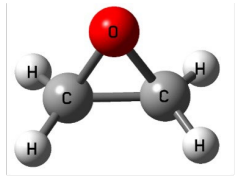
Community Air Monitoring Showcase Block 3

11:00 AM – 12:00 PM



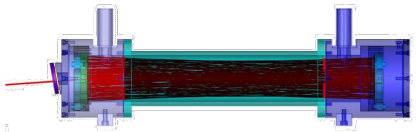
Ethylene Oxide Spectrometer

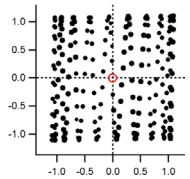
Aerodyne Research

NAAMC, 2024

Tunable Infra-Red Direct Absorption Spectrometer (TILDAS)

413 m path length in supercell

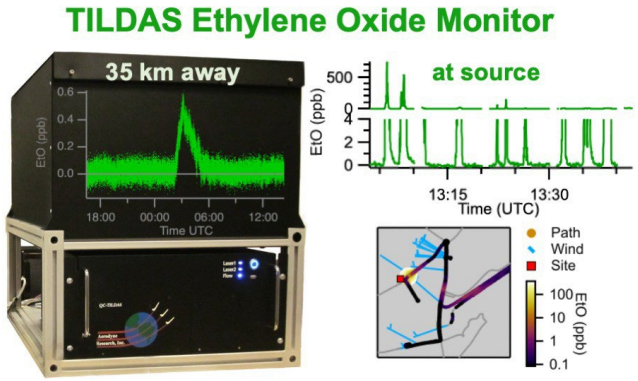




Spot pattern

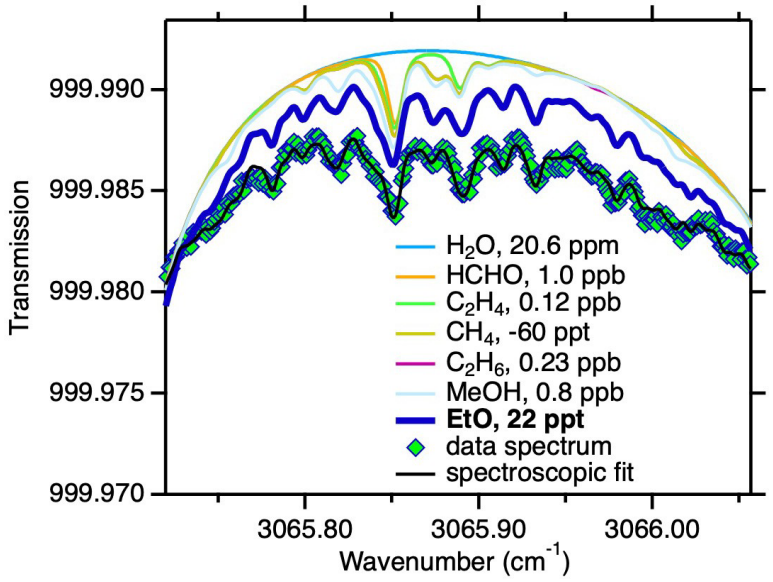
View through periscope into cell

1 second precision : < 75 pptv
time response : 1.1 seconds



Aerodyne Research

Aerodyne TILDAS is spectroscopically accountable : EtO



Any molecule that absorbs in this wavelength region is 'fit' which minimized the impact as an 'interference'

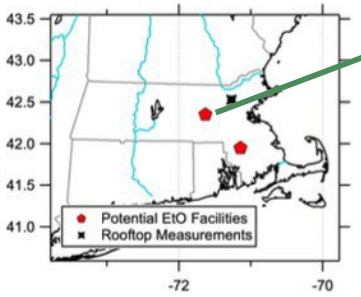
All spectra collected by the Aerodyne spectrometer are archived so plume encounters can be reviewed to verify the attribution of Ethylene Oxide

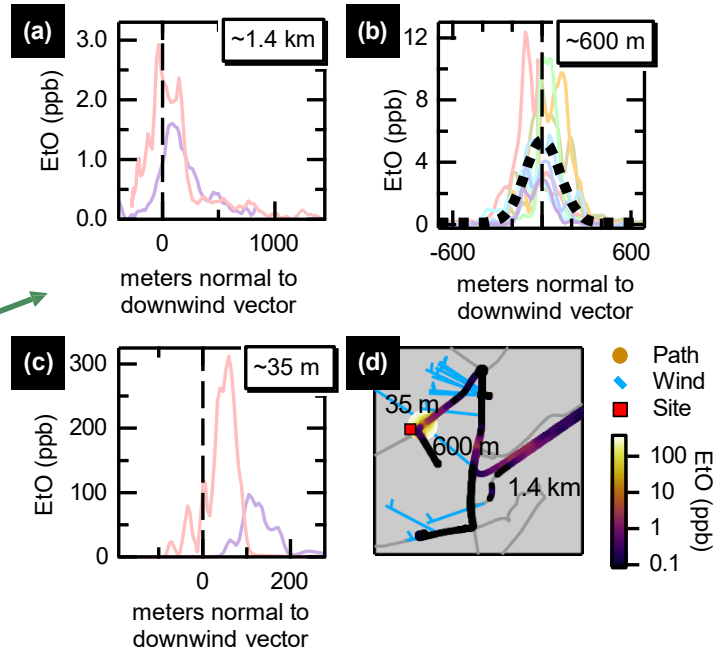
Figure 1. Spectrum of EtO and other gaseous absorbers in the spectral window that are included in the spectroscopic fit. A measured spectrum (green diamonds, 24 hr average ambient spectrum, humidity-matched zeroes) is shown overlaid with the final fit (black trace). Individual fit components include water (H_2O), formaldehyde (HCHO), ethylene (C_2H_4), methane (CH_4), ethane (C_2H_6) and methanol (MeOH).

Yacovitch, AMT, 2023 https://amt.copernicus.org/articles/16/1915/2023/

Fenceline Measurements At Source

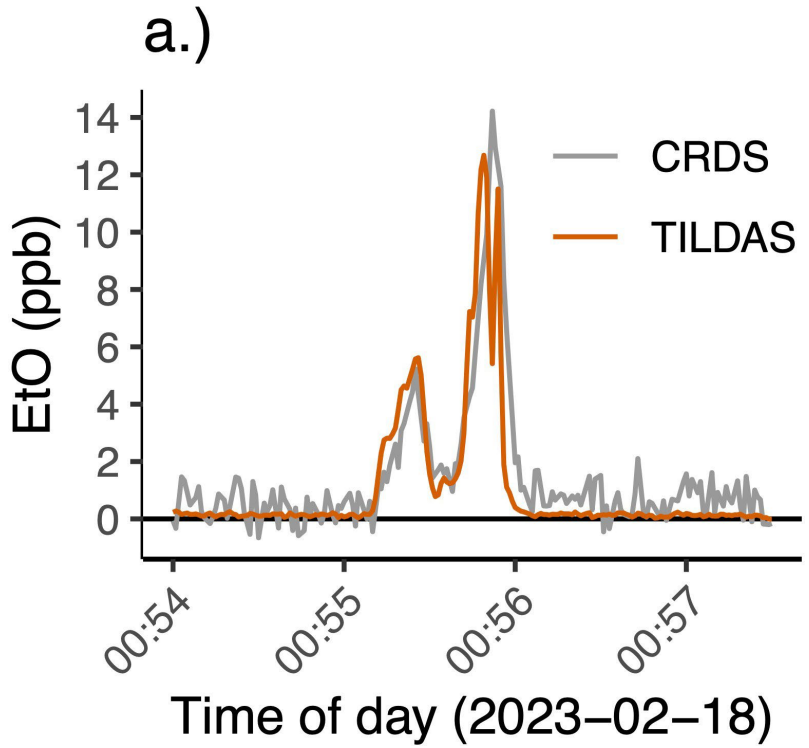
- 2 EtO Commercial Sterilization facilities in MA (per EPA)
- Both were emitting.





From: Yacovitch, T. I.; Dyroff, C.; Roscioli, J. R.; Daube, C.; McManus, J. B.; Herndon, S. C., Ethylene oxide monitor with part-per-trillion precision for in situ measurements. *Atmos. Meas. Tech.* **2023,** *16*, (7), 1915-1921. DOI: 10.5194/amt-16-1915-2023.

In-use intercomparison with CRDS



JHU analysis indicates Aerodyne EtO sensitivity is 9x that of the CRDS system deployed to the study

Robinson, et al., 2024

Aerodyne EtO Spectrometer

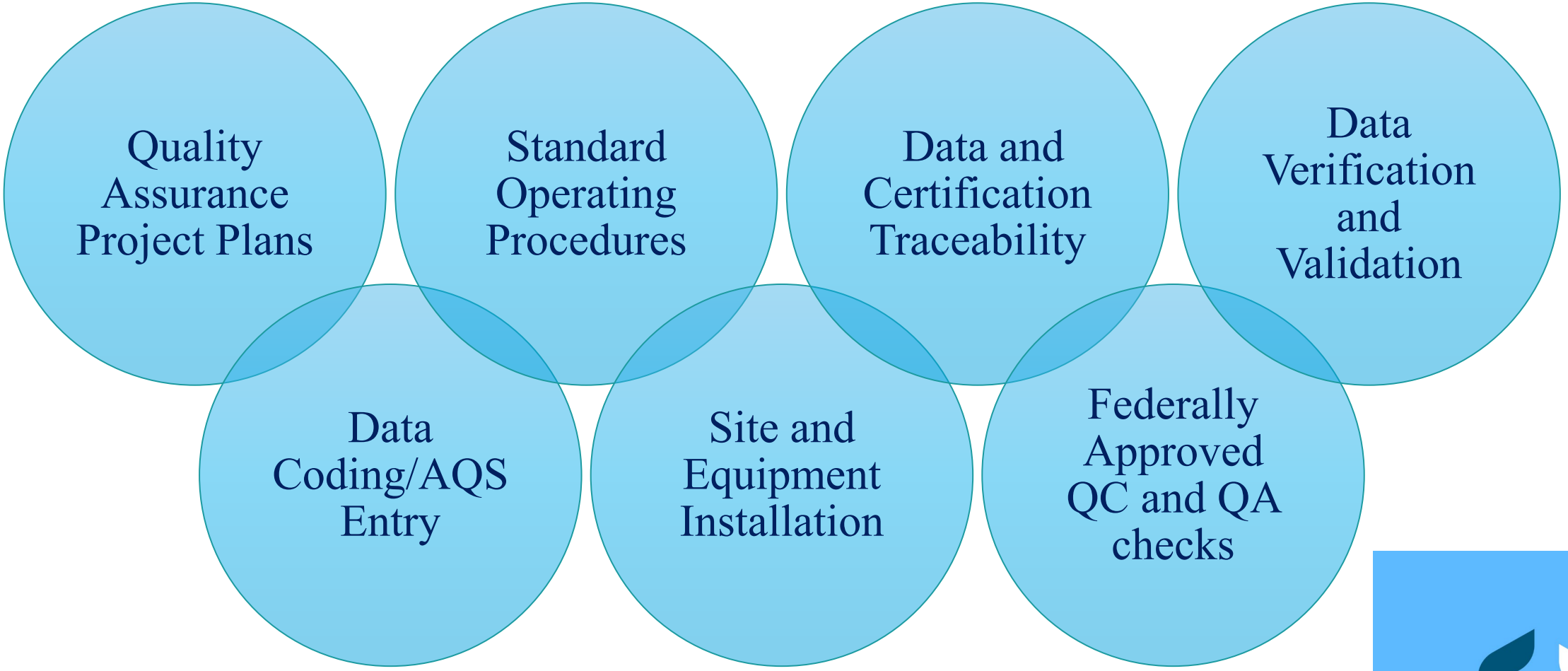
- ✓field-ready zero-EtO generation -- avoids consumables
- ✓experimental quantification and spectroscopic mitigation of gas matrix effects – interference free
- ✓spectroscopy quantified using certified EtO standards
- ✓deployed to Philadelphia, PA :: Toronto, Ontario Canada :: Los Angeles, CA
  :: Greater Boston, MA :: Donaldsonville, LA
- ✓quantified EtO emissions from gas vendors, sterilization facilities, petrochemical plants, long-range transport in urban areas

Ambient Air Consulting LLC

“Ideas are easy. Implementation is hard.” – Guy Kawasaki

Ambient Air Consulting LLC offers:

- **Technical Assistance and Support**
- **Quality Assurance**
- **Data Management**



Ambient Air Consulting LLC

***Projects can be long-term or as-needed.**

Background

- Career dedicated solely to the ambient air monitoring of NAAQS.
- Over 40 years experience successfully managing EPA regulated agencies.
- Experience with the installation, operation, and technical troubleshooting of various manufacturer's instrumentation.
- Successfully developed Quality Assurance program and staff training plans.

