

Sensors at work: measuring air quality in Eindhoven

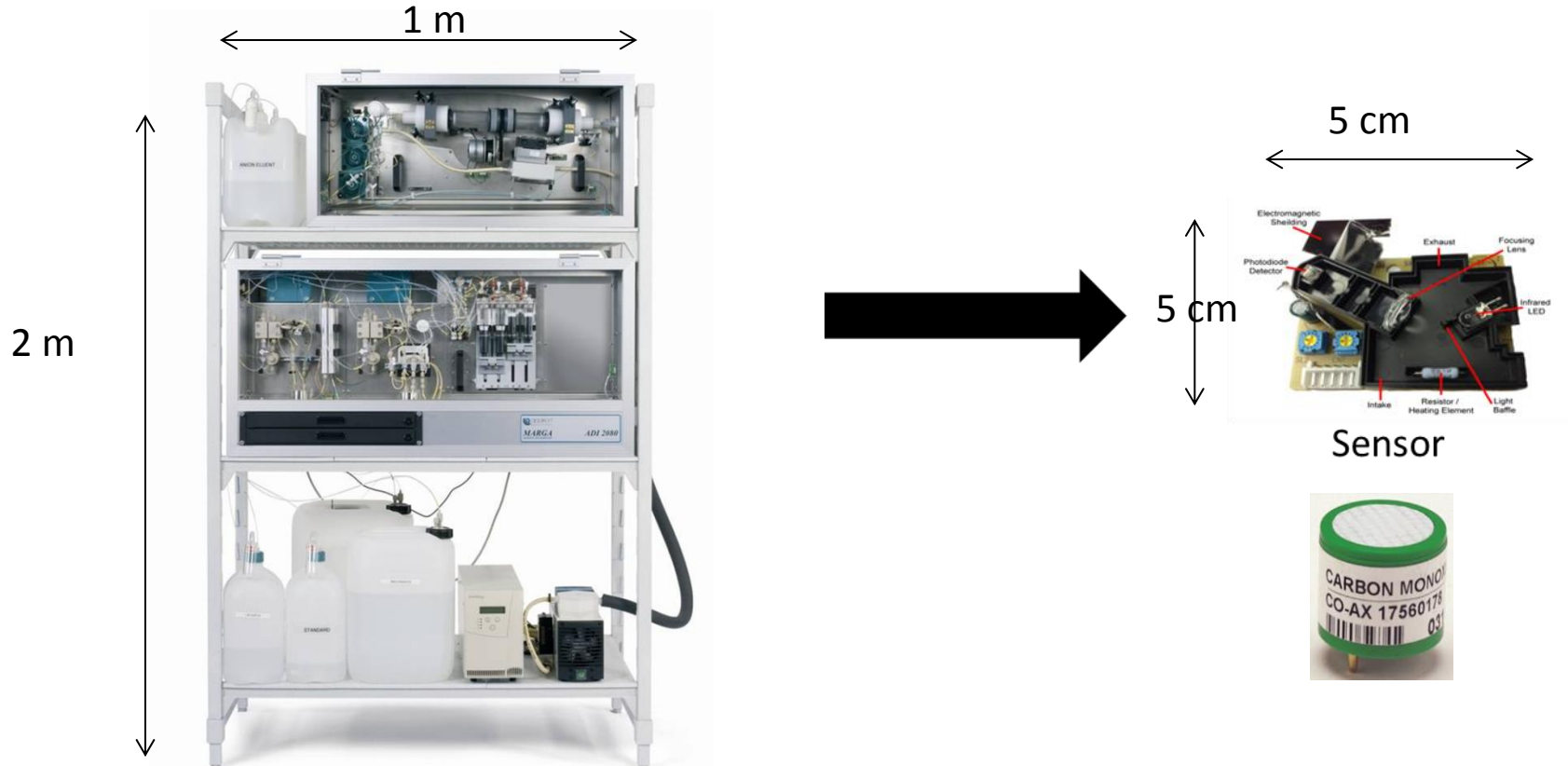
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Colloque ExTraCar, Liège
9 May 2016



➔ Instrument development



MARGA=Monitoring Instrument for AeRosols and GAses

Gas sensors

Electrochemical



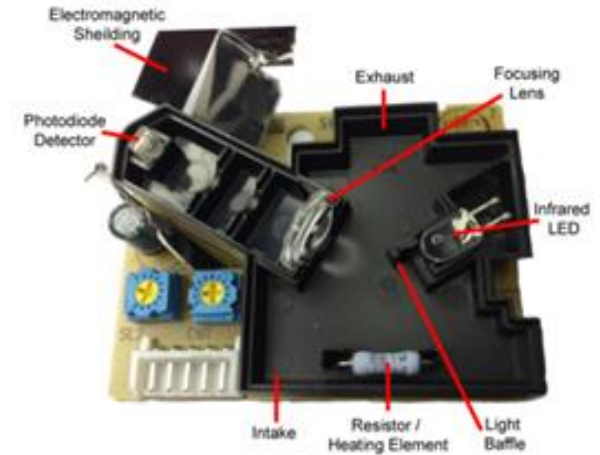
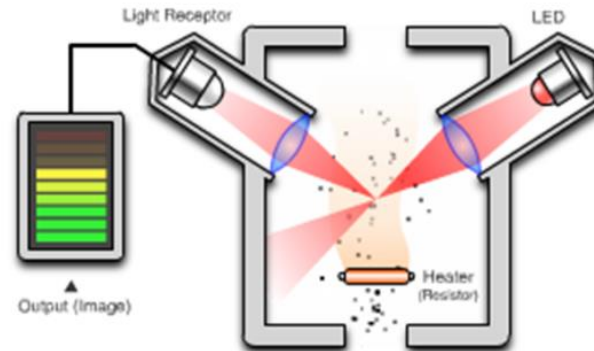
ME3-NH3
Ammonia gas sensor



