



# Portable Ambient Air Quality Monitoring

# Vaisala AQT400 - from Sensors to Solutions

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AQT400 SERIES AIR QUALITY MONITOR



# Vaisala new air quality transmitters for supplementary air quality networks

AQT410



Measures NO<sub>2</sub>, SO<sub>2</sub>, CO and O<sub>3</sub>

AQT420



Measures NO<sub>2</sub>, SO<sub>2</sub>, CO and O<sub>3</sub> and also PM2.5 and PM10 Particulate Matter



# Pollutant gas measurement

- One AQT400 device has 4 electrochemical sensors for pollution gases:
  - NO<sub>2</sub>, SO<sub>2</sub>, CO and O<sub>3</sub>
  - H<sub>2</sub>S to be configurable for larger quantities of sensors
- Electrochemical sensors are sensitive to ambient conditions around the sensor: temperature, humidity and aging
  - **The effects of ambient conditions are compensated by advanced algorithms**
    - This is where Vaisala's strong knowledge and scientific background makes the difference
  - **Also multi-step factory calibration is the key for the accuracy**



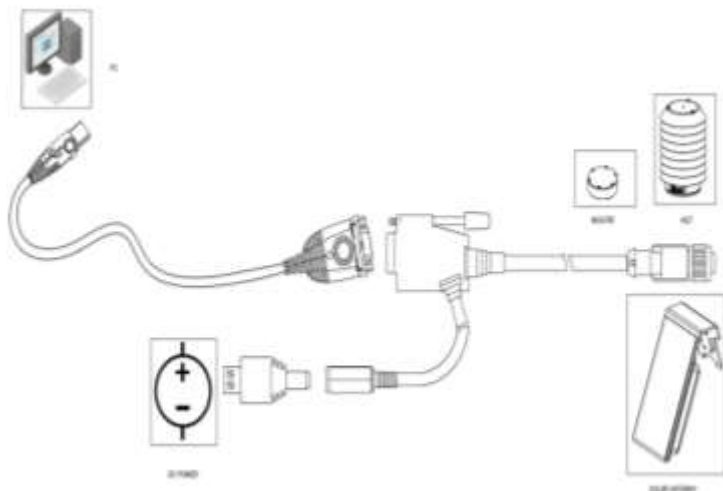
# Pollutant gas measurement with advanced algorithms

- Compensation of effects of ambient conditions allows the use a compact and light-weight sensor structure, without heavy covering box
- The sensor can be placed in open air and it can be easily mounted to various locations:
  - on streets on pillars and walls of buildings
  - industrial sites
  - indoors
  - on moving vehicles



# Basic accessories for AQT400

- Cable with M12 connector
  - 3.5 meters
  - 5 meters
  - 10 meters
- Mounting kit for mast installation
- Configuration / Maintenance cable for PC/laptop connection