- Dependable
- Responsive
- Dedicated
- Preventative
- Quality

Ambient Air Consulting LLC

Why choose Ambient Air Consulting LLC for your air monitoring needs?

Thank you

Mark Watson **Amber Watson**

205-482-2721 **601-807-4333**

ambientairconsultingllc@gmail.com

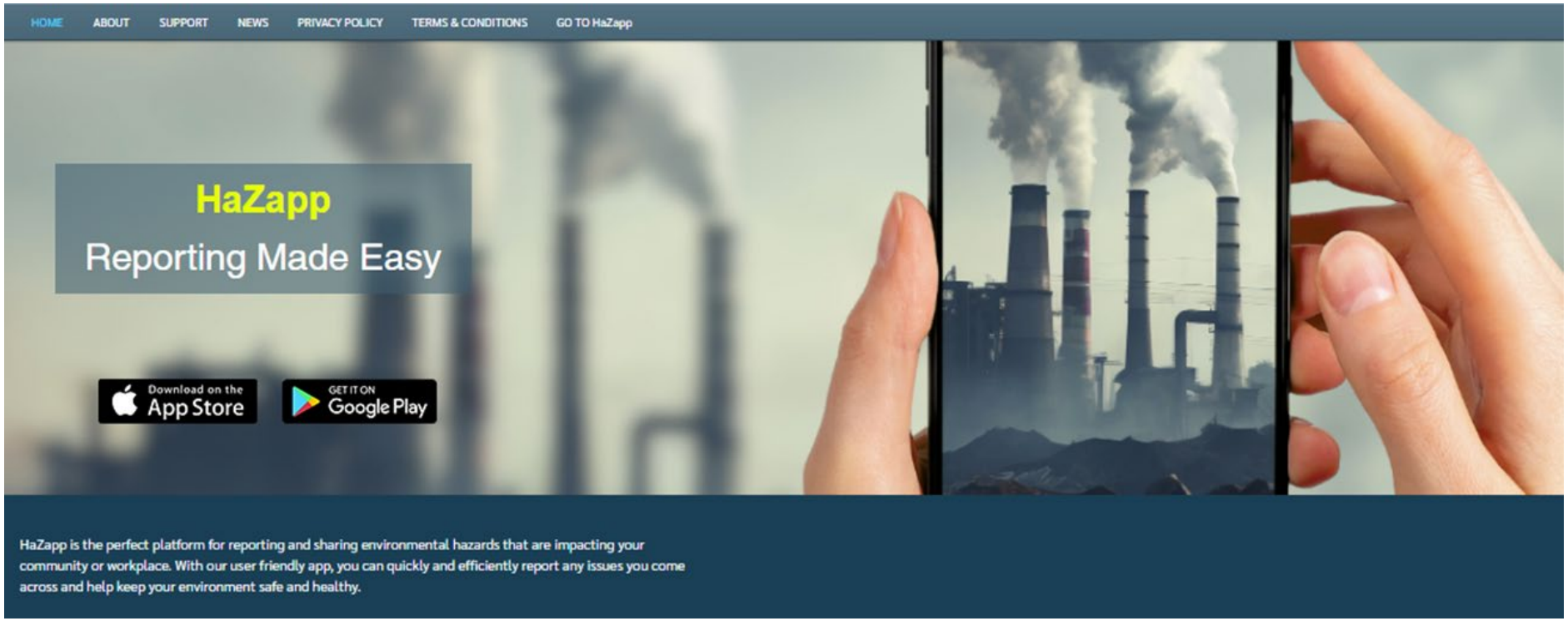
https://www.ambientairconsultingllc.com

Booth: 508

Ambient Air Consulting LLC

About HaZapp https://www.hazapp.io

2024 National Ambient Air Monitoring Conference New Orleans

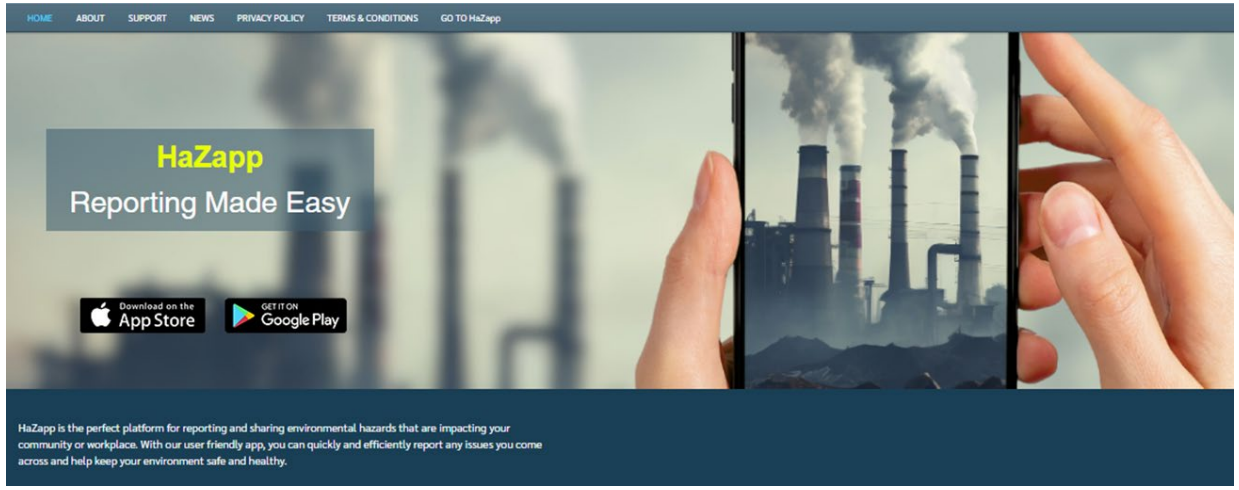


Gilad Shpitzer Atmosfir CEO gilad@atmosfir.net

Stevan LaZar Atmosfir Marketing & Sales steve@atmosfir.net

About HaZapp https://www.hazapp.io

HaZapp is the perfect platform for reporting and sharing environmental hazards that are impacting your community or workplace. With our user-friendly app and management toll, you can quickly and efficiently report any issues you come across and help keep your environment safe and healthy.

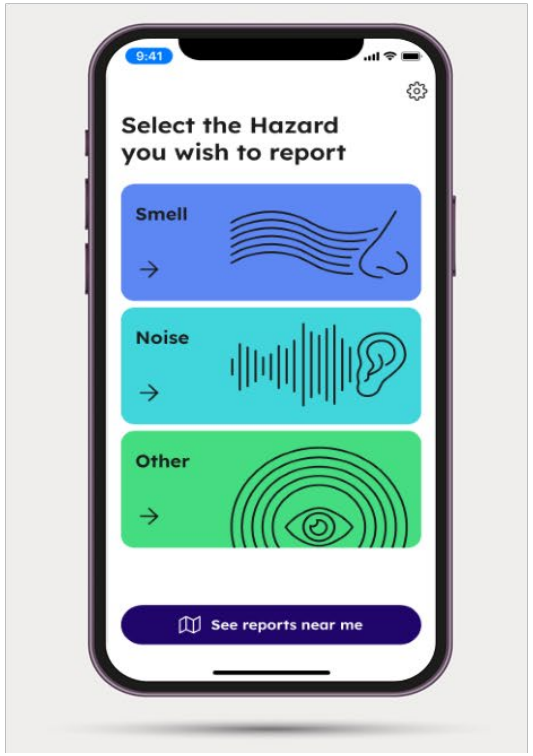


HaZapp Advantages

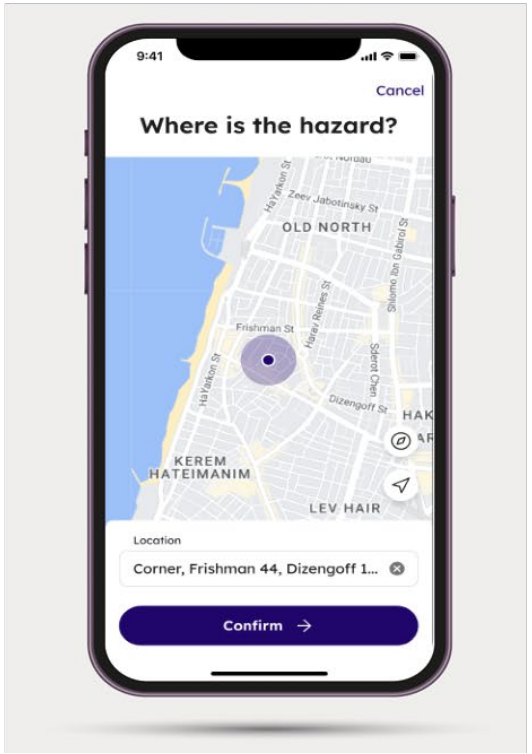
- √ One App for all Hazards (smell, noise, light, smoke…)
- √ One App for all the world (English, Spanish, Arabic,….)
- √ App complaint form follows state regulation
- √ Easy to use intuitive UI reporting
- √ Advanced auto algorithm to process the complaint
- √ High level of expertise and science
- √ Public relations and trust
- √ Working as : Webpage

Easy and Intuitive Interface

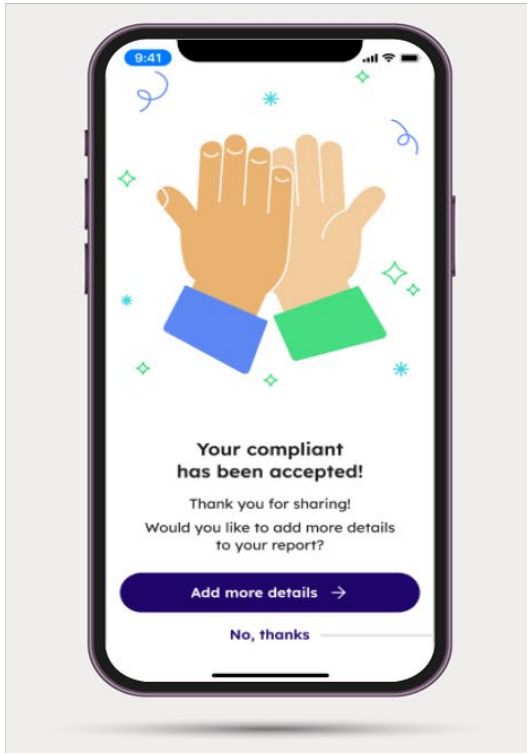
1. Choose between types of hazards with a single click – **smell, noise** and **other** (black smoke, waste etc.)



2. Enter a location or choose current location.



3. That's it! a simple complaint is submitted. You can choose to **add more details** or not



HaZapp Management Tool Advantages

√ Means of communication between the complainant and the municipal authority.

√ Database management and reporting interface

√ Investigation tools: back trajectory, logical questioning and filtering

√ Managing, documenting and Saving the hazard complaint for all its stages from receiving the complaint to closing .

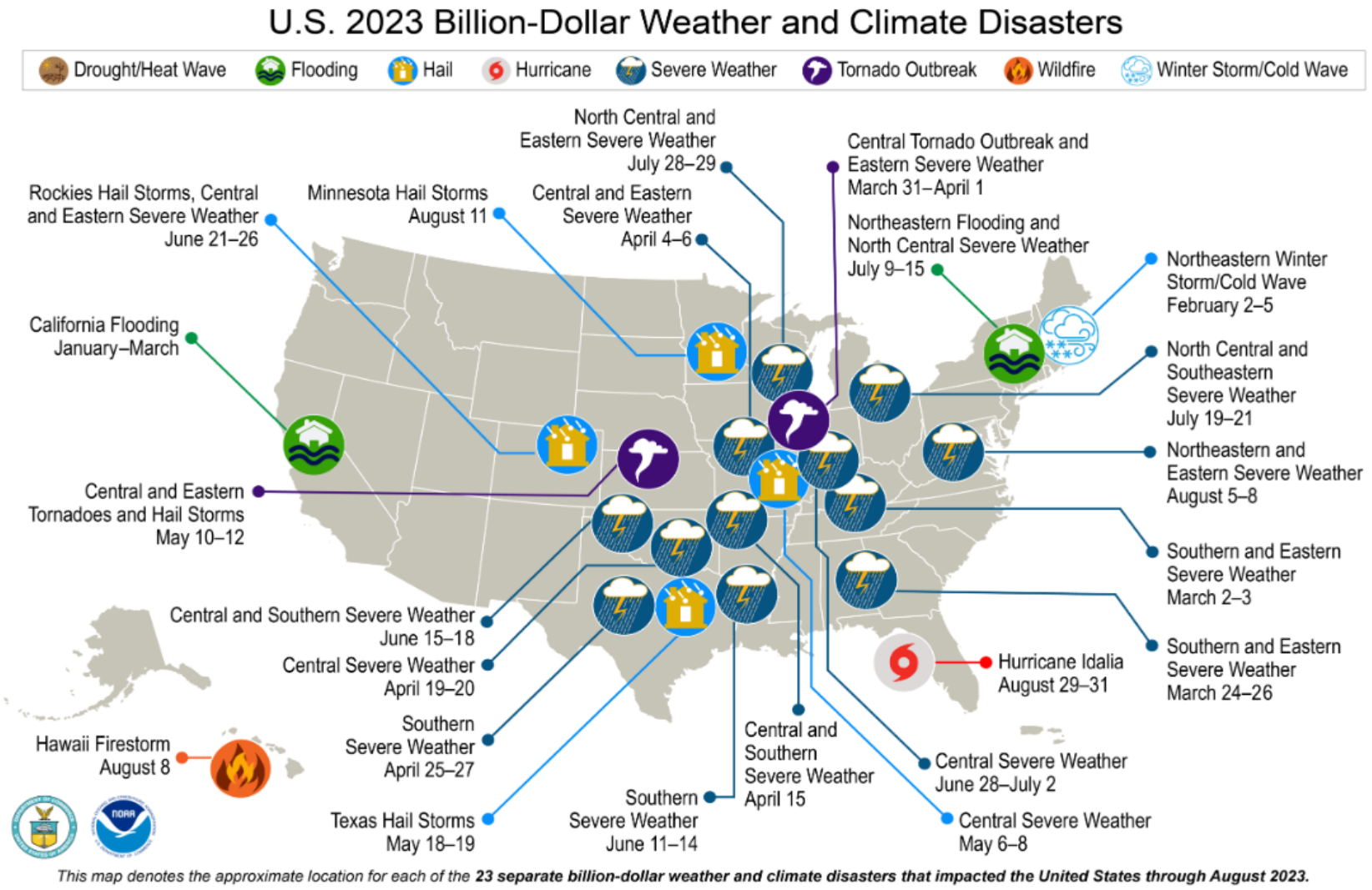
√ The most cost-effective tool to manage your complaint for less than 2000$/Month

