



National Institute for Public Health
and the Environment
Ministry of Health, Welfare and Sport

Expansion of UFP measuring capabilities in the Netherlands to improve models and emission inventories

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EFCA UFP Conference, Brussels, 2024-07-04





The Dutch National Air Quality Monitoring Network (LML)

- > LML = “Landelijk Meetnet Luchtkwaliteit”



107	Posterholt - Vlodroppeeweg
131	Vredepeel - Vredeweg
133	Wijnandsrade - Oplerpeltstraat
136	Heerlen - Looistraat
138	Heerlen - Jamboreepad
230	Bleis Houtakker - Bleisestraat
235	Huifbergen - Veinikestraat
226	Eindhoven - Genovevialaan
237	Eindhoven - Noordbrabantlaan
240	Breda - Tilburgseweg
241	Breda - Bastenikenstraat
246	Fijnaart - Zwingelspannedijk
247	Veldhoven - Europalaan
248	Nistelrode - Gagestraat
291	Heeze - Rui
292	Deurne - Vierdijk
301	Zierikzee - Lange Slikweg
318	Philippine - Stellevweg
320	Burgh-Haamstede - Torenweg
404	Den Haag - Rebecquesstraat
418	Rotterdam - Schiedamssevest
437	Westmaas - Groeneweg
442	Dordrecht - Bemeendweg
444	De Zijk - Vogelsarsdreef
445	Den Haag - Amsterdamse Veerkade
446	Den Haag - Bleriotlaan
448	Vlaardingen - Slouwaan
450	Den Haag - Neherkade
538	Wieringerwerf - Medemblikseweg
550	Haarlem - Schipholweg
615	Leusden - Maanweg
617	Biddinghuizen - Kuilweg
627	Bilthoven - RIVM
628	De Silt - Wilhelminalaan
633	Zegveld - Oude Meije
636	Utrecht - Kardinaal de Jongweg
639	Utrecht - Constant Erzejstraat
641	Braskeien - A2
643	Utrecht - Griffpark
644	Cabauw - Wielse Dijk
722	Elbergen - Lintveldseweg
723	Lunten - Zeggelaarspad
732	Speuld - Garderenseweg
738	Wekerom - Rierterdijk
741	Nijmegen - Graafseweg
742	Nijmegen - De Ruyfsestraat
746	Wageningen - De Veensteeg
807	Hellendoorn - Lüttenbergenweg
810	Barbeek - De Veenen
821	Enschede - Winkelhoest
822	Haaksbergerveen - Stratersdijk
918	Balk - Trophornsterweg
929	Vatharmond - Noorderdijp
934	Kollumerwaard - Hooge Zuidwal
937	Groningen - Europaweg
938	Groningen - Nijsteinheerd

