions?

Contact: [marita.voogt@rivm.nl](mailto:marita.voogt@rivm.nl)