PM sensor

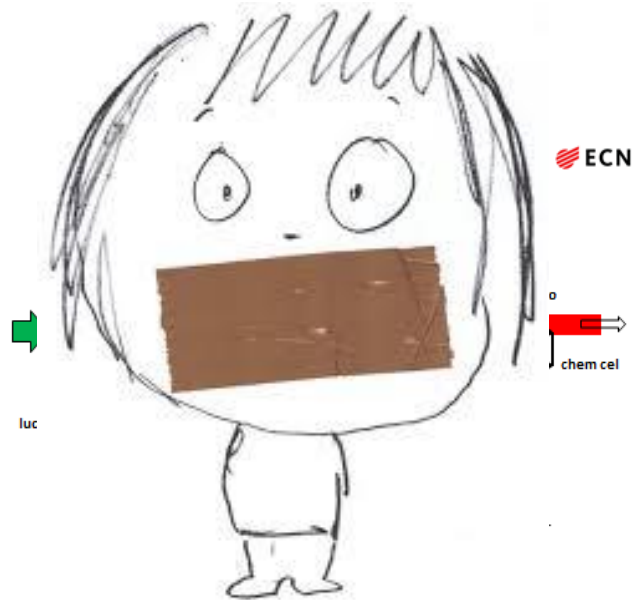
Optical

- Counting pulses → number of particles
- Discriminate sizes → **PM1, PM2.5, PM10**
- $> 0.3 \mu\text{m}$



NO₂ sensor

- Patent pending

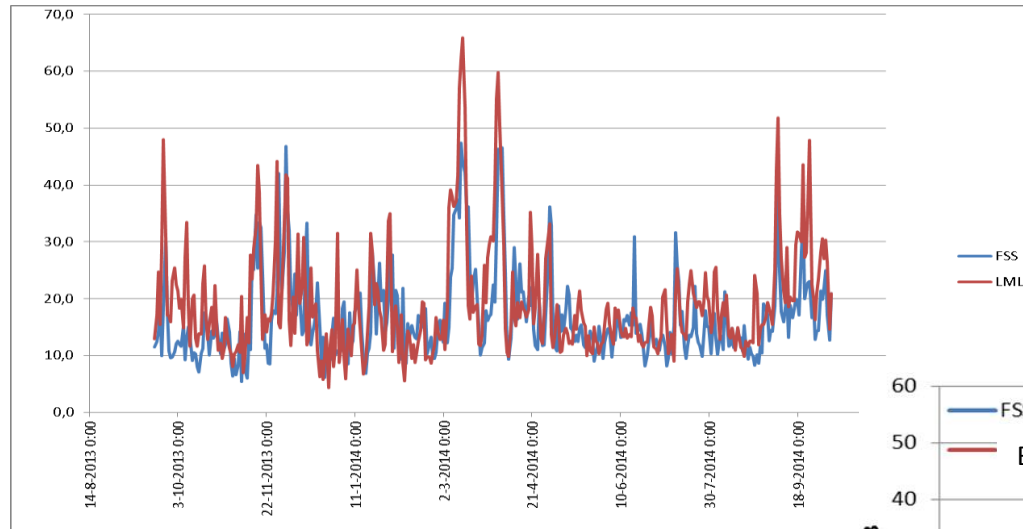


Integration in the “AirBox”



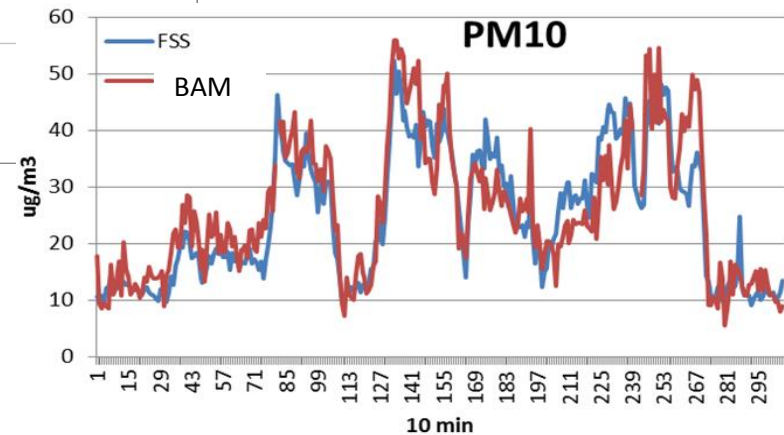
- Time resolution 1-10 min
- Modular – an array of sensors
- Battery (48 h)
- Data transfer every 10 min by GPRS