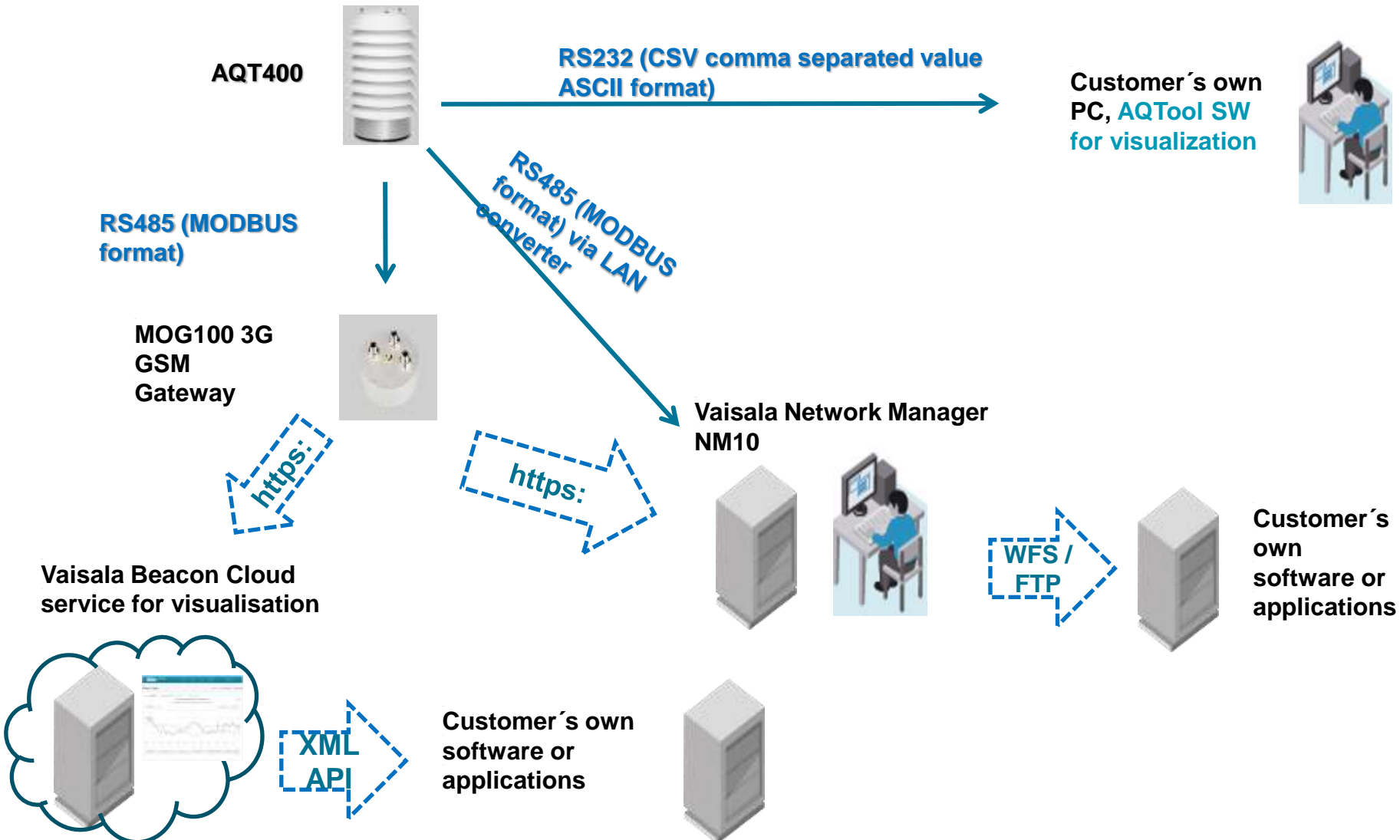
# Multi-Observation Gateway MOG100

- Multifunctional and robust gateway solution
- Includes
  - GSM module (3G quad band GSM) for wireless communication
  - Memory for data logging and local buffering (10 000 time stamps)
  - Regulator for solar panel input and backup battery
  - Powers also AQT400 sensor, requires 8-30 VDC
- Interfaces
  - 2 x RS485, dedicated ports for AQT and WXT
  - Power / solar panel
  - 4 x 0-10 VDC (16-bit ADC) sensor





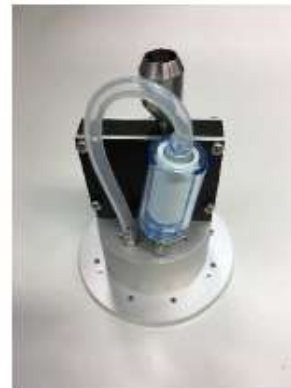
# Communication options for AQT400



# Particulate Matter Measurement

## Laser Particle Counter

- Size distribution with optical granulometric measurement
- Measures 1 minute sample between 5-10 minutes



# Weather parameters through WXT530 Multi-Weather sensor

- Possibility to connect Vaisala WXT530 Multi-Weather sensor straight to the AQT400 series
- WXT530 Multi-Weather sensor provides up to 6 different weather parameters: temperature, humidity, pressure, wind speed, wind direction and rain
- Weather data can be visualised through AQ-VIEW with the Air Quality data



# Test results for AQT400

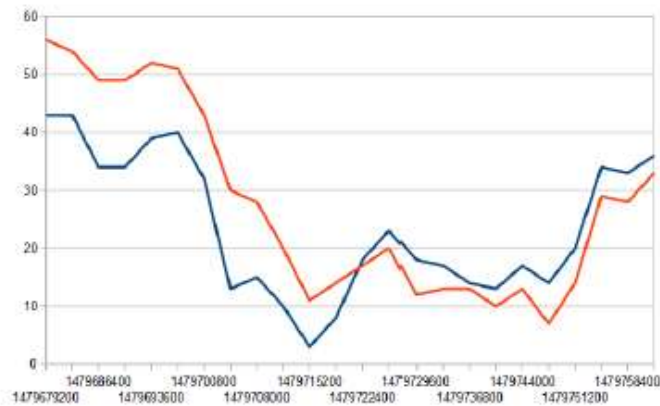
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# AQT410 O3 vs. Thermo 49i