Landelijk Meetnet Luchtkwaliteit OVERZICHT MEETSTATIONS 2024

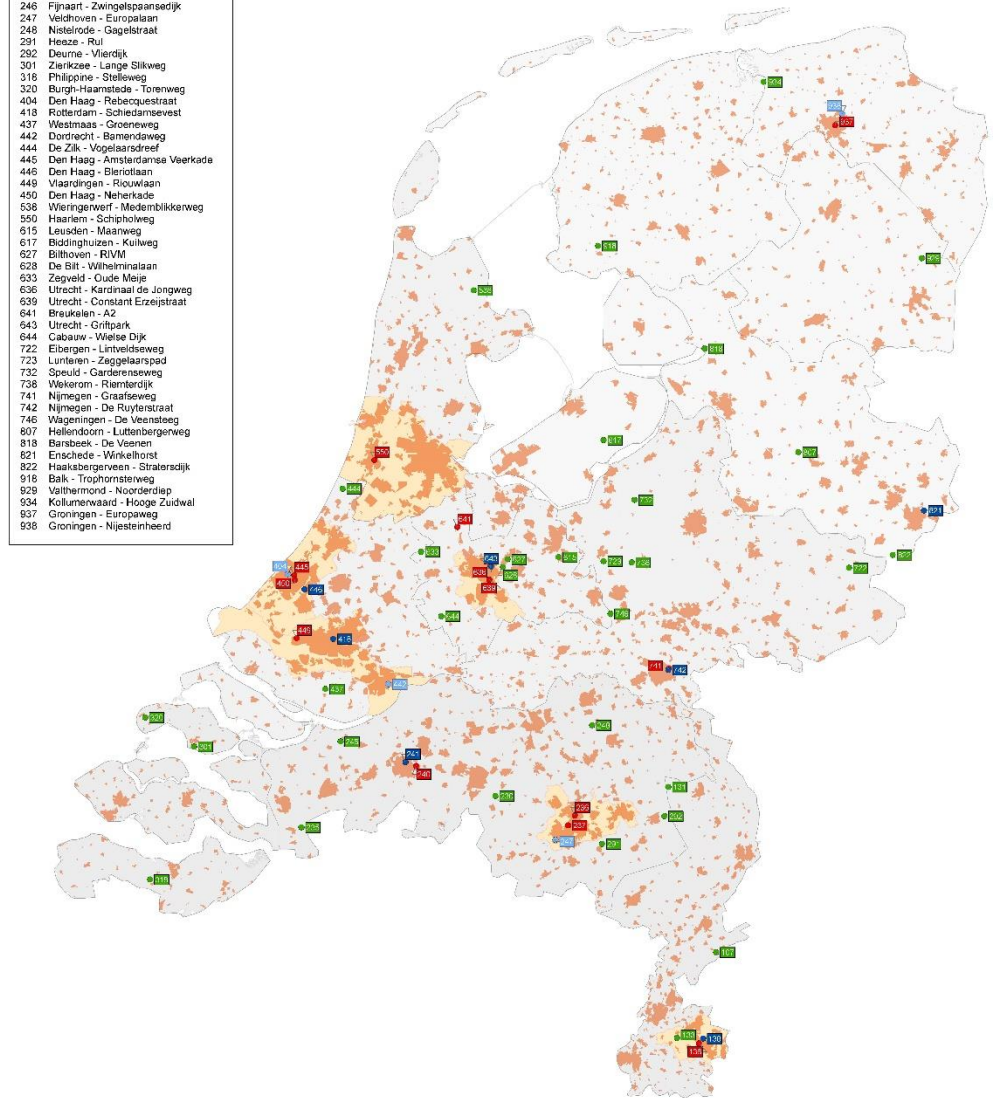
LML overview

Over 50 measurement stations, distributed over

- > Regional/rural background locations
- > Suburban locations
- > Urban background locations
- > Traffic-related locations

Set of measured chemical components varies by location.

Focus on health-relevant components.



actualisatie oktober 2023

Verklaring Symbolen

Stationstype

- Regionale achtergrondstations
- Voorstedelijke stations
- Stedelijke achtergrondstations
- Verkeersbelaste stations
- Bevolkingskernen

Gebiedsindeling

- Stedelijke agglomeratie
- Zone Noord-Nederland
- Zone Midden-Nederland
- Zone Zuid-Nederland