Comparison at Eindhoven

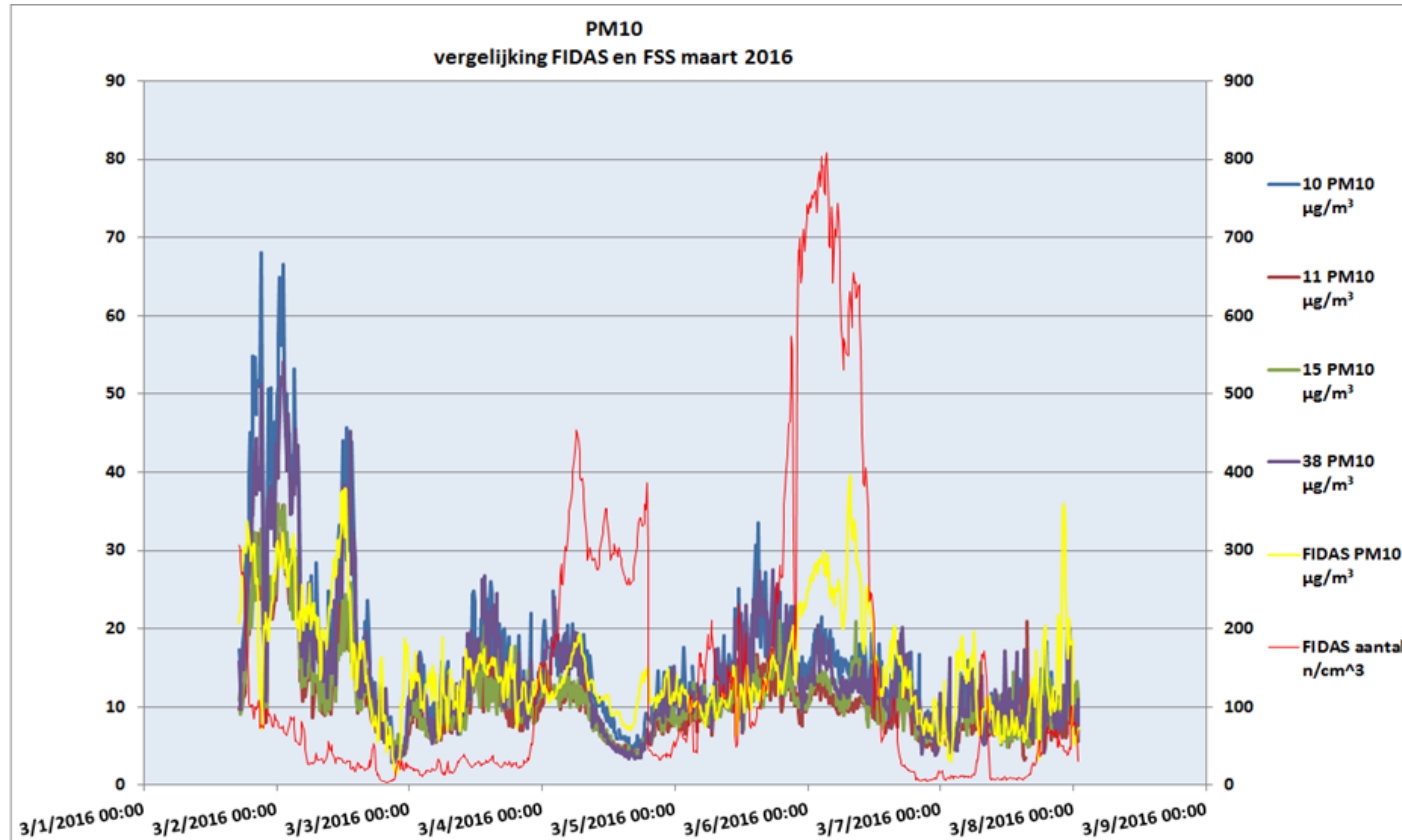


daily average PM10
1 year

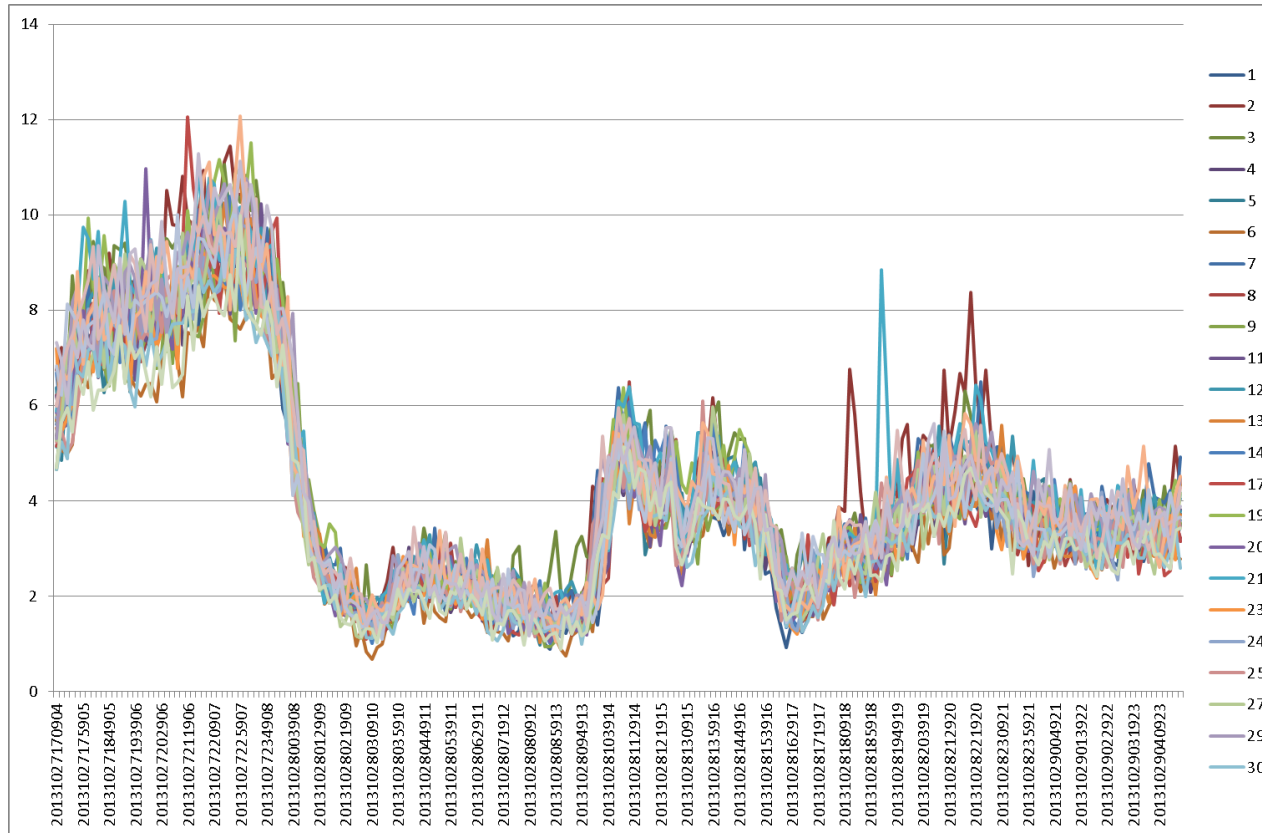
10 min
14 days