Scalable atmospheric monitoring solutions for healthier communities

Frank DeFina

Frank B. DeFina
Business Development Manager, Vaisala

VAISALA

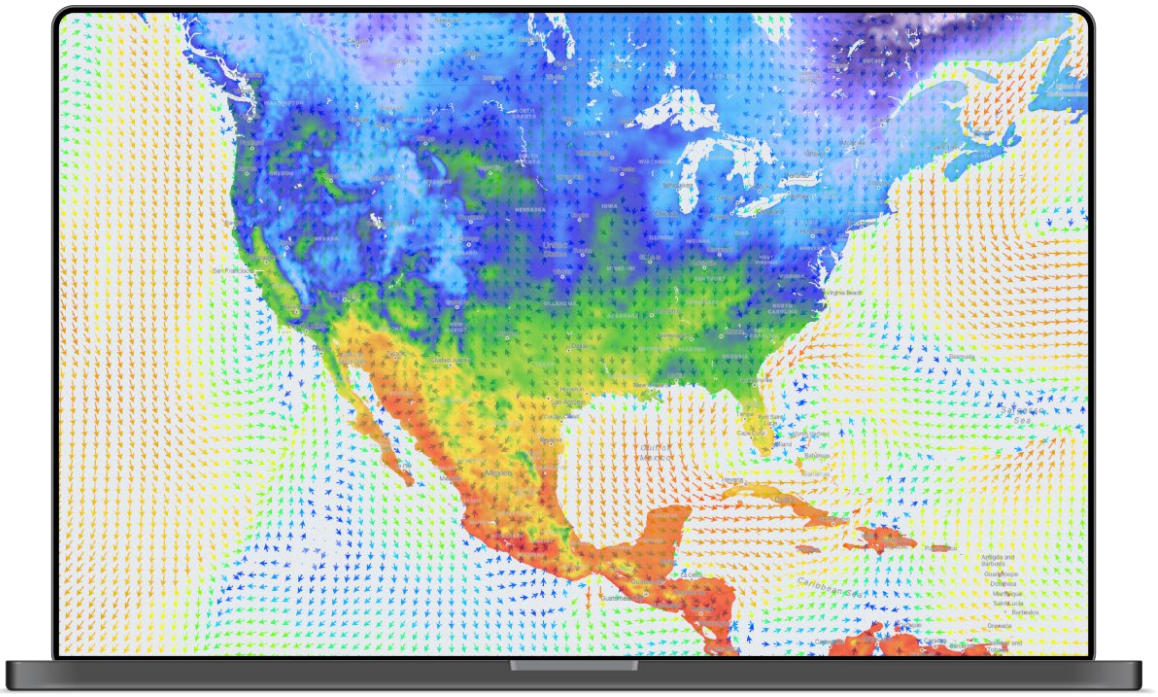


https://www.ncdc.noaa.gov/billions/

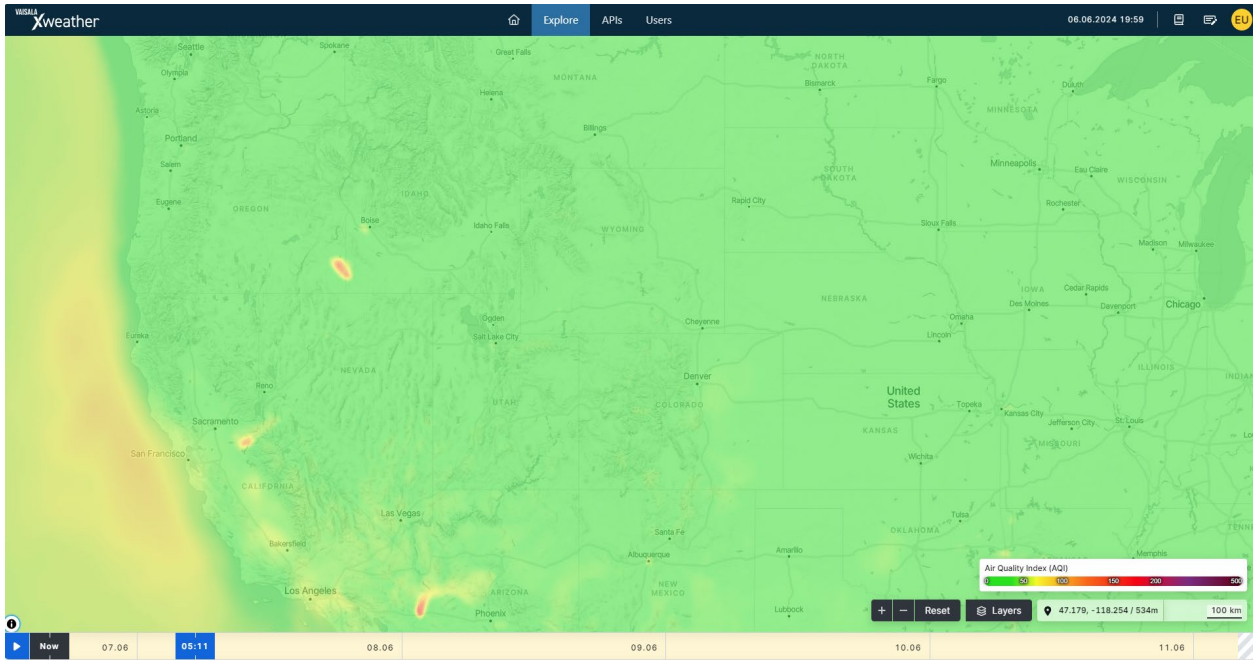
VAISALA

Xweather Insight

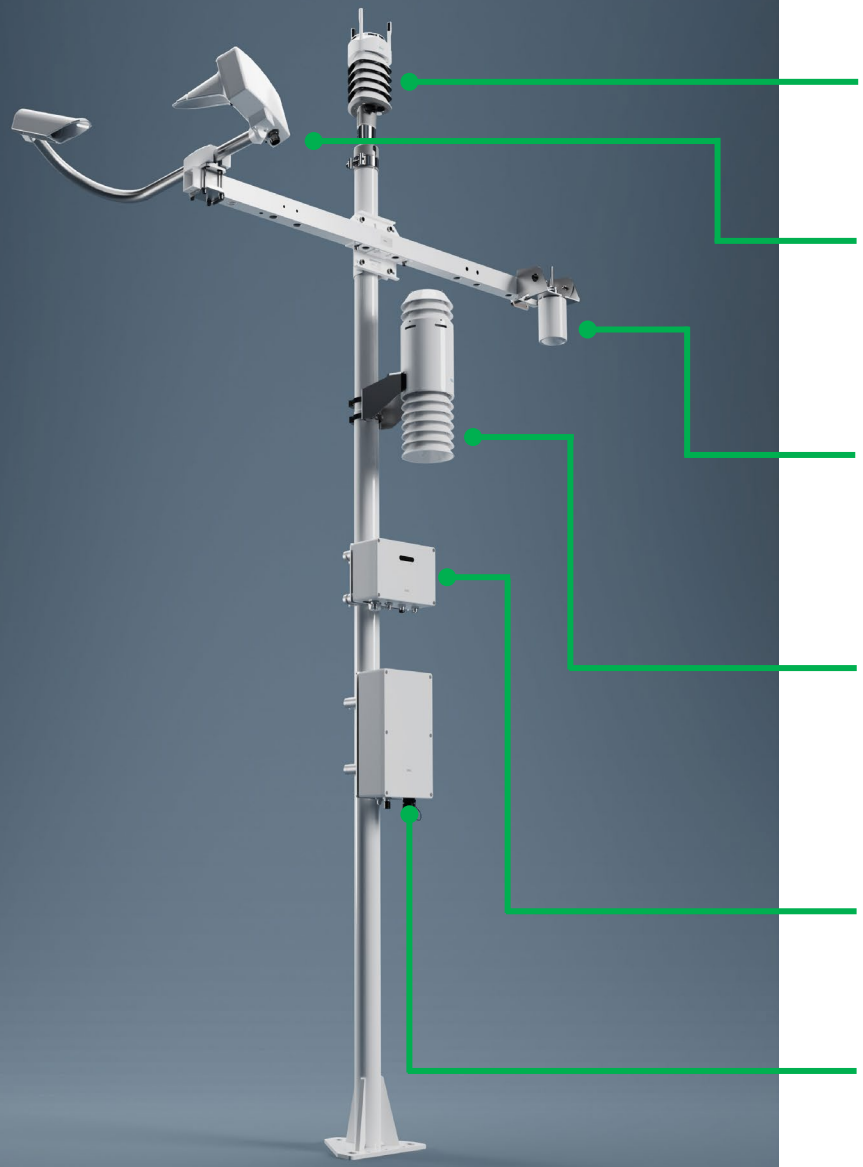
- Weather Forecast



- Air Quality Forecast



Connected Compact Station BWS500



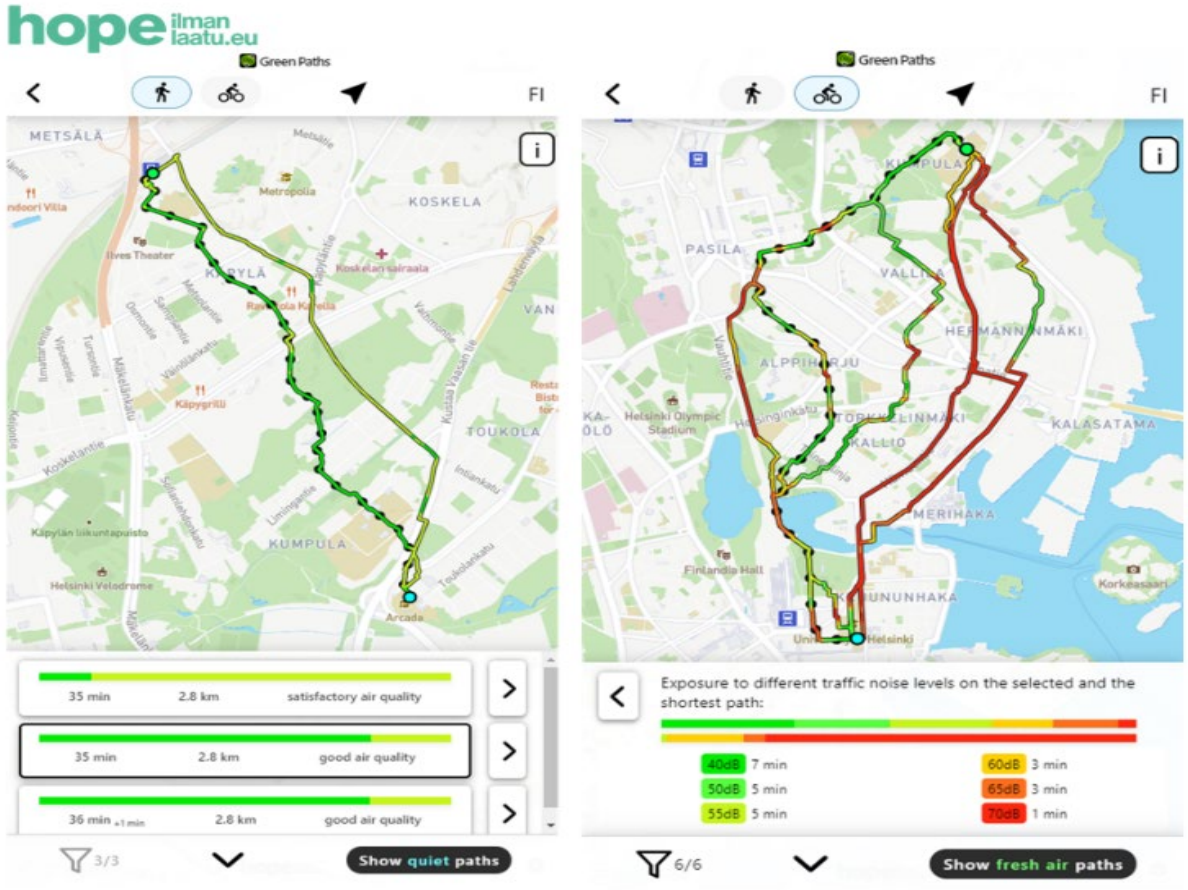
Measurement	Applications	Results
Temp, wind, pressure, humidity, rain	Severe weather alert	People & Infra Safety
Visibility & Precipitation	Track heat islands	Increased Awareness
Water Level	Smart lighting	Safe working environment
NO2, NO, O3, CO, PM2.5, PM10 (Wildfire Smoke .3 µm) AQI	Flood warnings	Safe & Efficient Operations
Gateway & Logger (Cloud API or MQTT)	Preventive actions	Regulatory Compliance
Power Unit	Emergency readiness	
	Clean air zones	
	Smart traffic mgmt	
	Public/Alternate Transport	