Helsinki City, Mäkelänkatu

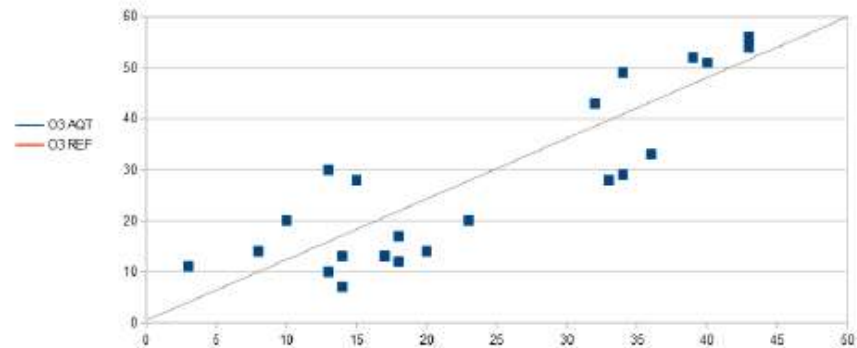
Mäkelänkatu Survey #2 O3

2016-11-21



Mäkelänkatu Survey #2 O3

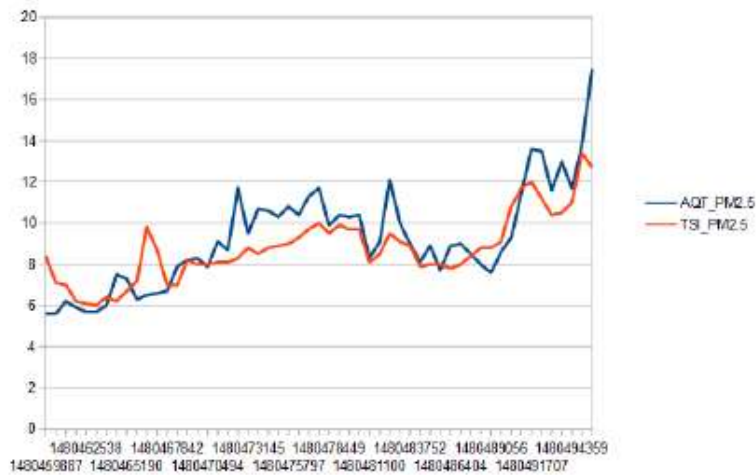
2016-11-21  $R = 0.87$



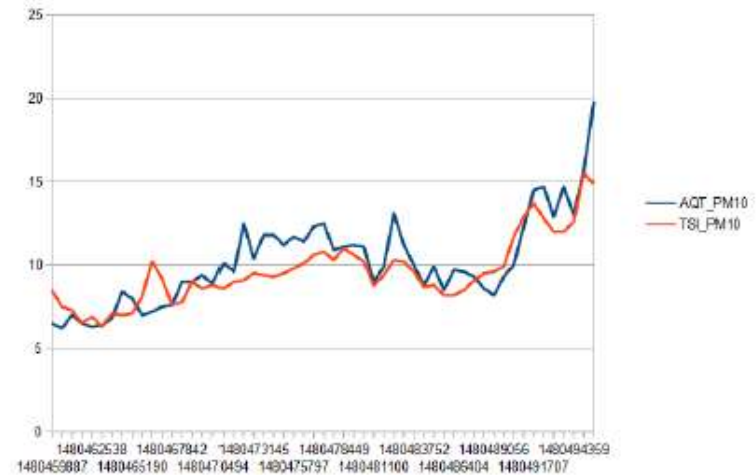
# AQT420 LPC vs. TSI DustTrak PM2.5/PM10