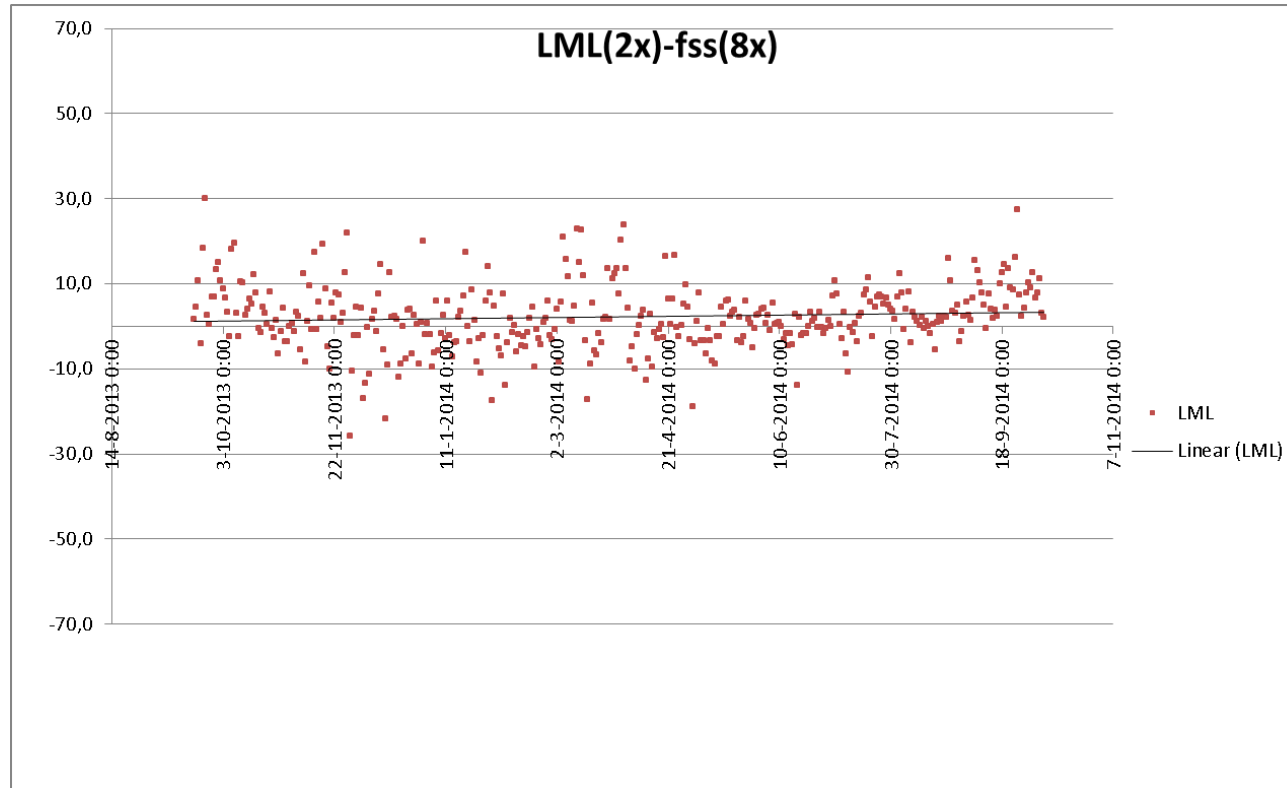
Comparison with Fidas



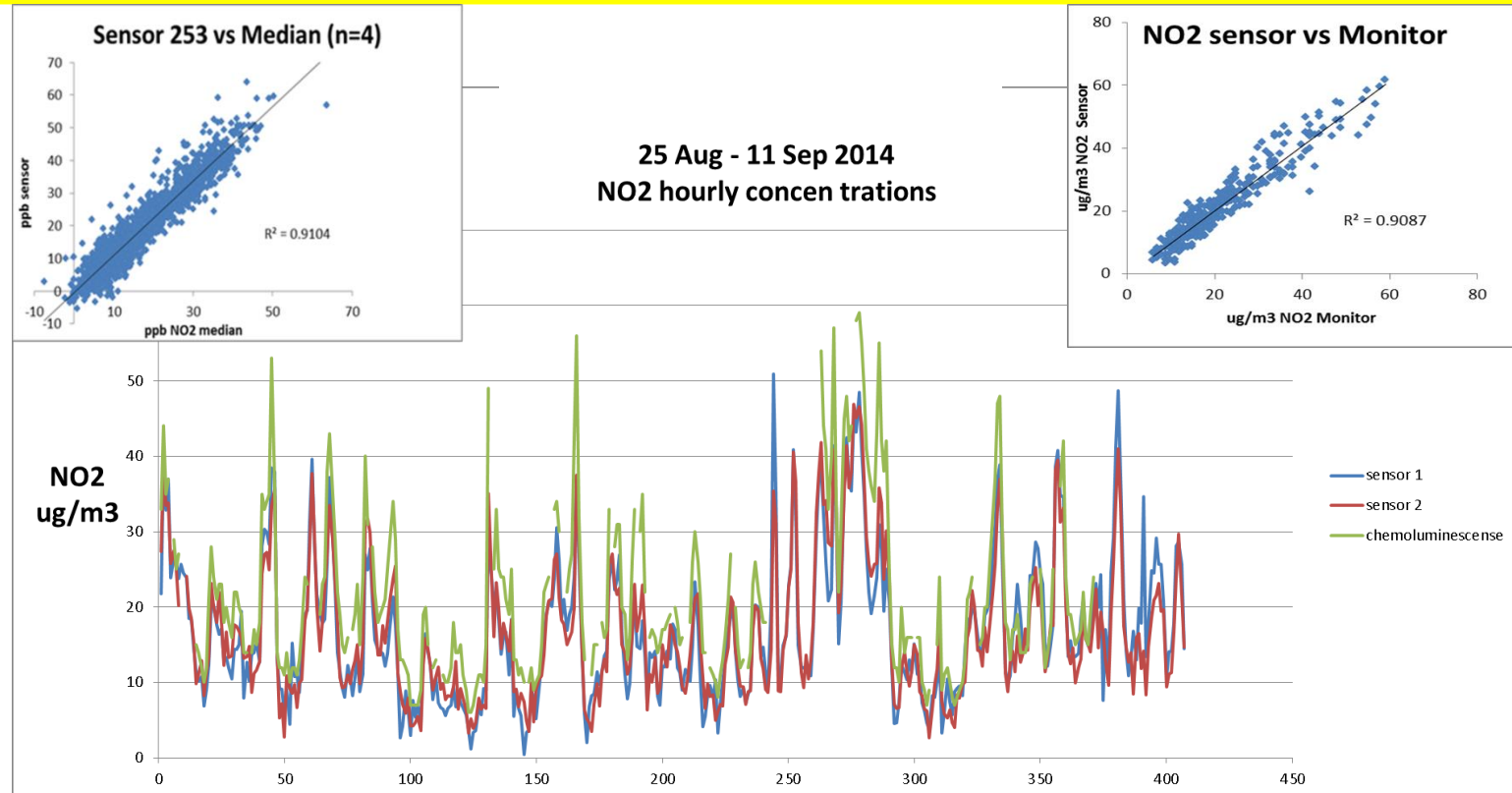
Comparison between PM sensors (precision)