HOPE Project 2018-2021

- University of Helsinki developed an online route planner for pedestrians and cyclists in Helsinki region based on HOPE local air quality data. 25 Vaisala AQTs and 6 WXT536 weather sensors.

- The web app, developed as an Open Source, showcase how air quality monitoring and modelling data can be used in a way that citizens will find it easily relatable and understandable

- What can you do?



Empowering Communities with IQAir

Swiss-based air quality technology company founded in 1963

Mission

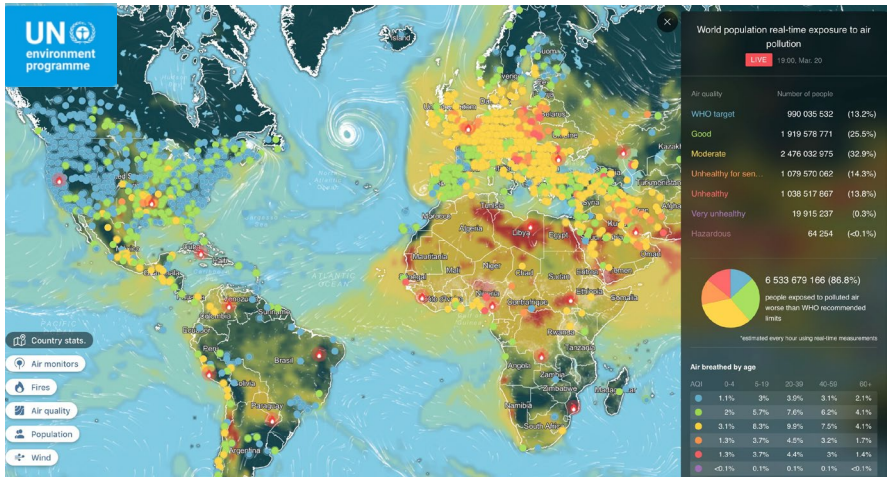
Empower individuals, organizations and communities to breathe cleaner air through information, collaboration and technology solutions

IQAir

Transforming Air Quality Data into Action: AirVisual Monitors and Platform

AirVisual Platform: Empowering Global Communities

- 30,000+ monitors; 15,000+ cities; 140+ countries/regions/territories
- Largest public source of air quality data
- Sensor agnostic



AirVisual Outdoor Monitors: Empowering Local Action

- Hyper-local, real-time data
- Comprehensive Pollutant Detection (PM1, PM2.5, PM10, and CO2)
- User-Friendly App Integration
- Robust Outdoor Design

IQAir

Governments

Companies

Individuals

Community Groups

Researchers

Empowering communities with air quality technology

- **Enable:** Community awareness
- **Support:** Policy-making
- **Help:** Ensure safe environments
- **Empower:** Local initiatives
- **Facilitate:** Health research

IQAir

Case Study: Aires Nuevos

- Air quality forecasting
- Hotspot detection
- Emergency response
- Education
- Personal exposure monitoring
- Indoor air monitoring
- Epidemiological studies

Latin America's Largest Citizen Air Quality Network

1st Air Quality Monitoring Network with a focus on childhood in Peru

+ 10,000
Children benefited from the project

+ 600
Caregivers (teachers, doctors, parents) benefited

6
Public spaces transformed based on air quality data

64%
increased coverage of the city's air quality monitoring

492 m²
of plantations of local species in the surroundings of the intervened spaces

1803 m²
of safe and accessible routes implemented to prevent dust lifting

622.5 m²
of murals on facades with photocatalytic paint that reduces air pollution levels

+45 %
improvement of air quality in the intervened spaces

* It should be noted that calm zones and / or safe routes were created, 70 playgrounds, rest and low-cost green areas were installed, community participation was promoted, etc.

IQAir

Thank you!

Cliff Fleck

IQAir North America

Cliff.Fleck@iqair.com

AirVisual App

AQ Monitors

IQAir Dashboard

IQAir

QUANTAQ

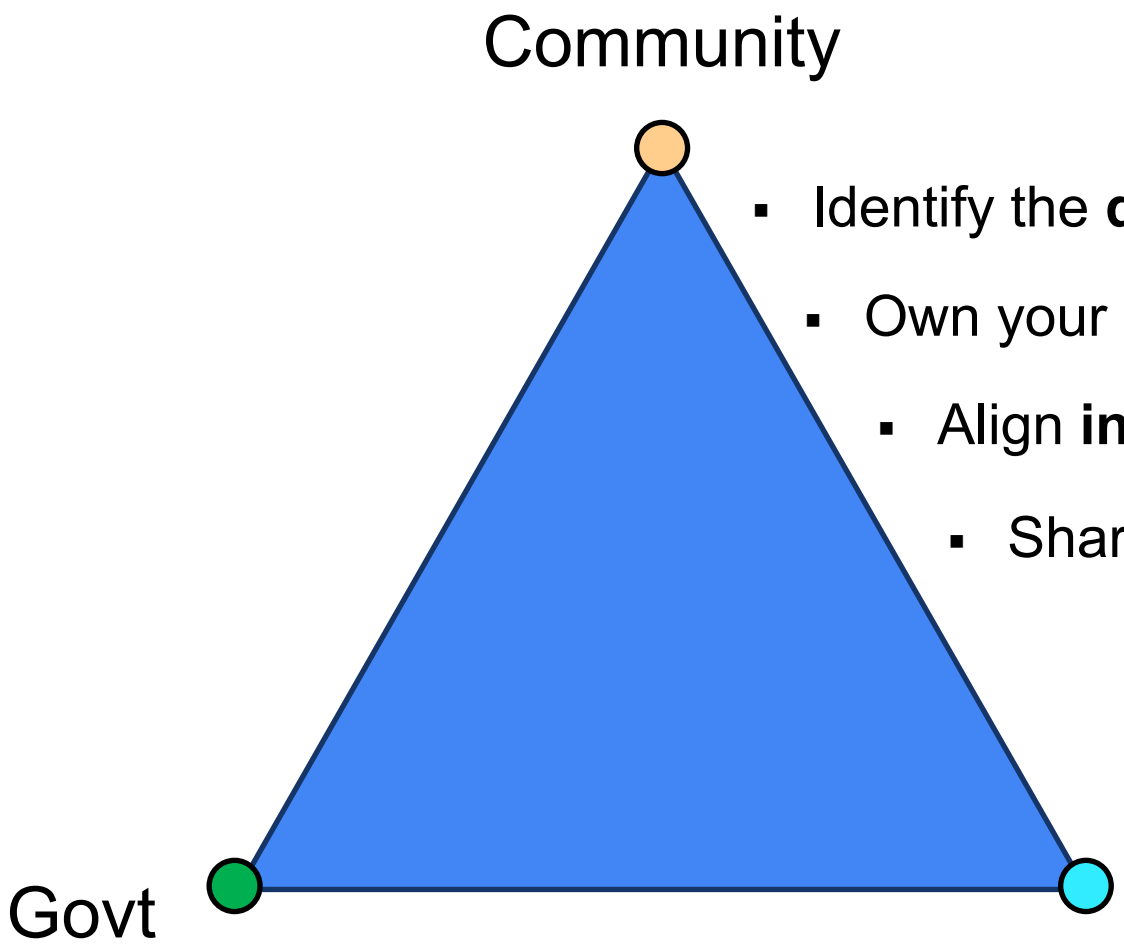
Scaling 10-100x

Overcoming real-world community air monitoring challenges

Dr. Eben Cross
Co-Founder and Chief Science Officer

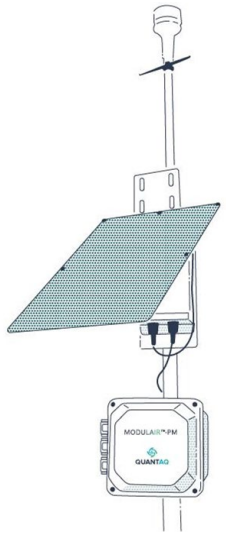

exciting
environmental
future
impossible
community
ej
rewarding
costly
logistics
intriguing
comfort-zone
empathy
listening
justice
frustrating
complicated
important
necessary
fair
vital
overwhelming
pressure
equitable
intimidating
cost-prohibitive
difficult

Building coalitions through trust



- Identify the **question** to be answered
- Own your strengths & **weaknesses**
- Align **incentives**
- Shared definition of success

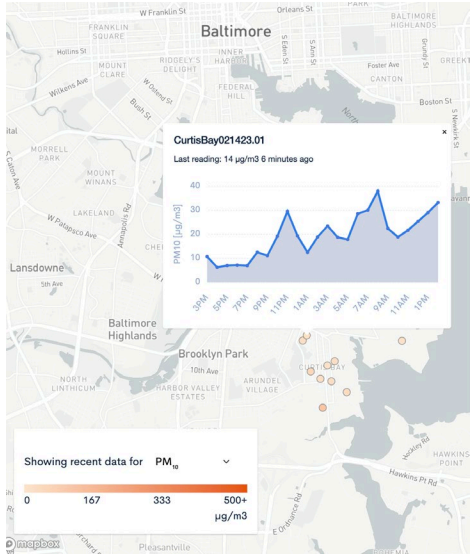
Making local AQ data ‘useful’ and ‘useable’