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

Kaartopmaak: Dera & Moolbroek

LML measurement cabins





My location

Measurements

Forecast

News

Reports

Information

Cont

Available data

Last hour on

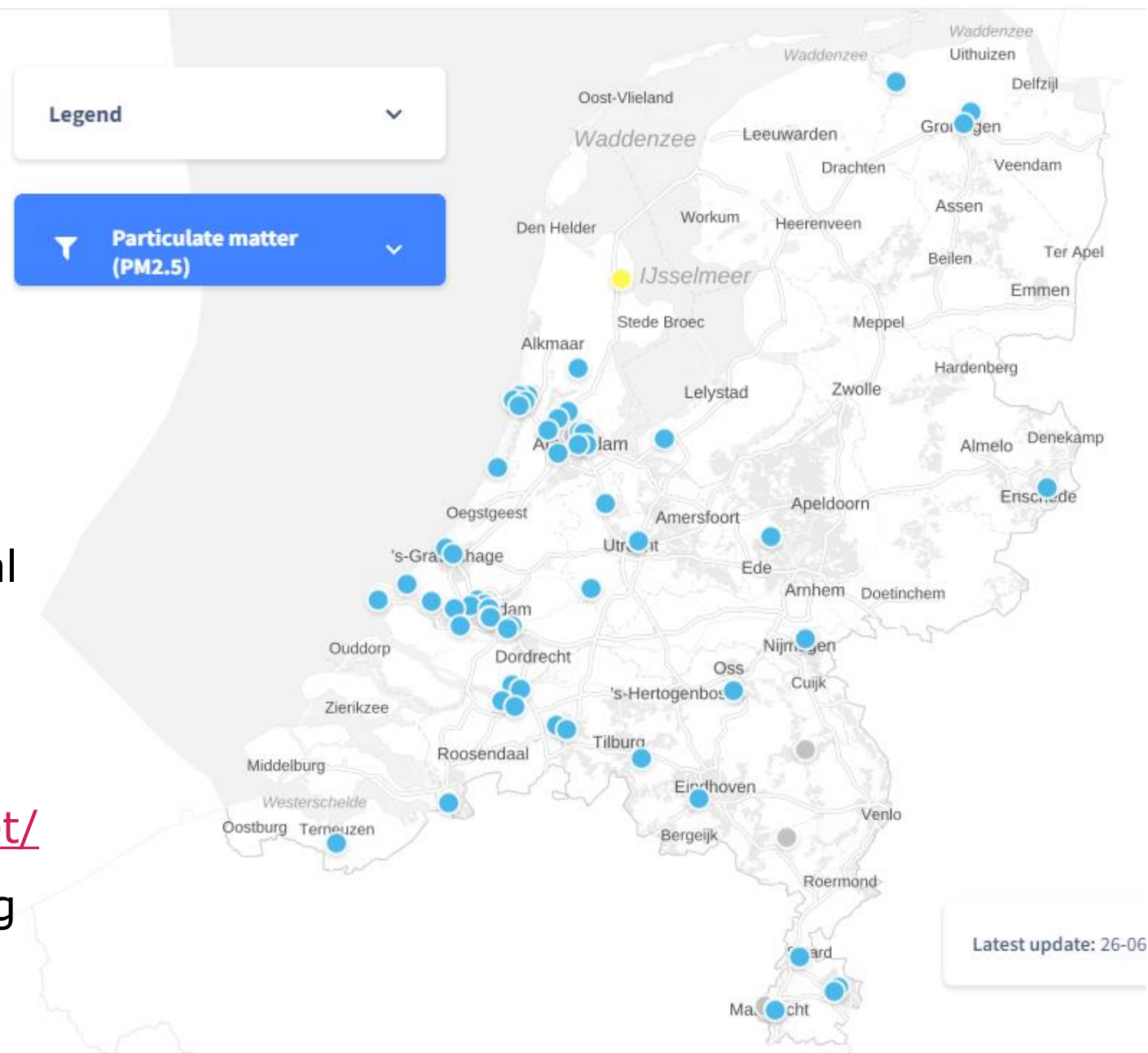
<https://www.luchtmeetnet.nl/>

- > With \approx 50 additional locations managed by regional partner orgs.
- > NO_x, O₃, PM, smoke, ...
- > Indicative UFP on handful of regional partner locations

Validated data on

<https://data.rivm.nl/data/luchtmeetnet/>

Used for air quality assessments, smog alerts, modelling, pollution maps etc.





Ongoing indicative UFP measurements in Utrecht province

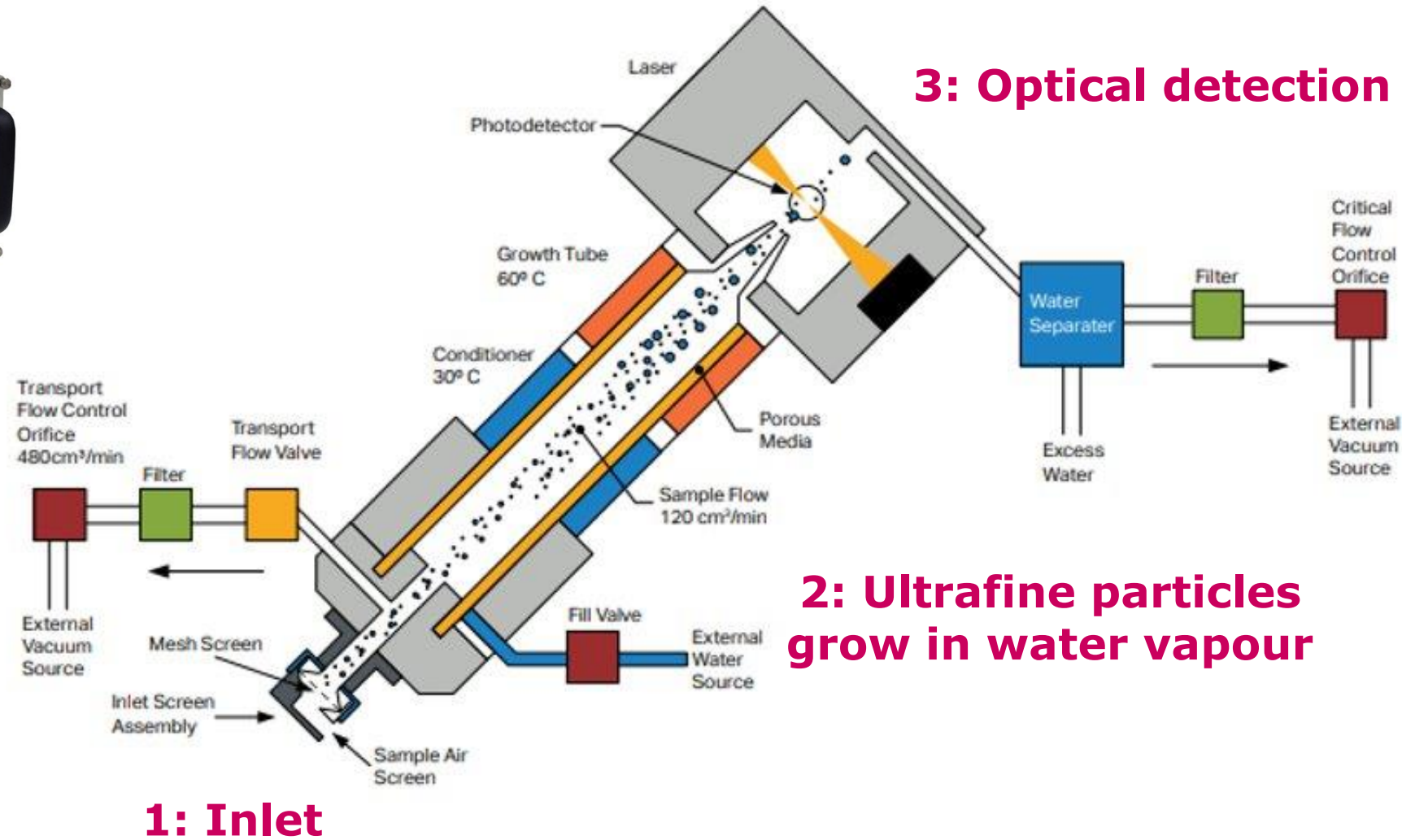


Equipment (current)