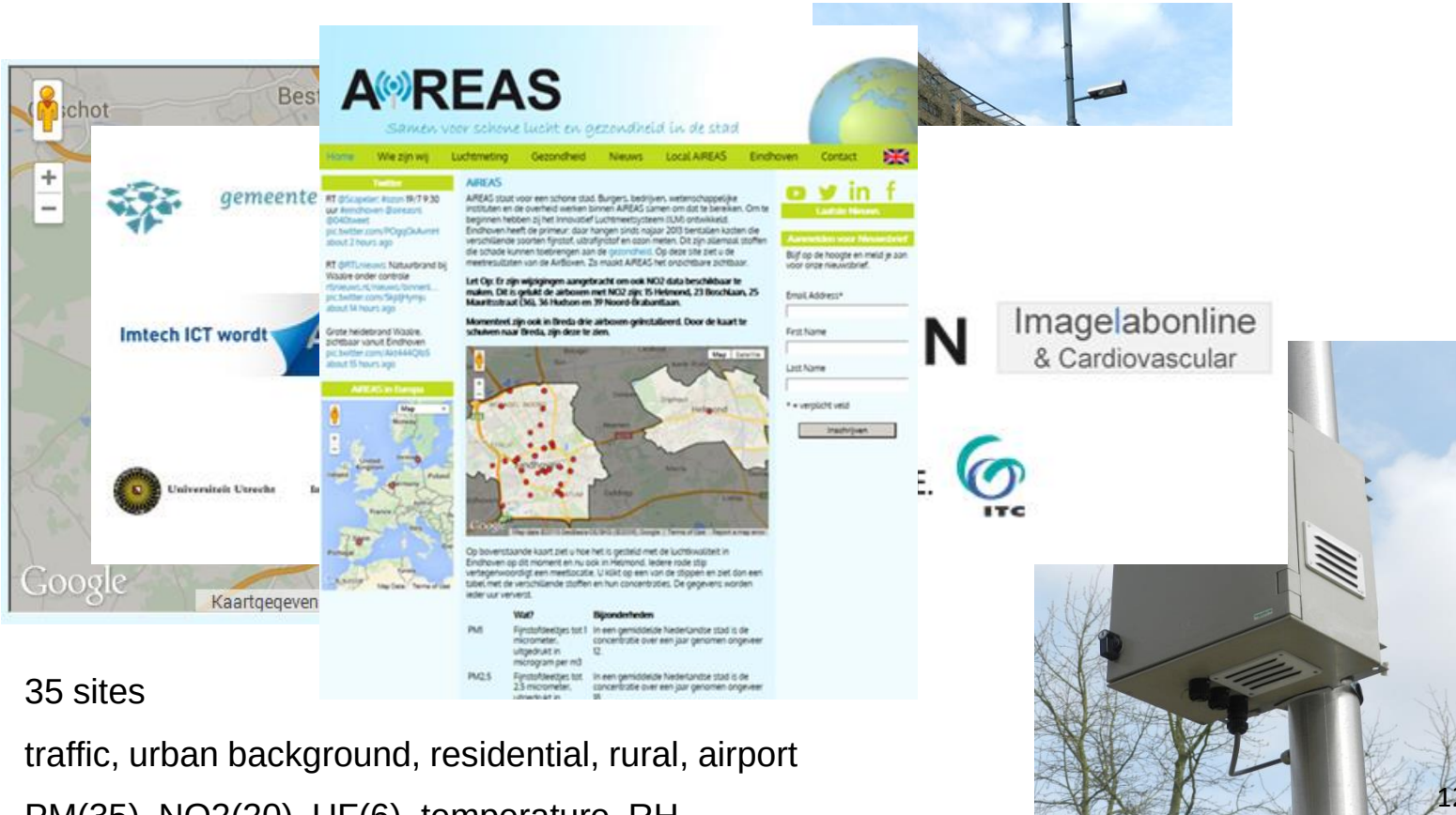
Stability



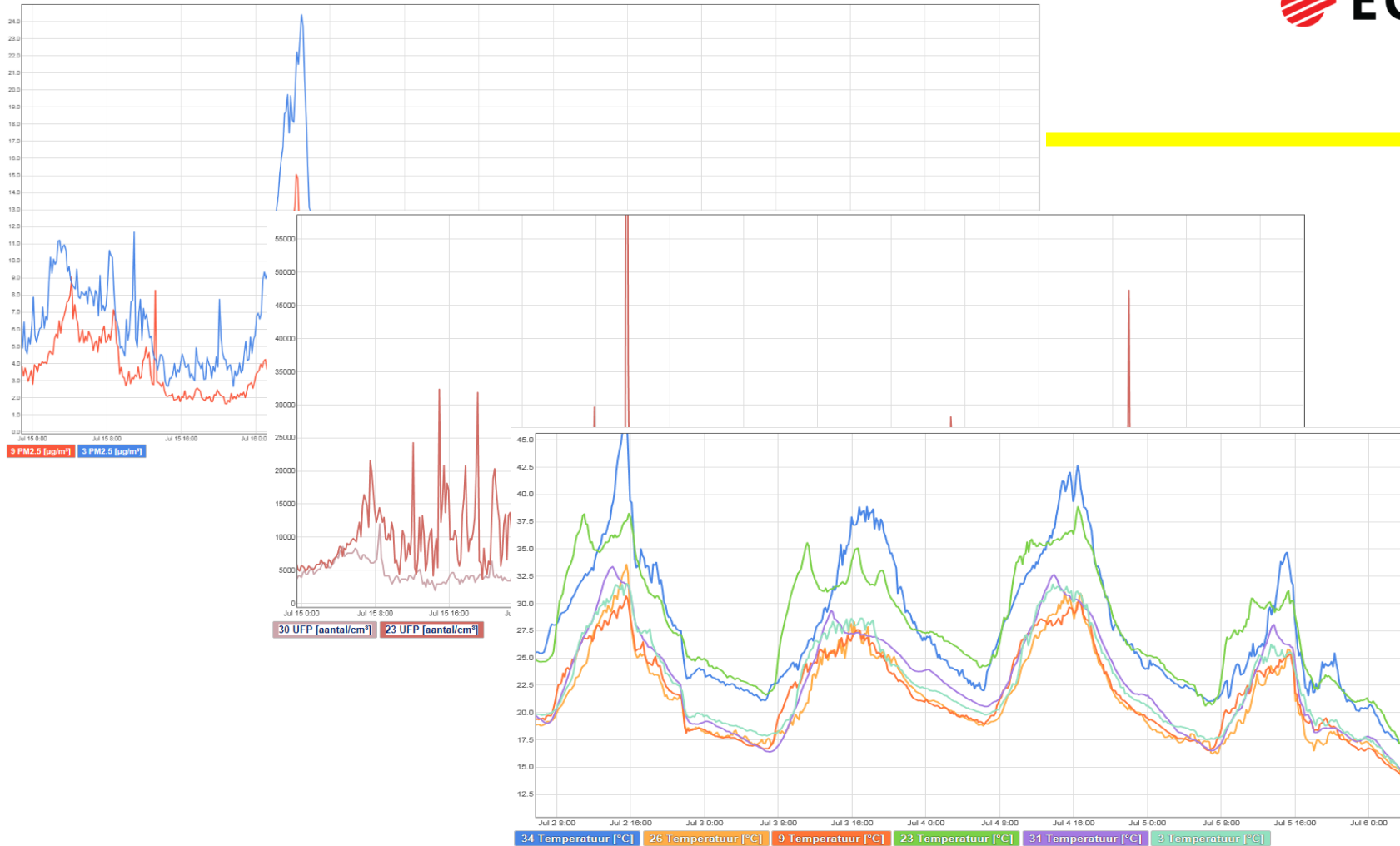
NO₂ sensor



Innovatief Lucht Meetsysteem (ILM)