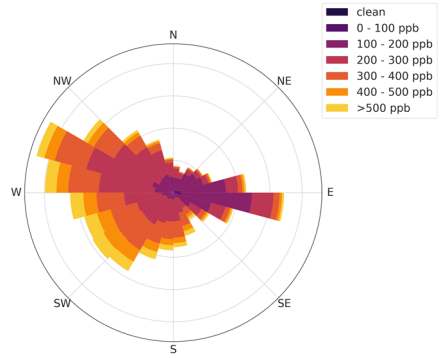


QUANTAQ CLOUD

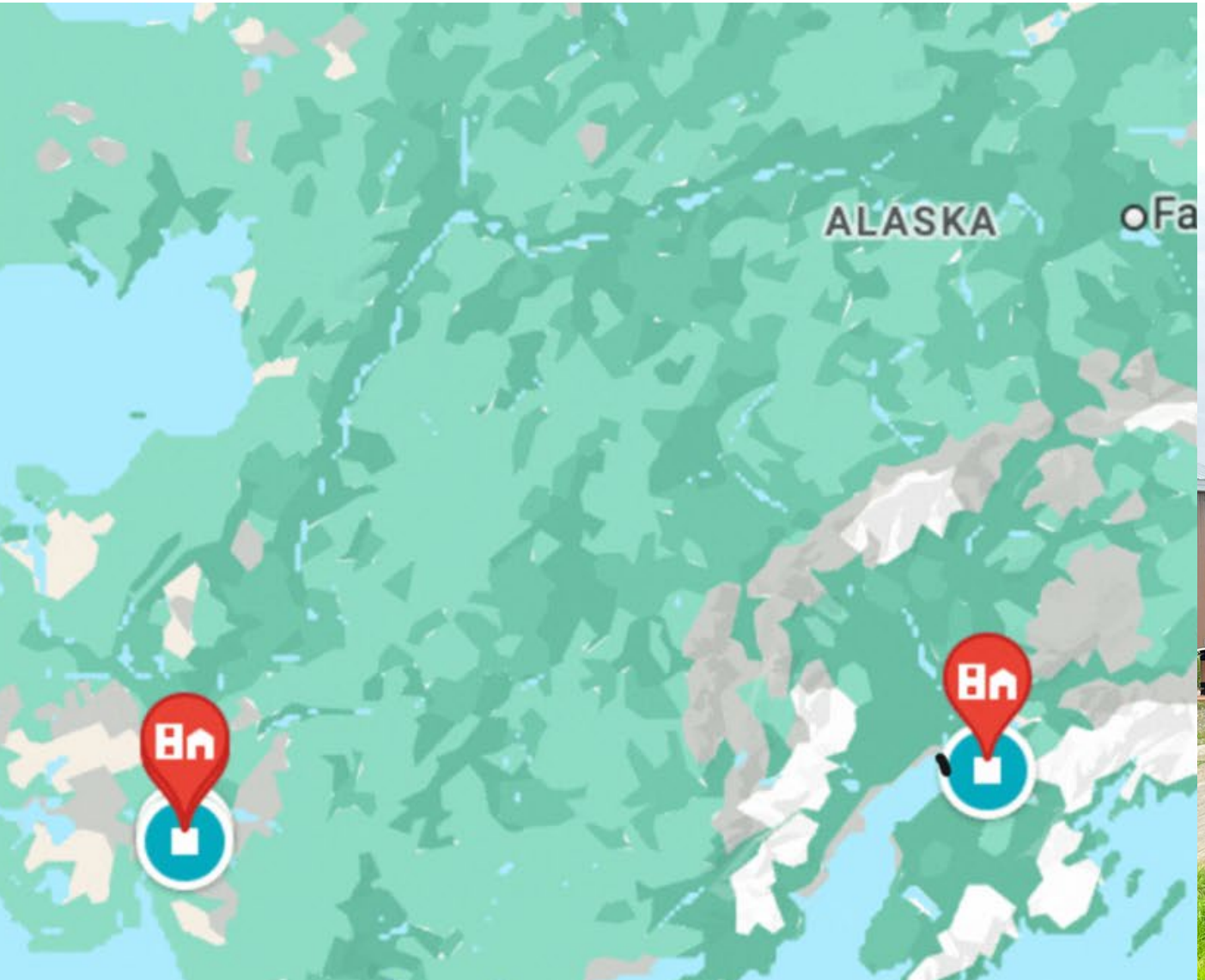
Distributed Sensor Networks

Air Quality Information

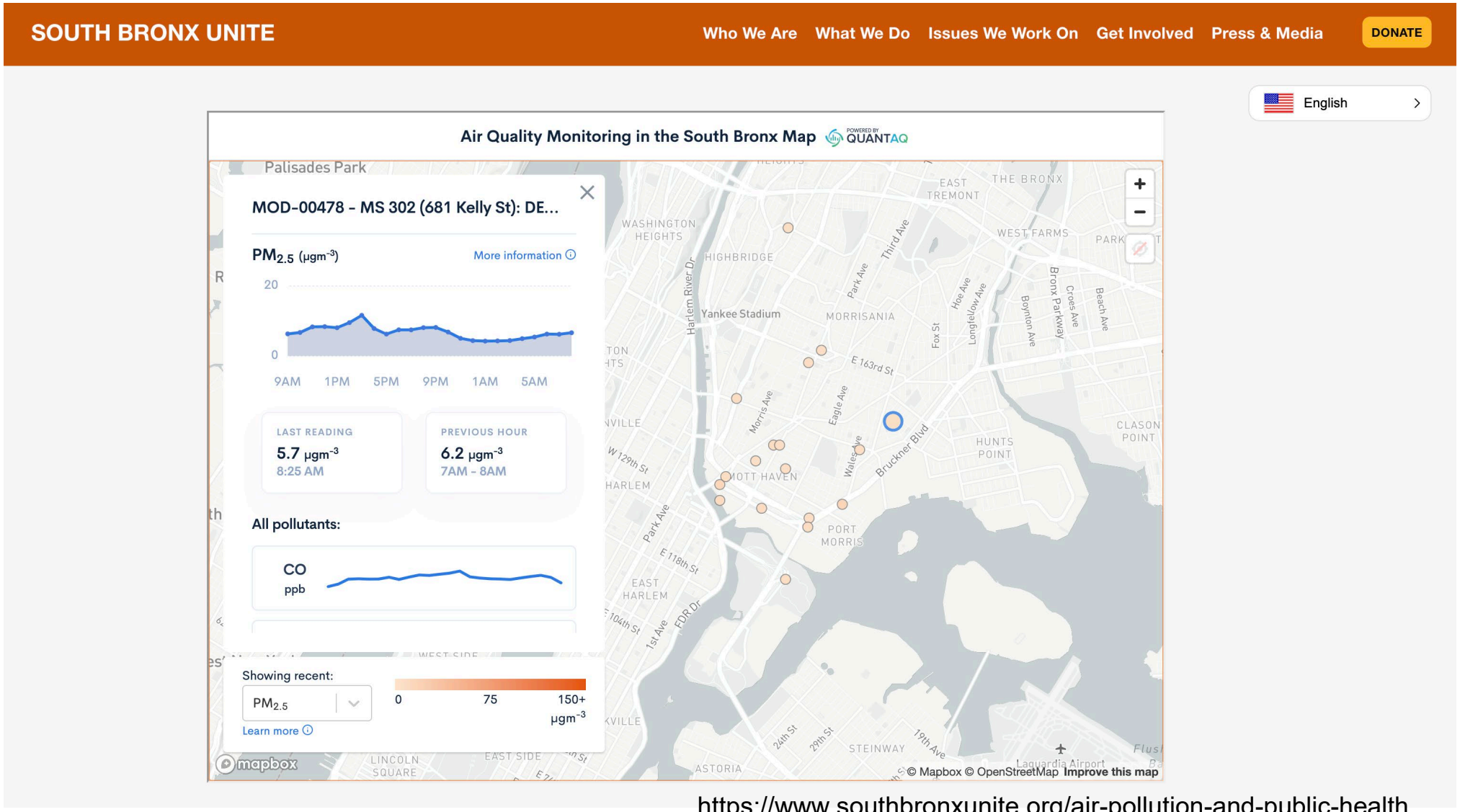




Improving AQ coverage across vast areas



Revealing local AQ realities



https://www.southbronxunite.org/air-pollution-and-public-health

Our vision for NAAMC 2026:

More state-local-tribal air monitoring teams help build **useful** community-AQ projects reinforcing that:

…“distributed, cost-effective community air monitoring is possible”

“...their local AQ programs are making a difference”

Thank You

Community Air Toxics Monitoring with AROMA

Aurelie Marcotte, Ph.D.
Director of Sales and Business Development
amarcotte@entanglementtech.com

Prepared for the Community Air Monitoring Showcase on August 12, 2024 at the National Ambient Air Monitoring Conference in New Orleans, Louisiana

Entanglement Technologies, Inc.
1192 Cherry Avenue
San Bruno, CA 94066

AROMA Chemical Vapor Analyzers

Thermal Desorption Cavity Ring-Down Spectroscopy Analyzer

Operates in Dual Modes Depending on Project Goals

RAPIDSCAN

Direct Spectroscopy Mode Results in Seconds

- Small molecule positive identification
- **Part-per-billion** measurements in seconds
- Large molecule classification and isolation of potential sources
- Replaces multiple single gas analyzers (CH_4, CO_2, EtO, H_2O, etc)

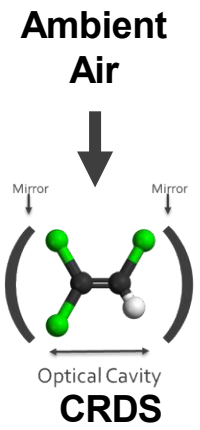
LABSCAN

Laboratory Grade Analytics in Minutes

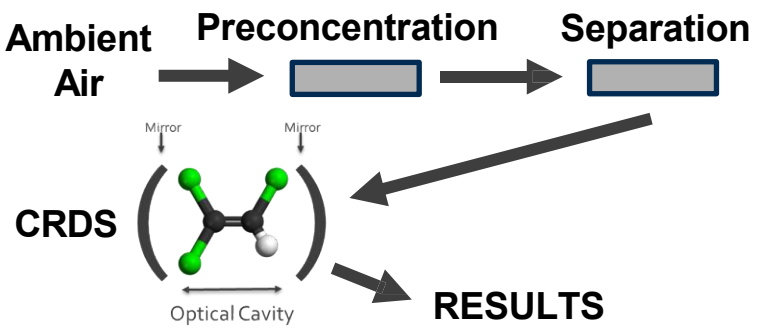
- **Part-per-trillion** speciated chemical analysis in **minutes** for volatile and semi-volatiles (10s of compounds)
- GC-like specificity and background rejection
- Better than GC robustness, stability, and ease of use

Designed for Actionability

- No operator expertise required
- No ongoing calibration required
- Multiple-line-of-evidence confirmatory analysis
- Reliable results in the harshest conditions
- Low consumable/infrastructure requirements
- Laboratory Grade Results



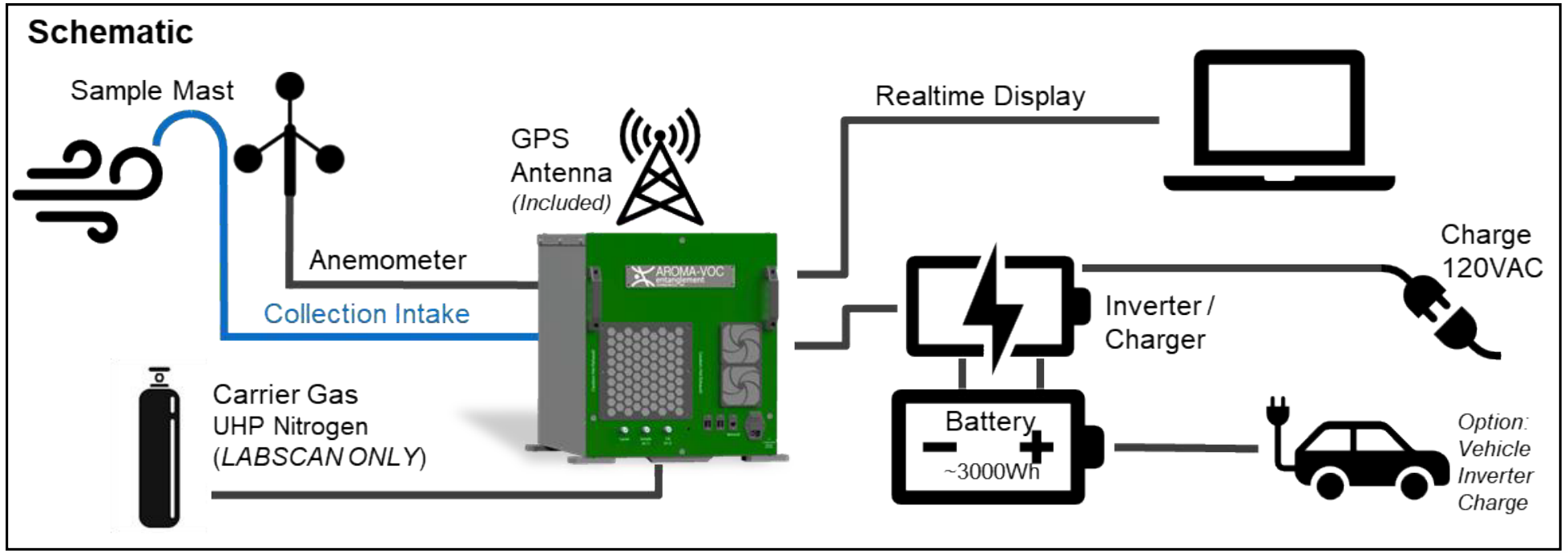
RESULTS
CO_2
CH_4
EtO
Alkanes
Aromatics
Dienes

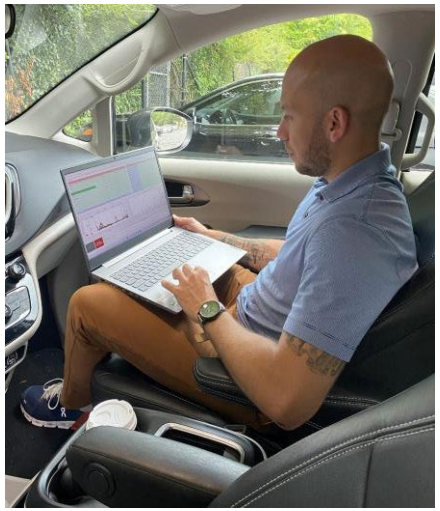


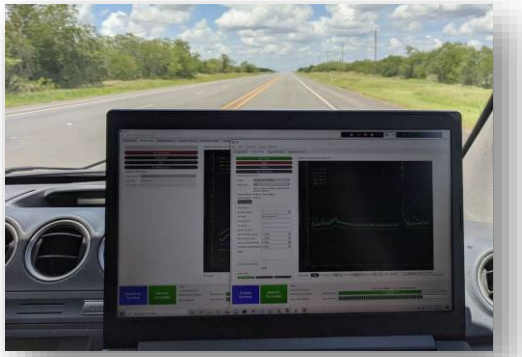
Benzene, 1,3-Butadiend, Acrolein, Ethylene Oxide, Trichloroethylene, etc.

entanglement TECHNOLOGIES, INC.