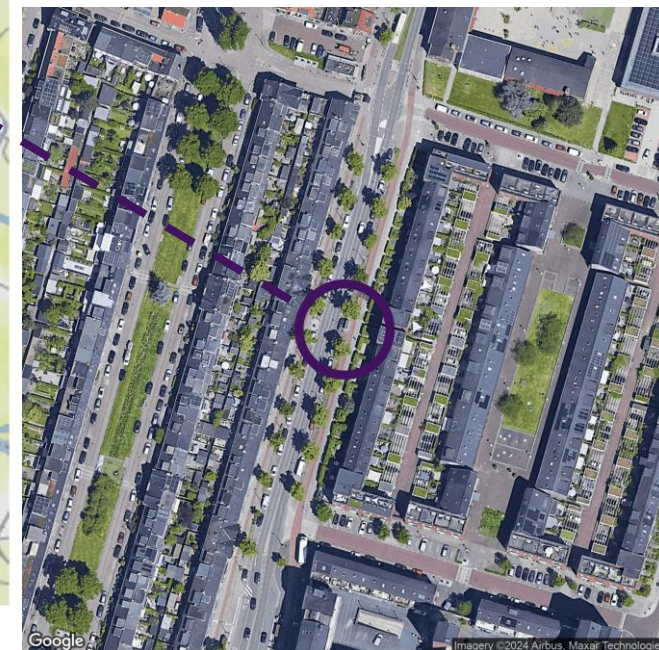
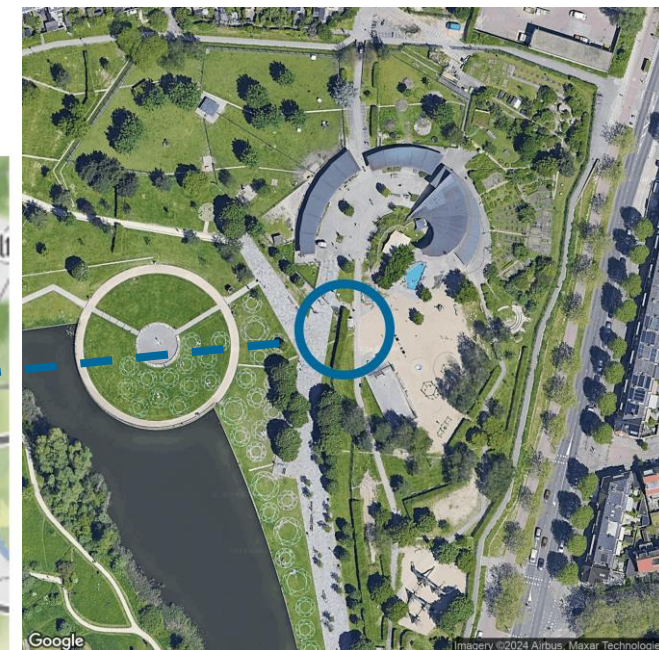
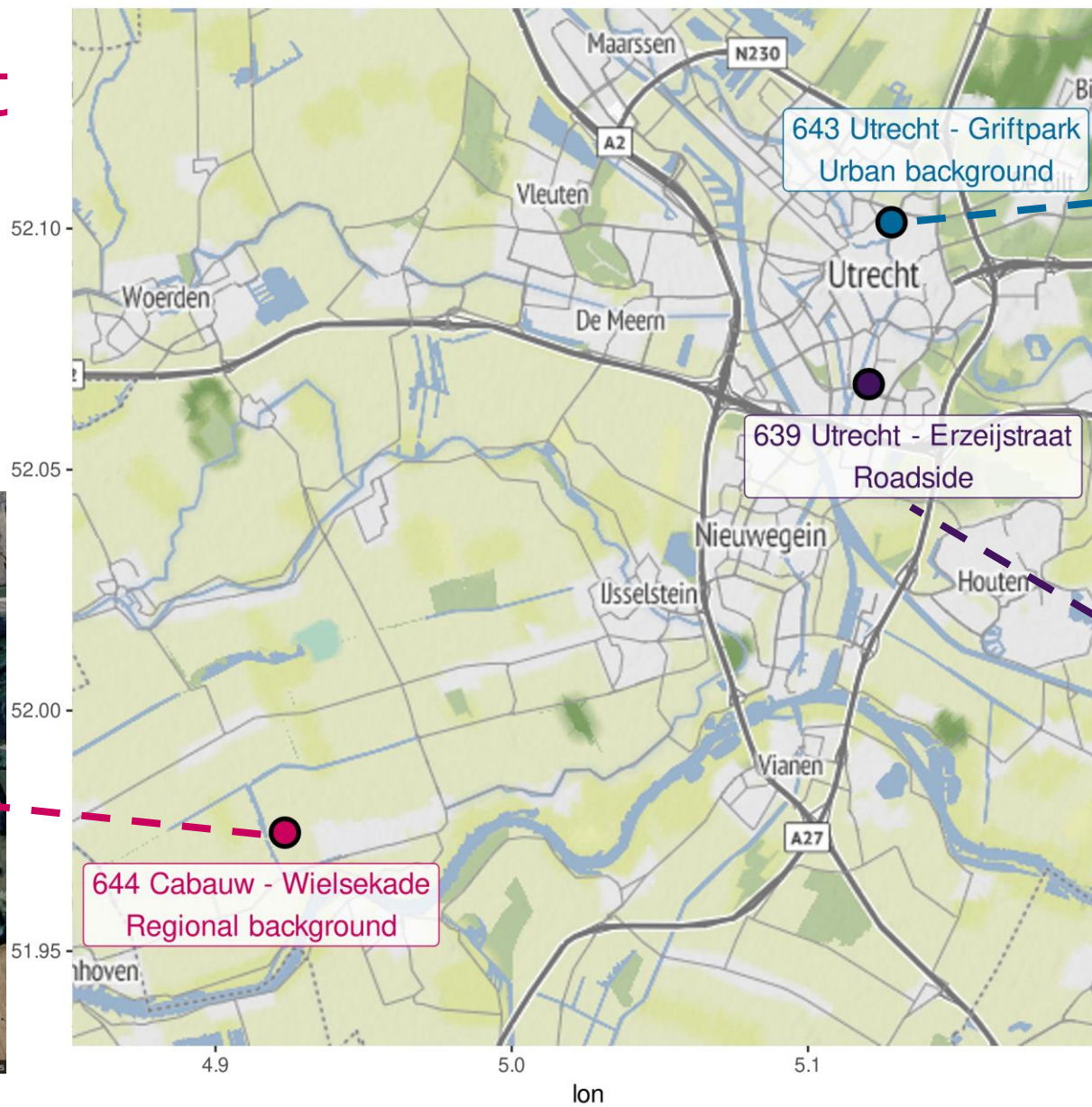
TSI EPC 3783