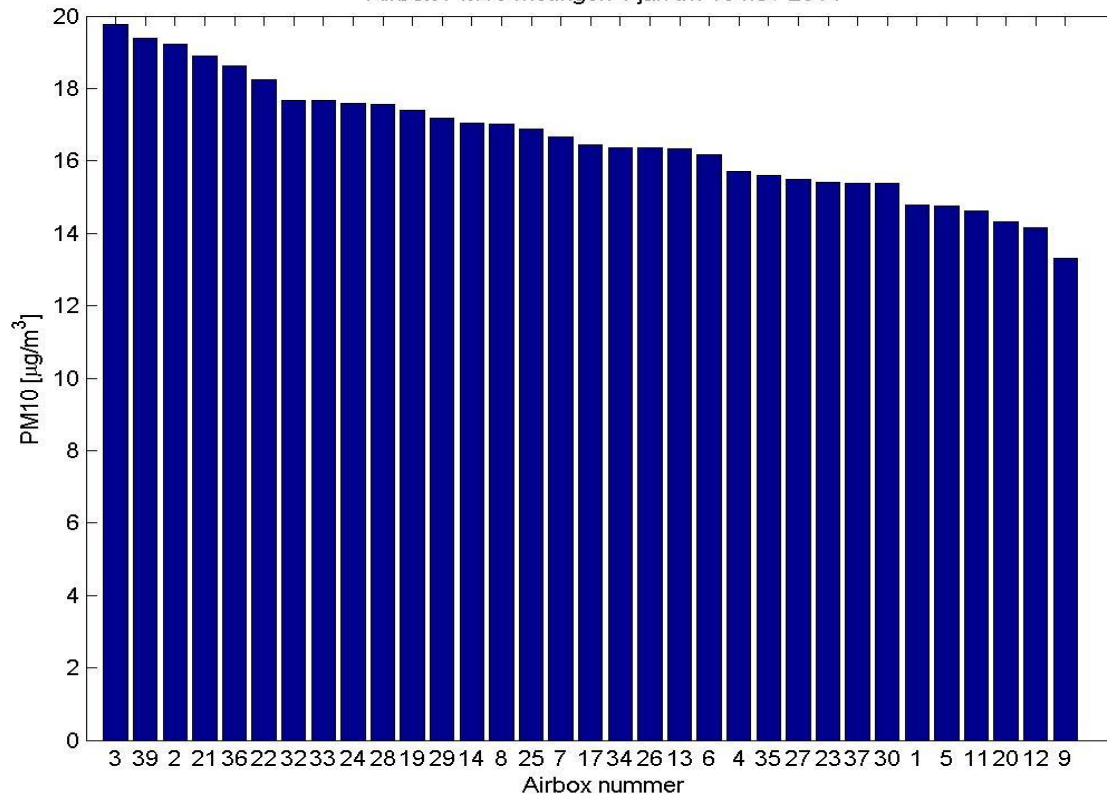
- 35 sites
- traffic, urban background, residential, rural, airport
- PM(35), NO2(20), UF(6), temperature, RH