Mobile Monitoring with AROMA







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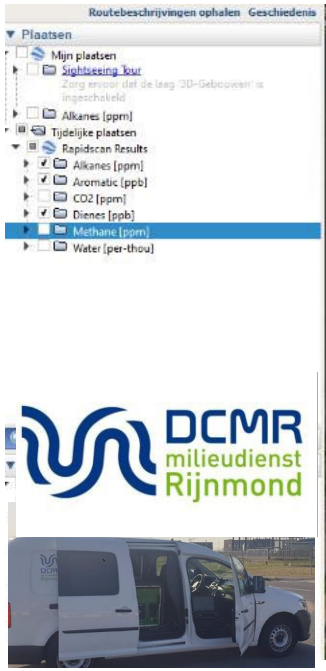
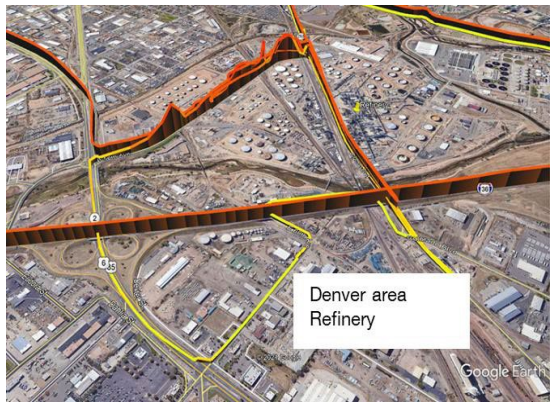
RapidScan – Identification of Areas of Interest

Port of Rotterdam, Netherlands



(**Left**) Alkanes, aromatics, and dienes measurements made in the Port of Rotterdam (**Center**) Alkanes measurement on May 5, 2022, that was traced to a sewer system from a refinery where rundown ended up in sewer and not going to wastewater system.

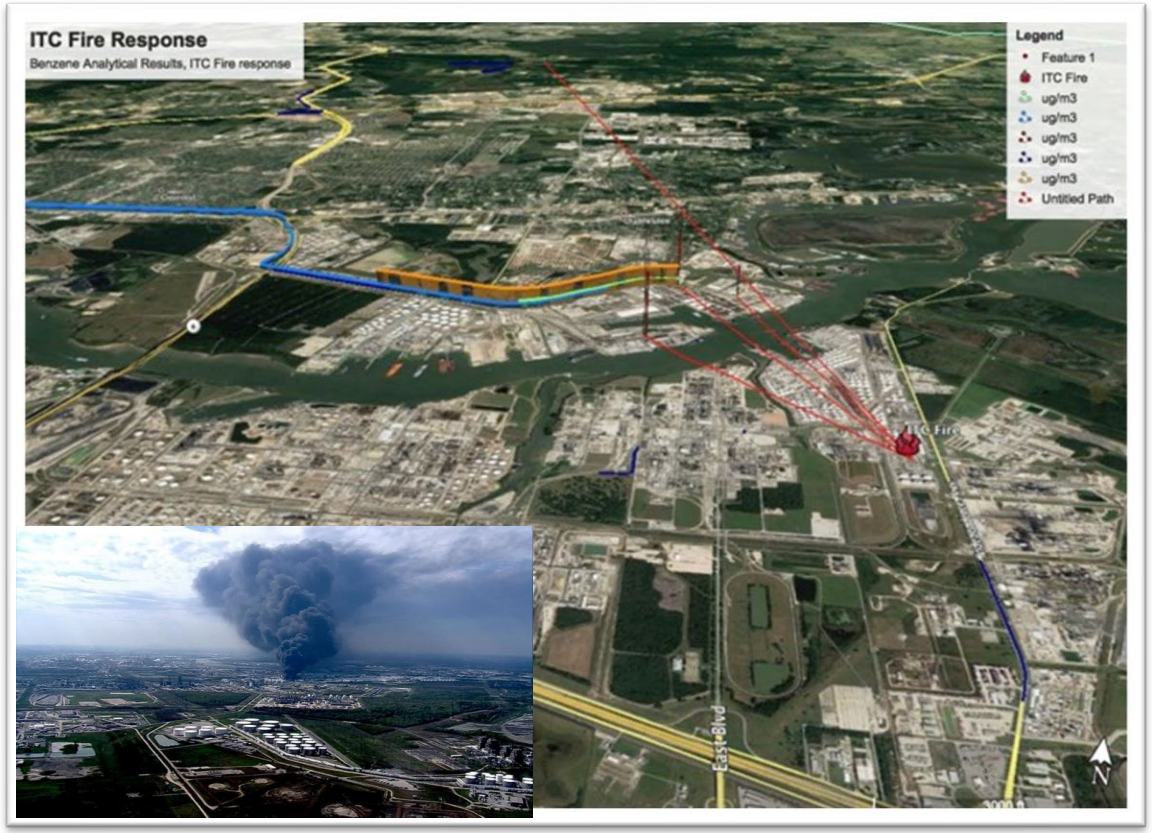


Colorado

(**Left**) Alkanes measurement located around an active drilling site located in a community in Longmont, CO
(**Center**) Methane measurement made around a landfill in Denver area
(**Right**) RapidScan measurements made around a Denver Refinery

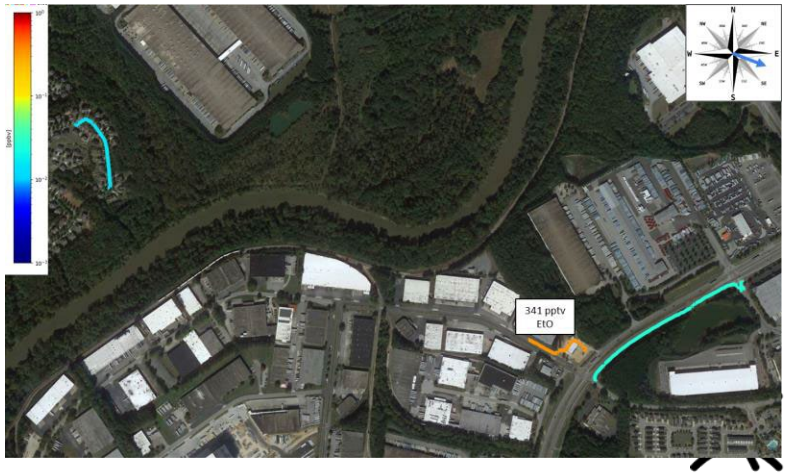
LabScan – VOC Speciation and Quantification

Emergency Response
ITC Facility Fire in Houston, Texas



Concentrations of benzene across the Houston Ship Channel from the ITC facility were in the hundreds of parts-per-billions, even days after the fire. Elevated benzene concentrations were measured as far as 12 miles downwind with AROMA-VOC

Background Studies and Potential Source Impacts
Ethylene Oxide in Georgia



Ethylene oxide measurements around two sterilization facilities in GA from a rental minivan. Upwind and downwind measurements were made as well as at site, which is labeled by the boxes with ethylene oxide. Ambient concentrations around 20 pptv

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TECHNOLOGIES, INC.

TSI Devices citations and innovations

TSI was part of ~10 poster boards at ASIC

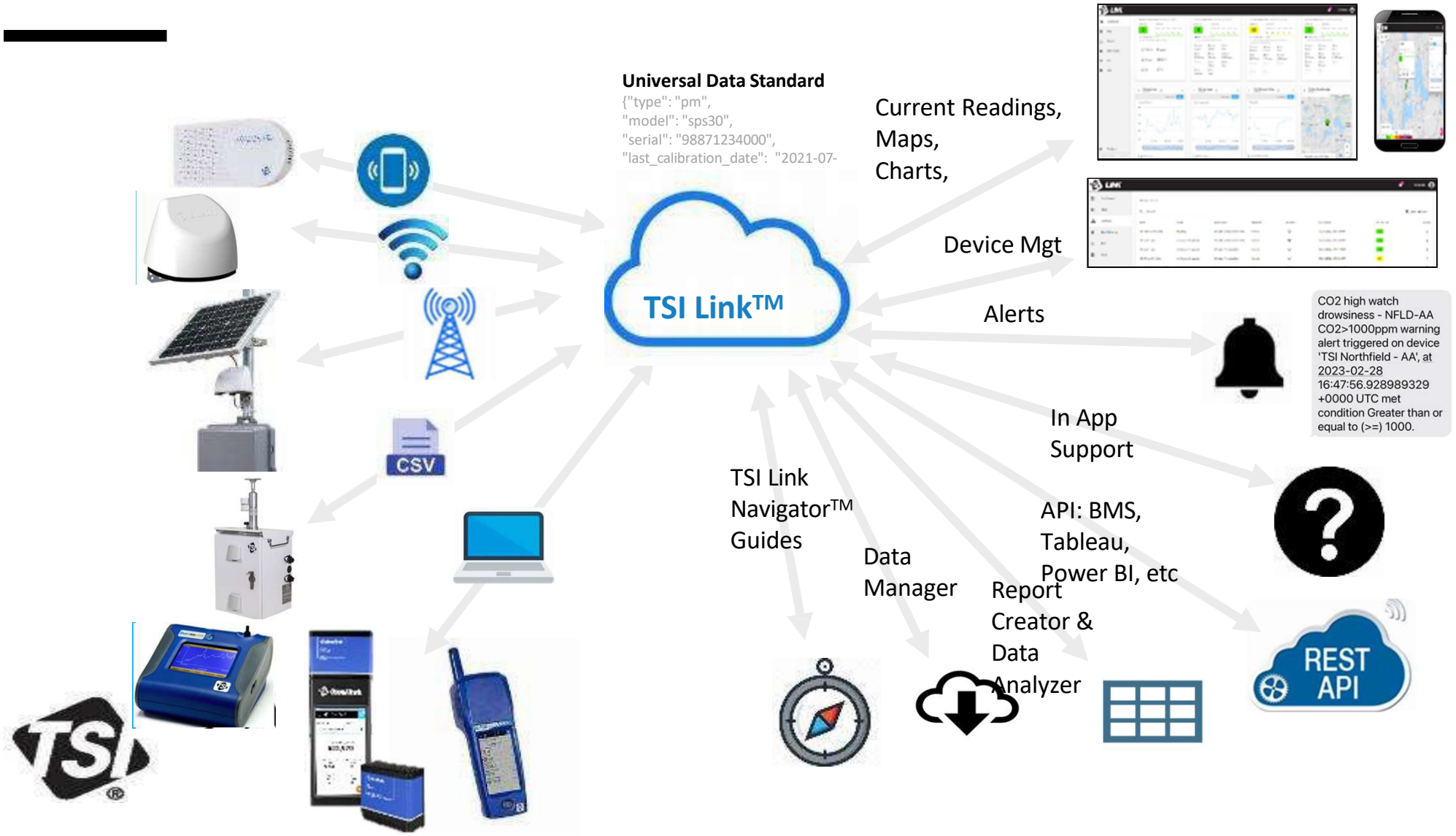
Used by regulators, businesses, universities and schools
Attached to drones, bikes and tollbooths

Our goals: Continue to support the innovation & progress
4 quick lessons

- ✓ ***Platform*** *for more functionality and collaboration*
- ✓ *Better together:* ***Monitor + Studying***
- ✓ ***Efficiency + Intelligence***
- ✓ ***Small particles count, count small particles***