- > Older generation device
- > Water-based
- > $D_{50} = 7 \text{ nm}$
- > Not compliant with FprEN16976:2024
- > RIVM has 3





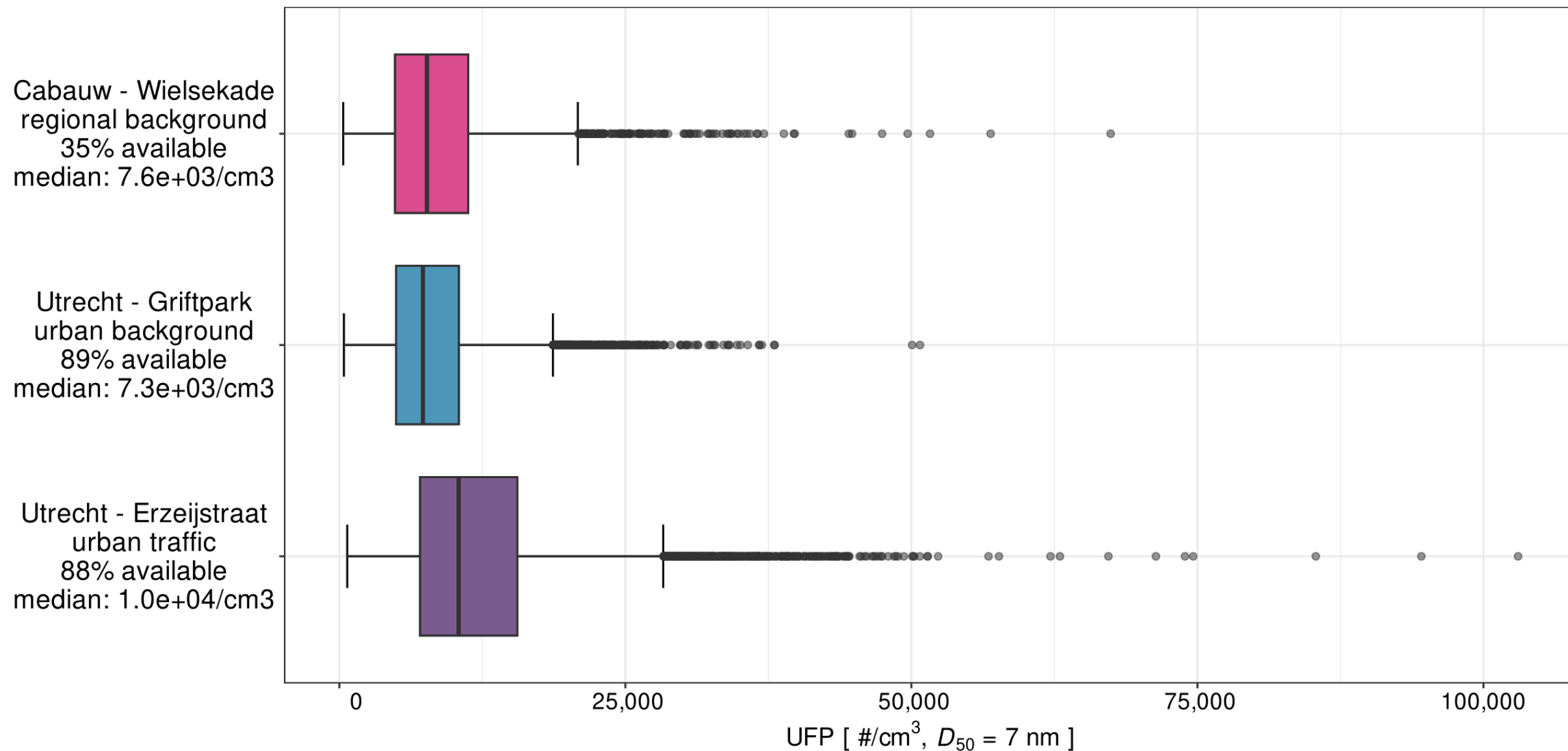
Measurement locations (current)