PM10 averages per site 2014

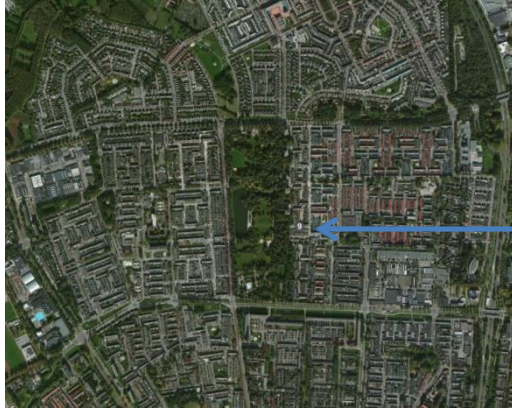
Airbox PM10 metingen 1 jan tm 18 nov 2014

Average:
16,7 $\mu\text{g}/\text{m}^3$



1, Eij-erven 41
2, Lijmbeekstraat 190
3, Keizersgracht 28
4, v. Weberstraat-Limburglaan
5, Falstaff 8
6, Grote Beerlaan 15
7, Botenlaan 135
8, Leenderweg 259
9, Maasteikstraat 7
10, Geen naam
11, Leostraat 17
12, Jan Hollanderstraat 70
13, Sliffertsestraat 12
14, Twickel 30
15, Geen naam
16, Geen naam
17, Amstelstraat
18, Geen naam
19, Finisterelaan 45
20, Sperwerlaan 4A
21, Donk 24
22, Hofstraat 161
23, Jeroen Boschlaan 170
24, v. Vollenhovenstraat
25, Mauritsstraat 36-Anna v. Egmondstraat 14
26, Gedempte gracht 109 (Vestdijk)
27, St. Adrianusstraat 30
28, Rijkswaertstraat 6
29, Ds. Fliednerstraat
30, Spijndhof
31, "Vincent Cleerdinlaan, Waalre"
32, Vesaliuslaan 50
33, Beukenlaan 62
34, Pastoriestraat 57
35, Boschdijk 393
36, Hudsonlaan 694 (Kennedyalaan)
37, Genovevalaan
38, Geen naam
39, Noord-Brabantlaan 36
40, Geen naam

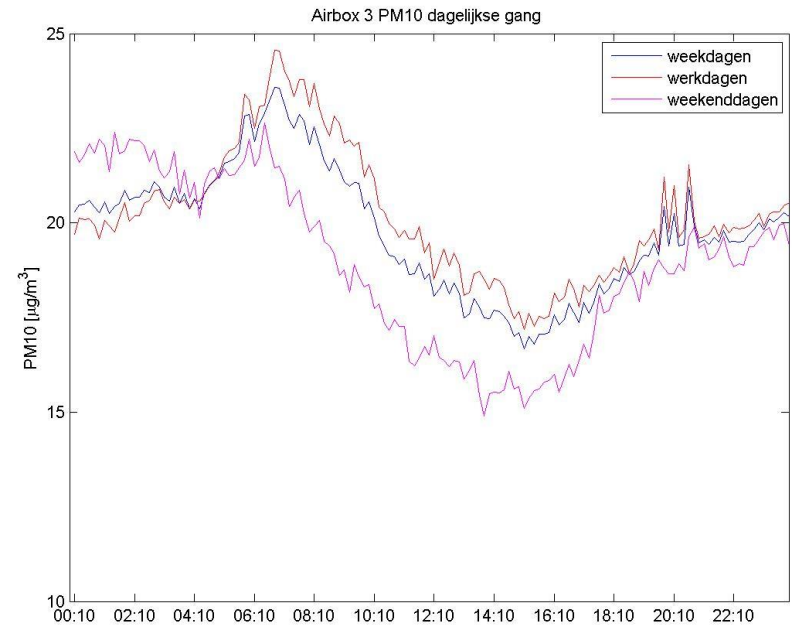
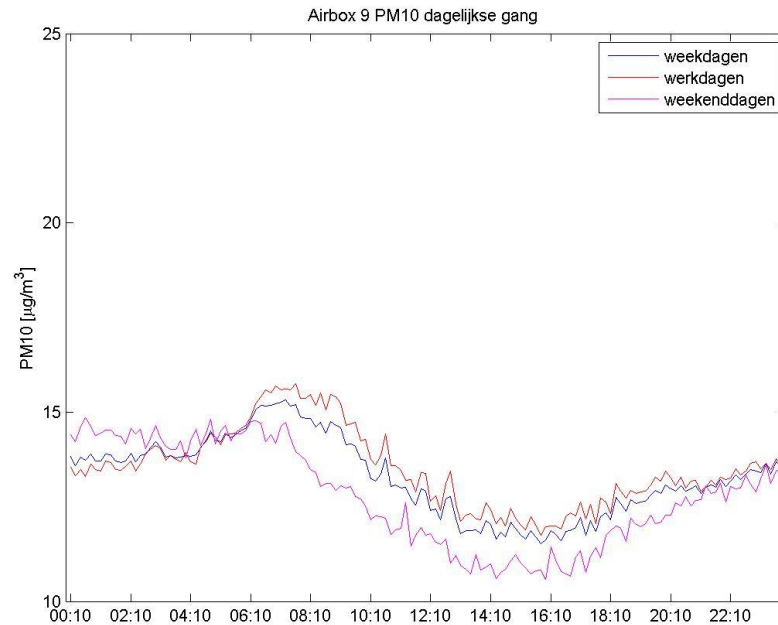
Site 9 Maaseijkstraat 13,4 $\mu\text{g}/\text{m}^3$