Vaisala R&D, Bulevardi, Helsinki

AQT/TSI PM2.5 Bulevardi, Hki 29.11.2016



AQT/TSI PM10 Bulevardi, Hki 29.11.2016



## Helsinki, Sept – Oct 2019

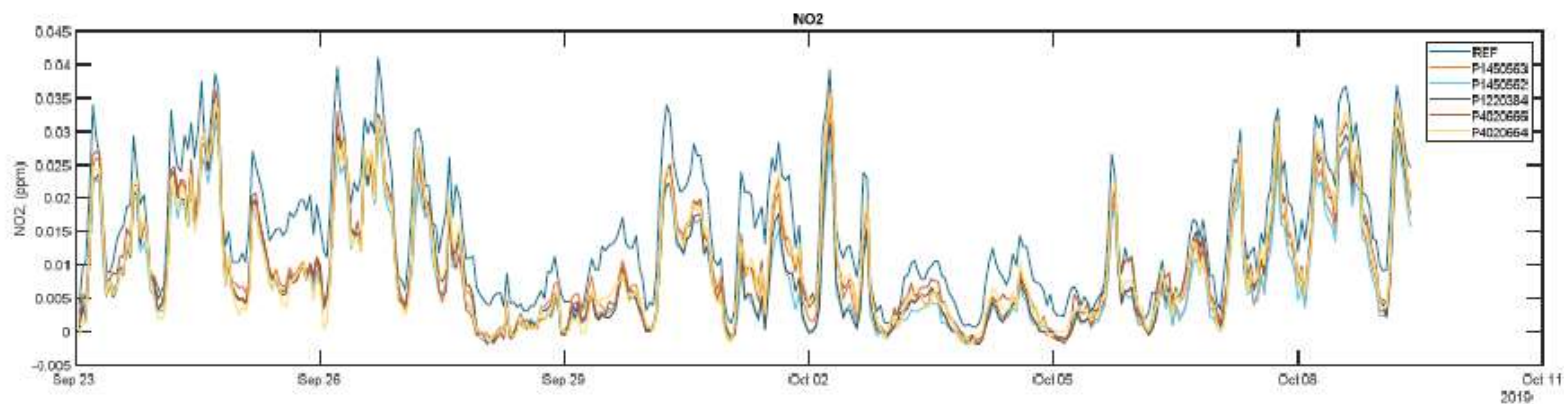
Urban traffic site

In collaboration with Helsinki Region Environmental Services Authority

### Reference analyzers:

|                   |                          |
|-------------------|--------------------------|
| NO <sub>x</sub>   | Horiba APNA-370          |
| CO                | Horiba APMA-360          |
| O <sub>3</sub>    | Thermo 49i UV photometer |
| PM <sub>2.5</sub> | TEOM 1405                |
| PM <sub>10</sub>  | TEOM 1405                |

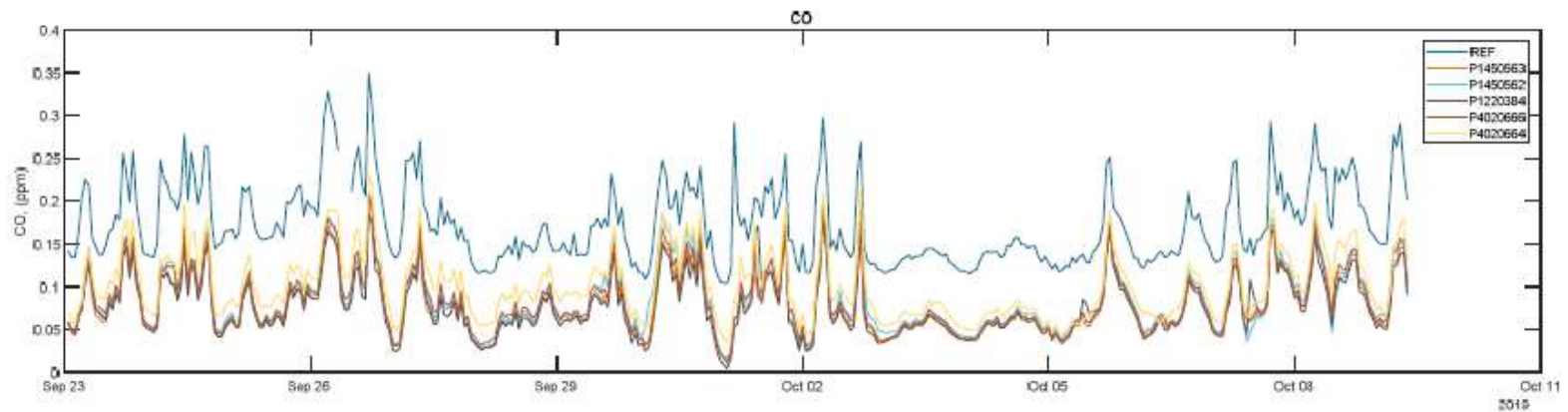
# NO<sub>2</sub> Helsinki Sept – Oct 2019