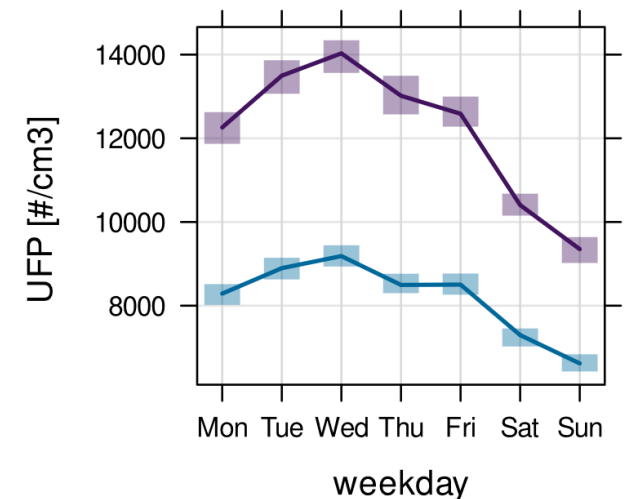
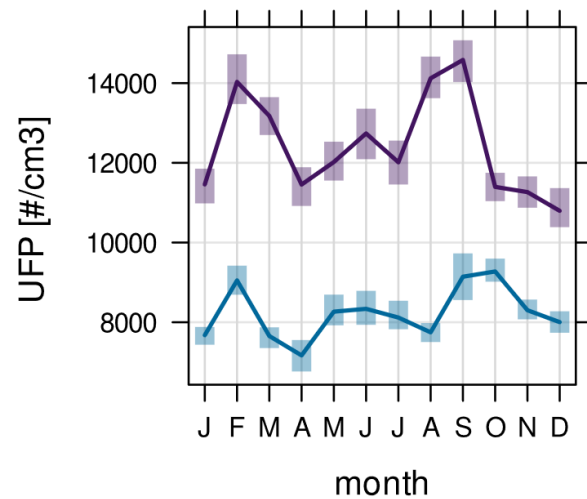
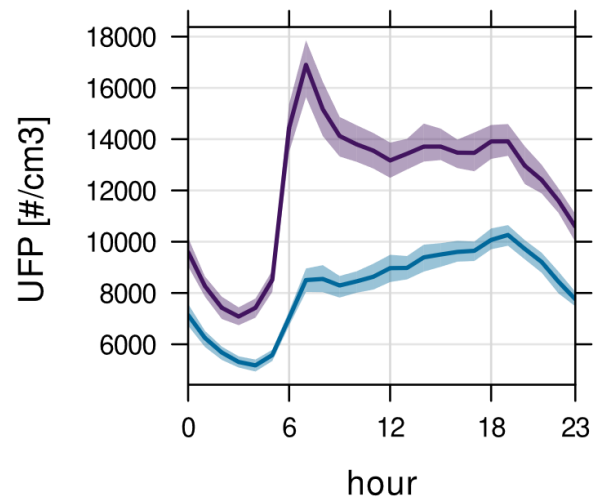
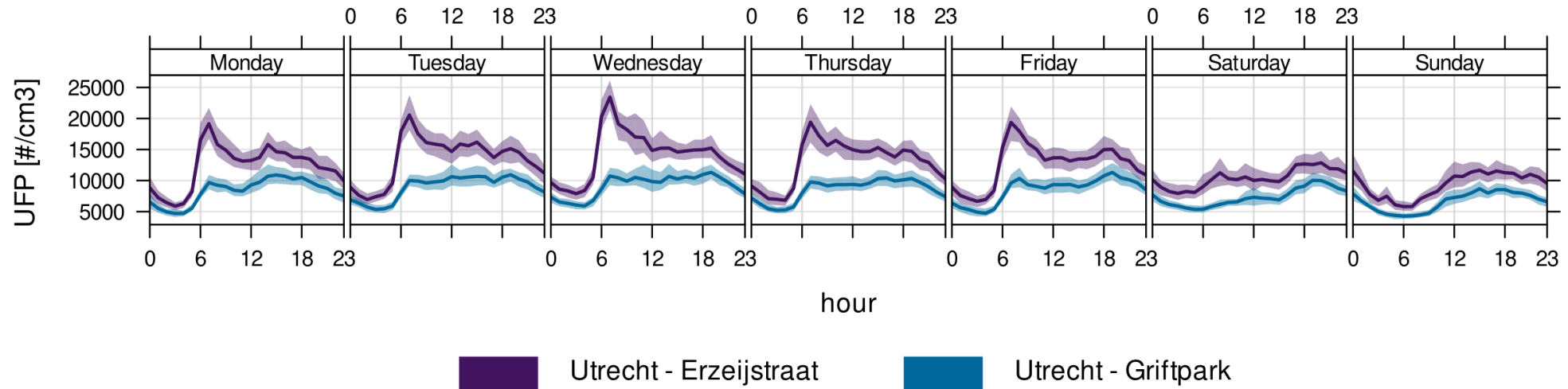
Preliminary results