TSI Link Platform

Platform for more functionality and collaboration

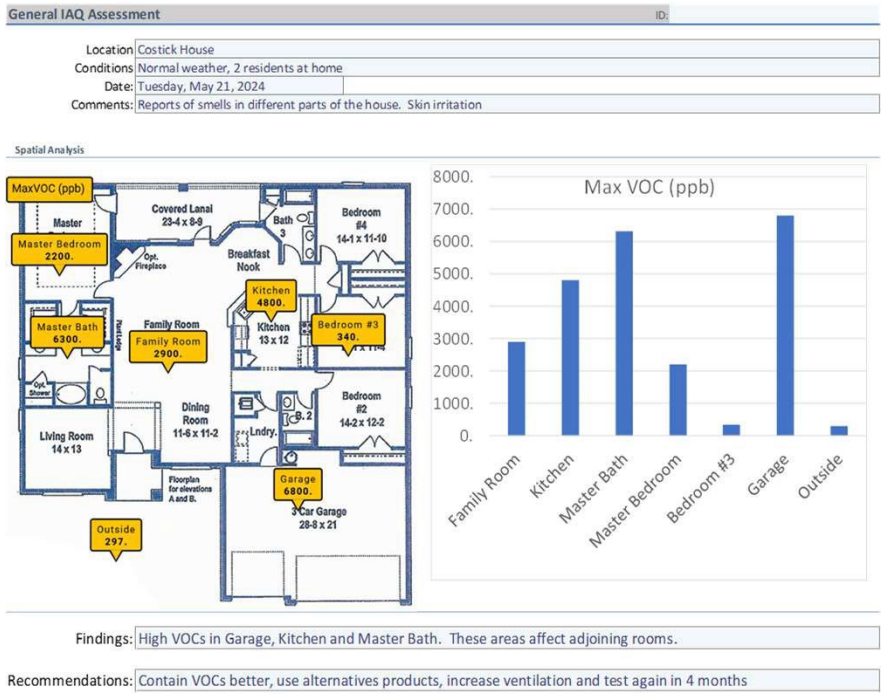


Better Together: Monitoring + Studying

+

OmniTrak assessment

Efficiency meets Intelligence

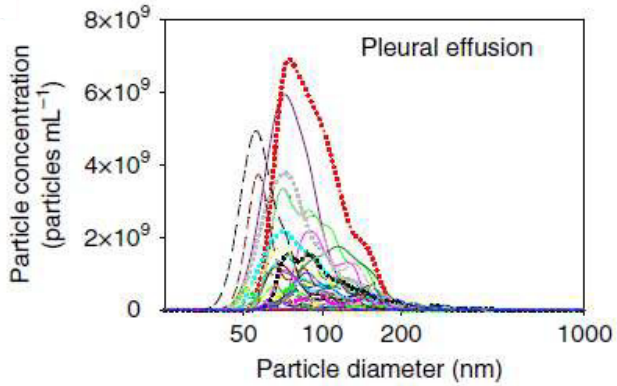


Multiple Modules + Automatic templates

Monitoring Ultrafines: Particle Number Metric

Small particles count, count small particles

More adsorption, more of them, less measured, less mass

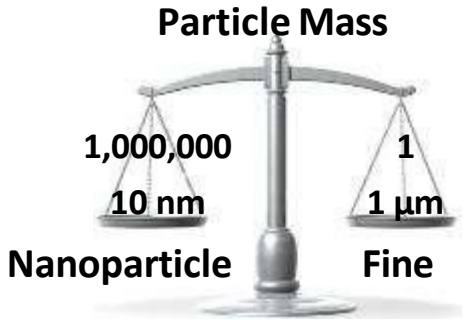


Exogenous nanoparticles found in human lung fluid (pleural effusion) (Lu *et al* 2020)

Human volunteers inhaled 5 nm and 30 nm gold nanoparticles (Miller *et al* 2017):

- detected in blood and urine within 24 h,
- still present after 3 months
- levels were greater for 5 nm than for 30 nmcc

Mass-based measurements can't effectively detect ultrafine particles or assess exposure risk!



TSI's ultrafine measurements:

Condensation Particle Counters (CPC) for number concentration

Scanning Mobility Particle Sizers (SMPS) high-resolution size distributions

Battery-operated mobile sizers and counters bring the measurements with you

The Sensible EDP Team

Roger Nounou
VP Partners & Channels

Jenna Granstra
Operations Director
Data Solutions

Montrose Key Stats

- 3500 Employees
- 95+ locations
- 6000+ clients from public & private sectors
- 5 patents issued in 2022, for a total of 18 patents

Sensible EDP
POWERED BY MONTROSE ENVIRONMENTAL

SUNCOR ENERGY

love my air

Sensible EDP
POWERED BY MONTROSE ENVIRONMENTAL

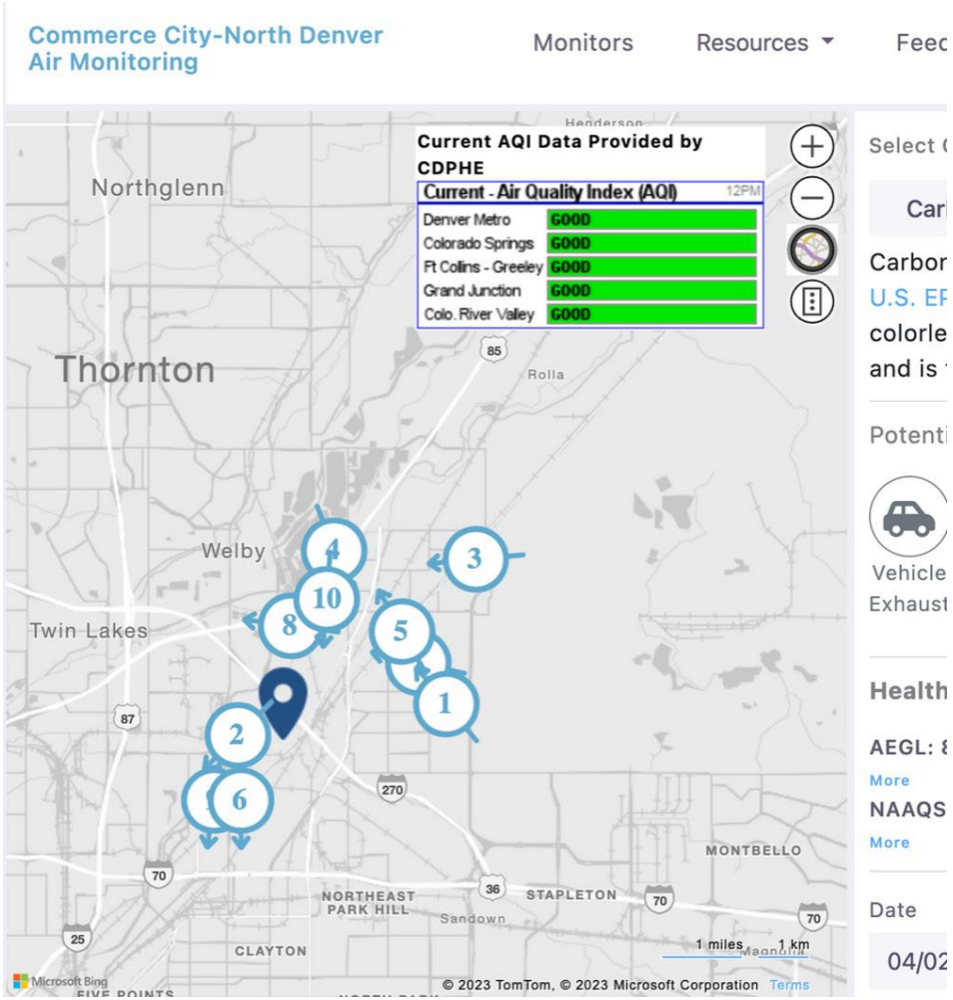
Case Study

Background

Suncor Energy, a Canadian integrated energy company, operates an oil refinery in Commerce City, Colorado.

The Sensible Solution

- Installed ten air monitoring stations and a mobile van
- Provided real-time air quality data via a website and smartphone app



Monitoring Program

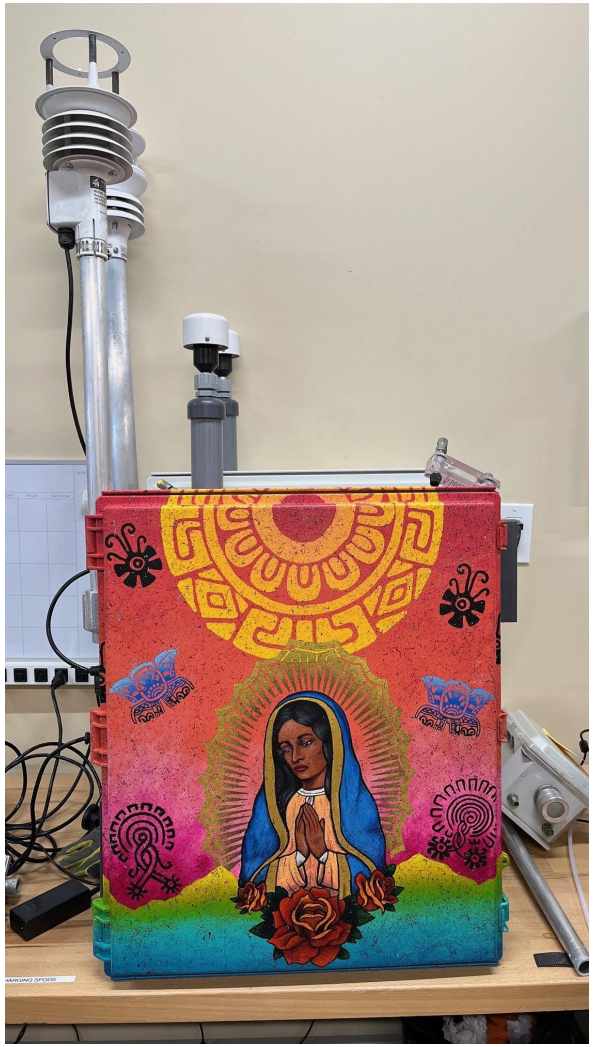
- 10 locations established (5 were with input from community)

- Within three miles of the Commerce City Refinery
- Proximity to other industrial sources
- Wind data taken into account
- Nearby buildings and other structures
- Safety, ability to access the site

Monitoring Program

➢ Pollutants

- Low and mid tier Sensors for SO2, CO, NO, NO2, H2S
- tVOC and speciated VOC canister collection &analysis
- Quarterly community monitoring of 64 analytes using a mobile van equipped with a PTR-TOF-MS




Thank You

GRIMM AEROSOL TECHNIK

Single Particle Counting for Precise PM Monitoring

Full-Flow Analysis

TECHNOLOGY FOR A CLEAN AND SAFE ENVIRONMENT

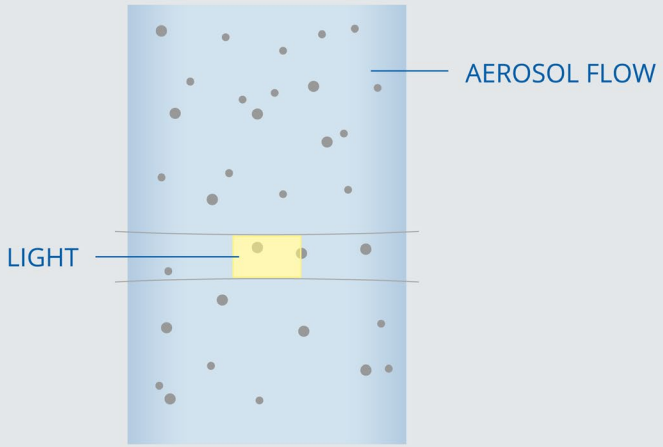
DURAG GROUP

Differences In Optical PM Monitoring Technology

GRIMM instruments are designed to detect, count and size every single particle.