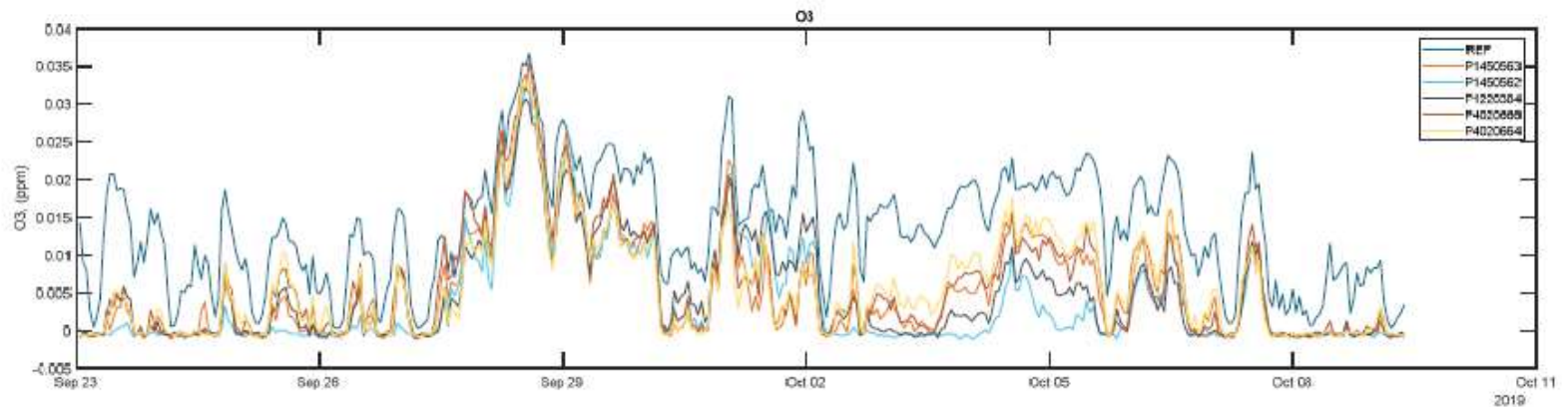


# CO Helsinki Sept – Oct 2019

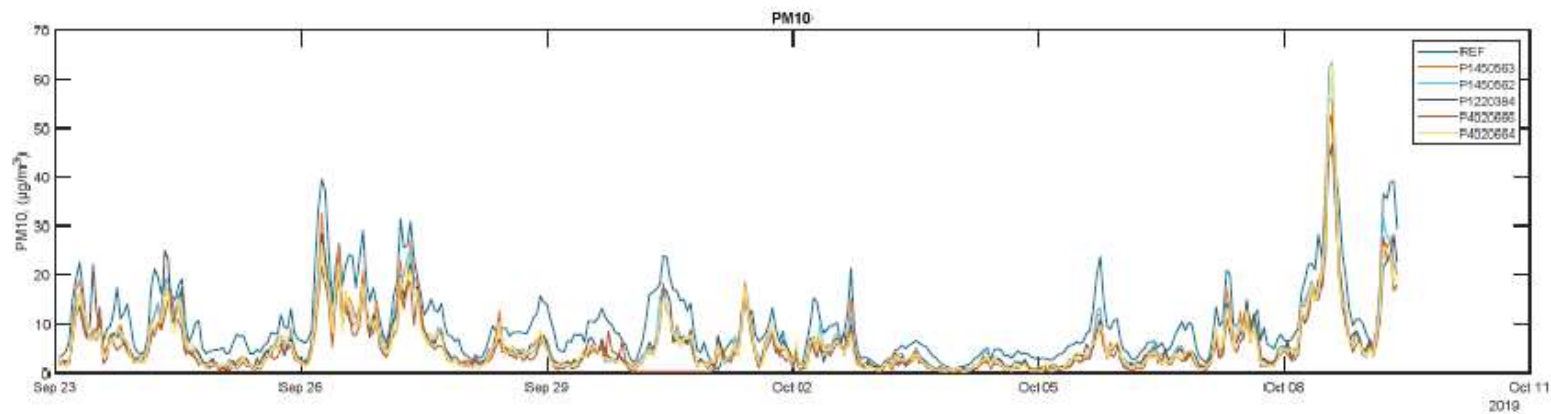
five different instruments



# O<sub>3</sub> Helsinki Sept – Oct 2019



# PM10 Helsinki Sept – Oct 2019



# Discussion Points

- Cost of ownership
- Installation, Power, Security
- Access
- Data Handling
- Calibrations, Frequency
- Consumables
- Capacity ( Operational )

# Transportable Advantages

- Lower cost of ownership
- Reduced Footprint
- Ease of Installation ( Quick Start-up )
- Versatility of sensor selection – Expandability