Hourly averages, 19 Oct 2022 – 9 Feb 2024, boxes = quartiles





Preliminary results



mean and 95% confidence interval in mean



Expansion of UFP measurements in the LML

Timeline



Jan 2020:
Minister for the Environment and Housing request advice on UFP from National Health Council

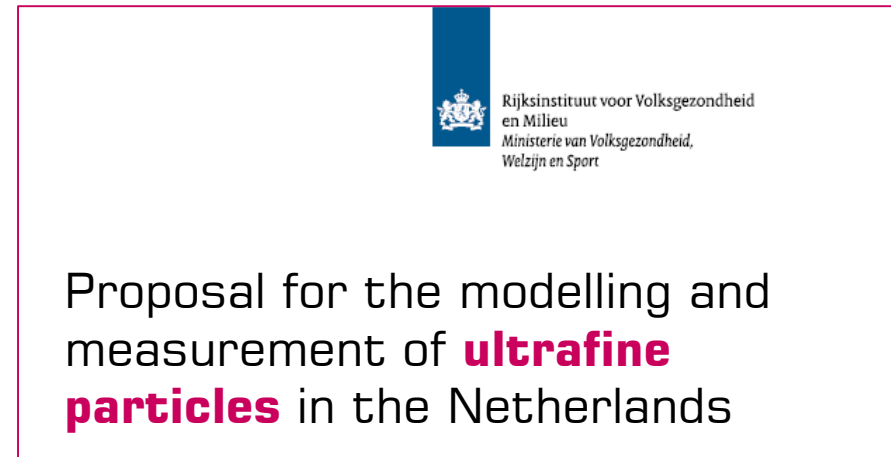
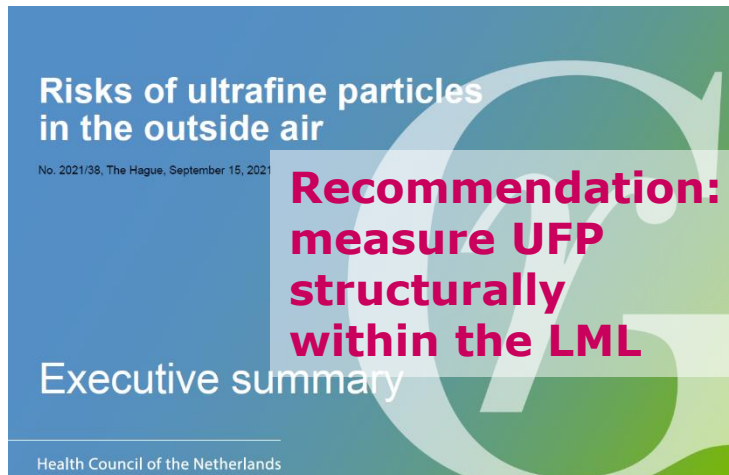
End of 2021:
Minister Of Infrastructure and Water Management asks RIVM for measurement and modelling strategy

Dec 2022:
RIVM publishes report with proposed monitoring strategy

Sep 2021:
Advisory report by National Health Council

Summer 2022:
RIVM starts investigation

2023-2024:
tendering process to purchase new UFP measurement equipment



Inventory & proposal



- > Which data are already available?
- > Availability, performance and robustness of instruments?
- > What kind of data do health experts need?
- > What is done abroad?