Optical focusing (others)

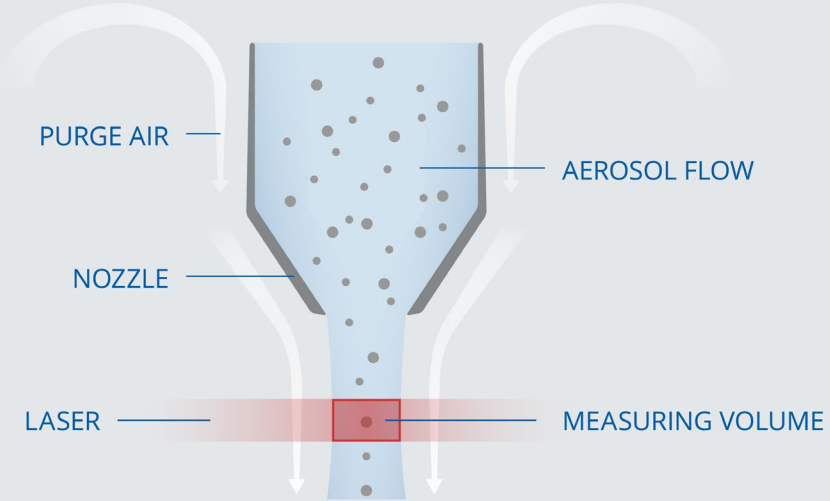
Light is brought into the sample air



Less than 1% of the sample air cross-section is analyzed for particles

Aerodynamic focusing (DURAG / GRIMM)

Sample air is brought into the light



100% of the sample air cross-section is analyzed for particles (Full-Flow Analysis)

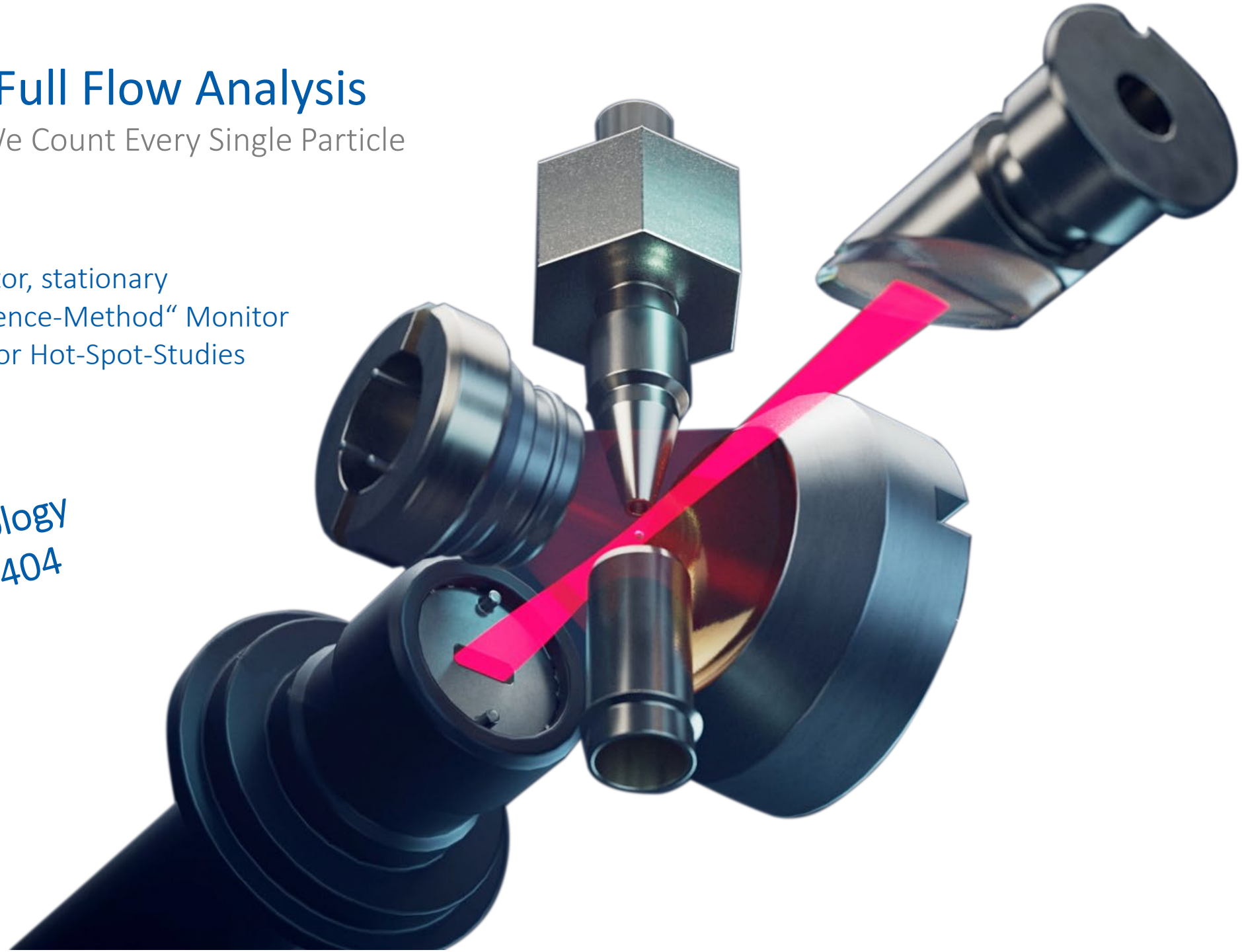
Realization of Full Flow Analysis

How We Make Sure We Count Every Single Particle

Available as:

- Approved PM Monitor, stationary
- Mobile „Near-Reference-Method“ Monitor
- Handheld Monitor for Hot-Spot-Studies

See our laser technology in action at Booth #404



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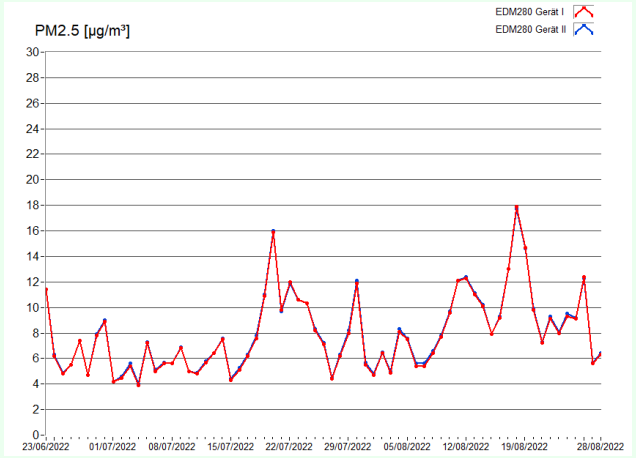
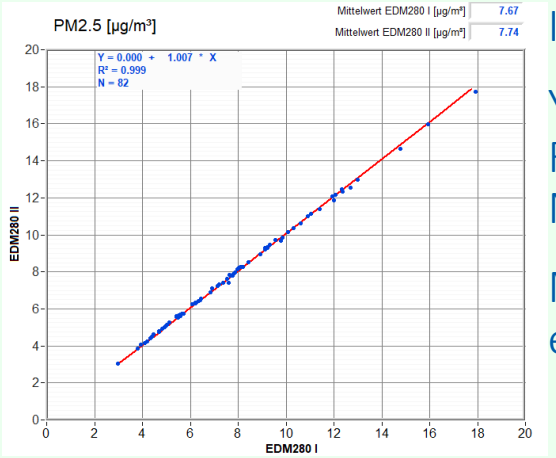
Precision of Optical “Full-Flow Analysis“ in Ambient Air Stations

PM2.5: intercorrelation optical versus gravimetric





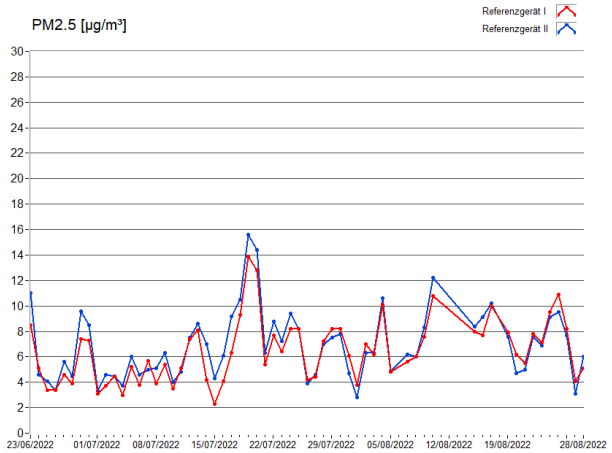
Intercorrelation Approved Optical Monitor PM2.5

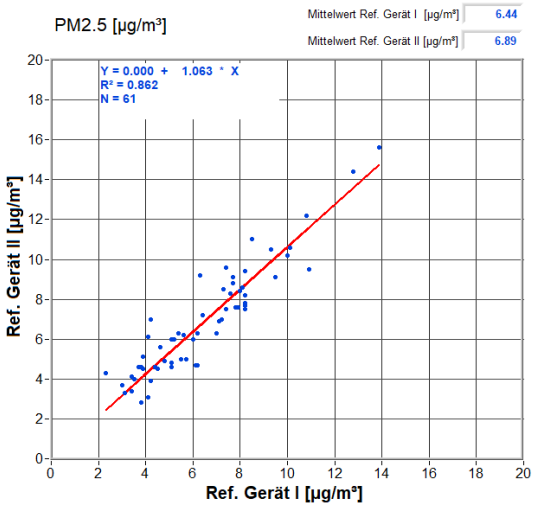
$Y = 1.007x + 0.000$

$R^2 = 0.999$

$N = 82$

Mean deviation **< 1 %,** even at lowest µg/m³.





Intercorrelation Approved Gravimetric Sampler PM2.5

$Y = 1.063x + 0.000$

$R^2 = 0.862$

$N = 61$

Mean deviation **>6 %** at lowest µg/m³.

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Limit Values, Community Programs, and Real-Time Data

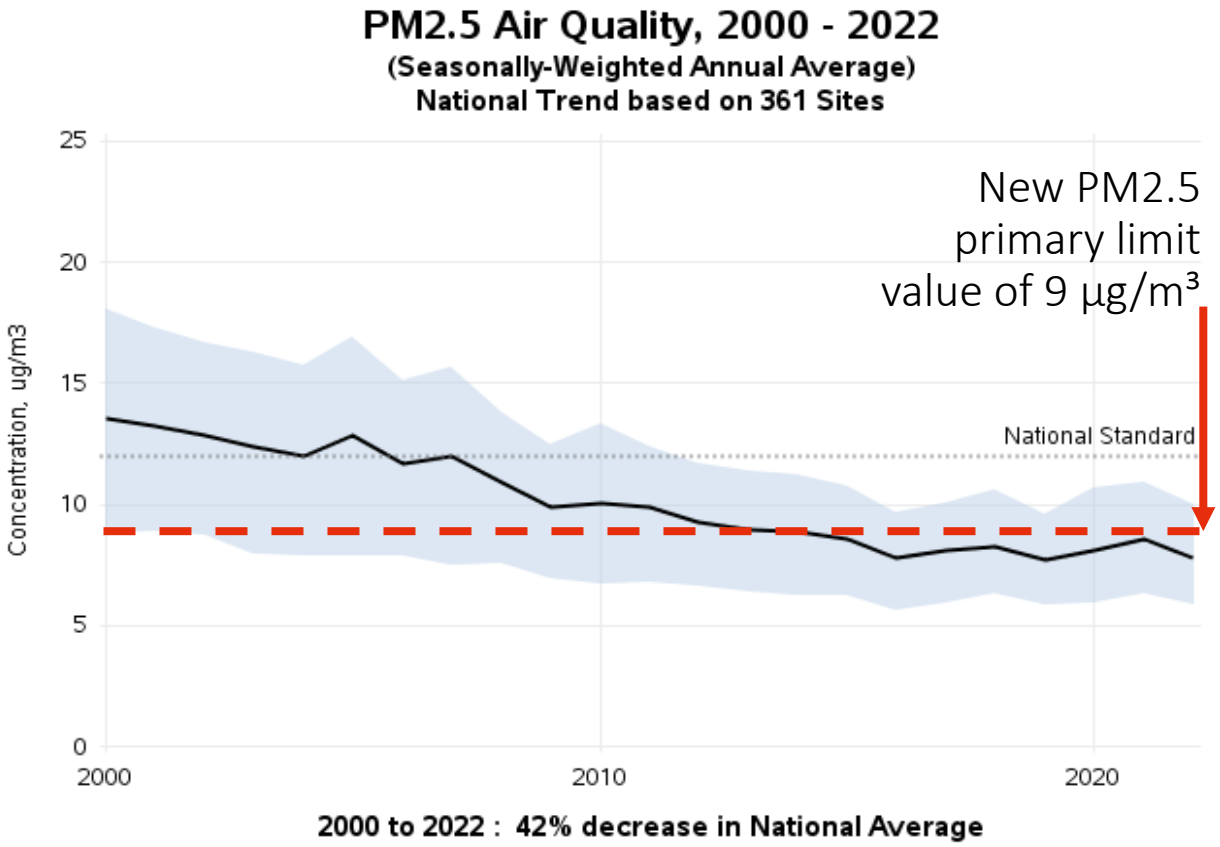
Everybody Has The Right To Breath Clean Air

Constantly decreasing PM2.5 values create challenges for sampler accuracy in the **sub-10-microgram range** → Communities need precise data in real-time and with highest availability

Aims of the EAQMC Program

The Enhanced Air Quality Monitoring for Communities

- Improve air quality monitoring in underserved and overburdened communities
- Provide better data on air pollutants
- Address health disparities
- Support community-driven solutions
- Increase availability and accessibility of air quality information
- Empower communities to protect public health
- Advance environmental justice.



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Thank You

Come See Our Technology in Action @booth#404

- ✓ Low TCO
- ✓ Energy-saving
- ✓ Real-time data
- ✓ Precise data

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TECHNOLOGY FOR A CLEAN AND SAFE ENVIRONMENT

INDOOR + OUTDOOR AIR QUALITY INSTRUMENTATION

AP2E and GRIMM product portfolio

11-D Portable spectrometer

EDM 264 Mobile spectrometer

EDM 280 Environmental dust monitor for PM monitoring

1371 MiniWRAS Portable wide range spectrometer

SMPS+C Scanning mobility particle sizer with condensation particle counter

SMPS+E Scanning mobility particle sizer with Faraday Cup Electrometer

EDM 665 Outdoor wide range aerosol spectrometer

EDM 465 Ultra fine particle counter

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Booth #404

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