Site 3 Keizersgracht 19,8 $\mu\text{g}/\text{m}^3$



Daily cycle



New initiatives

- Health studies

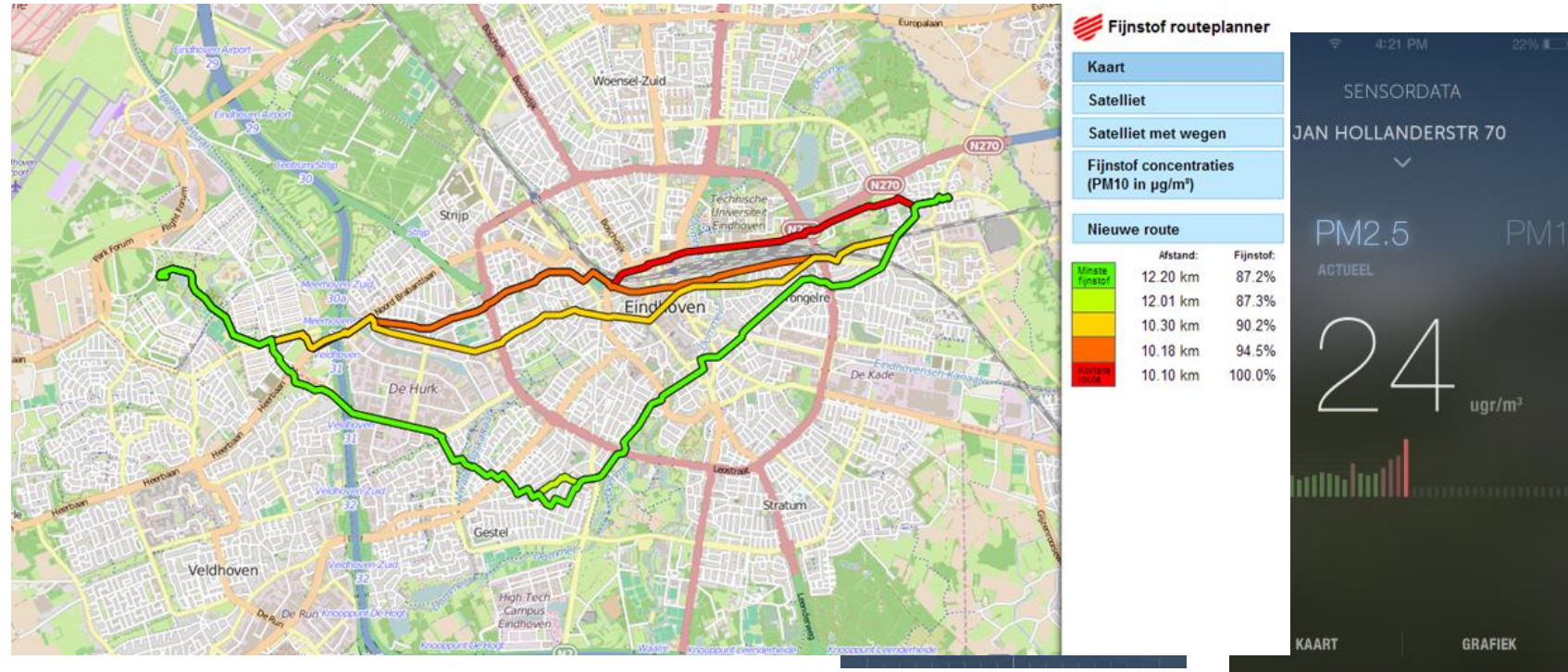


New initiatives

- Citizen science



New initiatives



- Is cycling healthy?

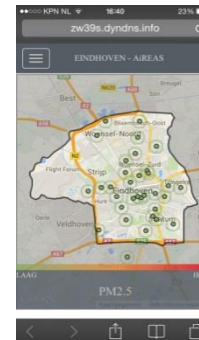
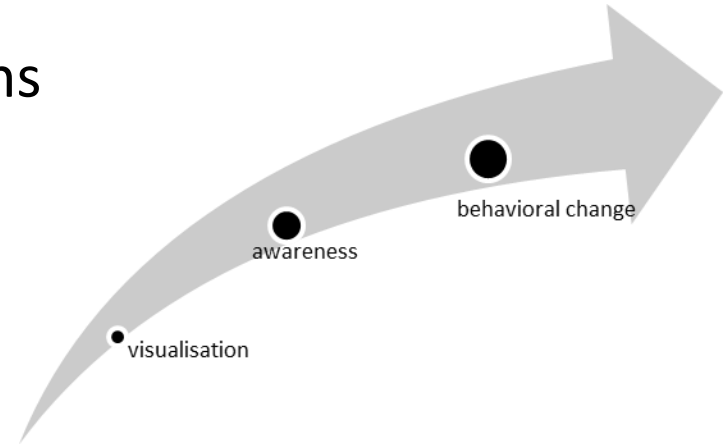
New initiatives

- More communication to citizens

- explain what the data means

- raising awareness

- behavioral change?





Questions?

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