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

Proposal for the modelling and measurement of **ultrafine particles** in the Netherlands

Ernie Weijers, Joost Wesseling, Timothy van der Duim, Guus Stefess,
Guus Velders, Dirk Wever

→ Proposed monitoring strategy

Monitoring strategy



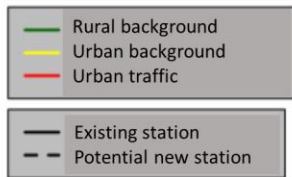
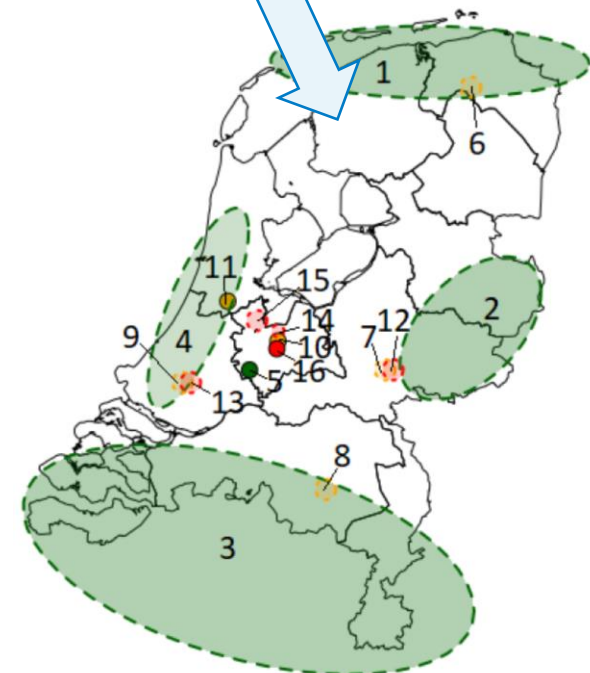
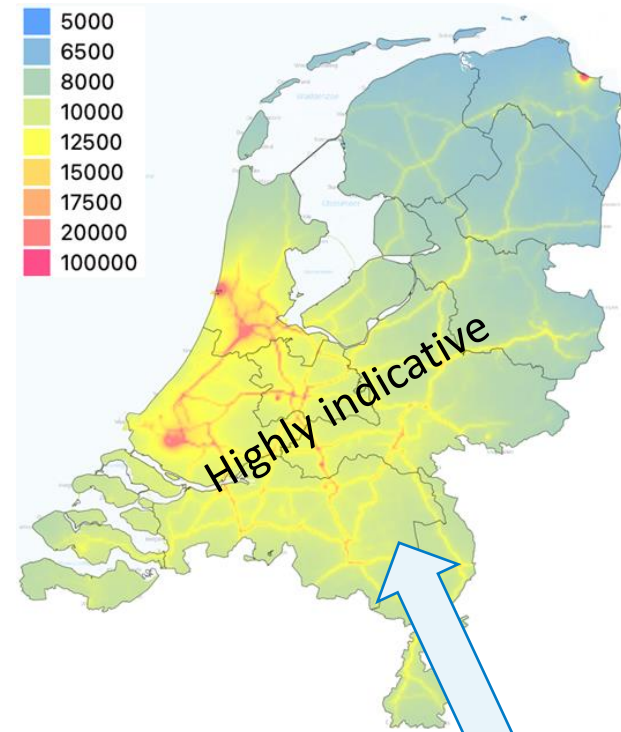
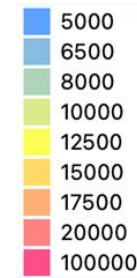
Explorative, to refine as we go

Stationary locations

- › Calibration of concentration map
- › Geographical coverage
- › Rural background
- › Urban background
- › Local contribution from “coupled” street stations
- › Multi-year trends

Mobile measurements

- › Source characterization





Setting up measurements: considerations

- > Concept Air Quality Directive with UFP measuring obligation
- > Concept CEN/TS 16976:2024 (CPCs):
 - "The working fluid shall be **butanol**"
 - "Detection efficiency at low particle size: **$D_{50} = 10 \text{ nm}$** " (previously 7 nm)
- > Uniform sampling (inlet system)
- > Suitability for long-term monitoring
- > Calibration and maintenance

Official Journal of the European Union L 152

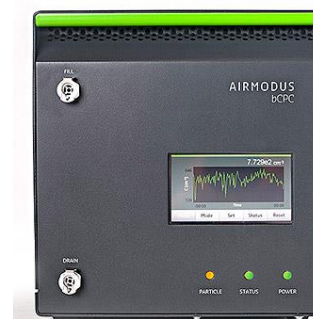
EUROPEAN STANDARD **FINAL DRAFT**
NORME EUROPÉENNE **FprEN 16976**
EUROPÄISCHE NORM

February 2024

ICS 13.040.20 Will supersede CEN/TS 16976:2016

English Version

Ambient air - Determination of the particle number concentration of atmospheric aerosol





Questions?

