EPA Region 4's Fenceline VOC Sensor Loan Program

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Many slides adapted from a presentation created by Megan MacDonald and Eben Thoma
EPA Office of Research and Development, Center for Environmental Measurement and Modeling

Overview

- Next Generation Emissions Measurements (NGEM) Approaches
  - SPOD VOC fenceline (or near source) sensors
- Pilot Deployments: Louisville, KY and Greensboro, NC
- Sensor Intelligent Emissions Locator (SENTINEL) open-source analysis tool
  - Quality Assurance, Dashboard, and Report Generator
- R4 Fenceline VOC Sensor Loan Program

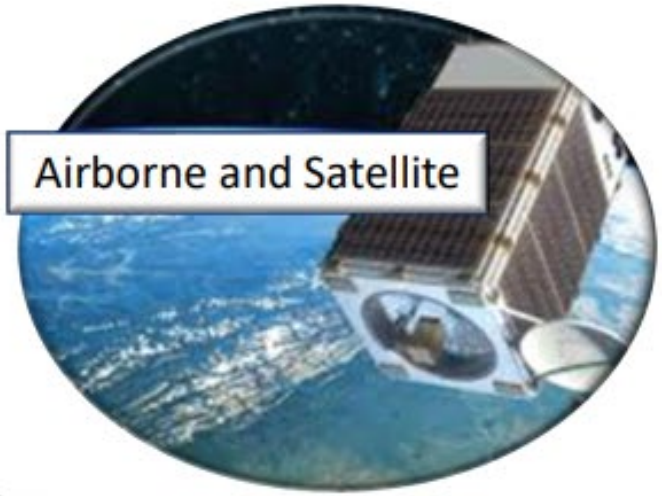
The Many Forms of NGEM

Fenceline Sensors

Near-source Sampling

Open-path Fenceline

Airborne and Satellite



Mobile Measurements

Optical Gas Imaging

Participatory Science (EPA Odor Explore App)

Field Instruments

In-plant Sensors
Hazardous areas

Today's Focus

NGEM Approaches Vary by Distance to Source

Fenceline Sensors (SPODs)

Not Hazardous Area Rated

In-community Measurements

Fenceline Monitoring

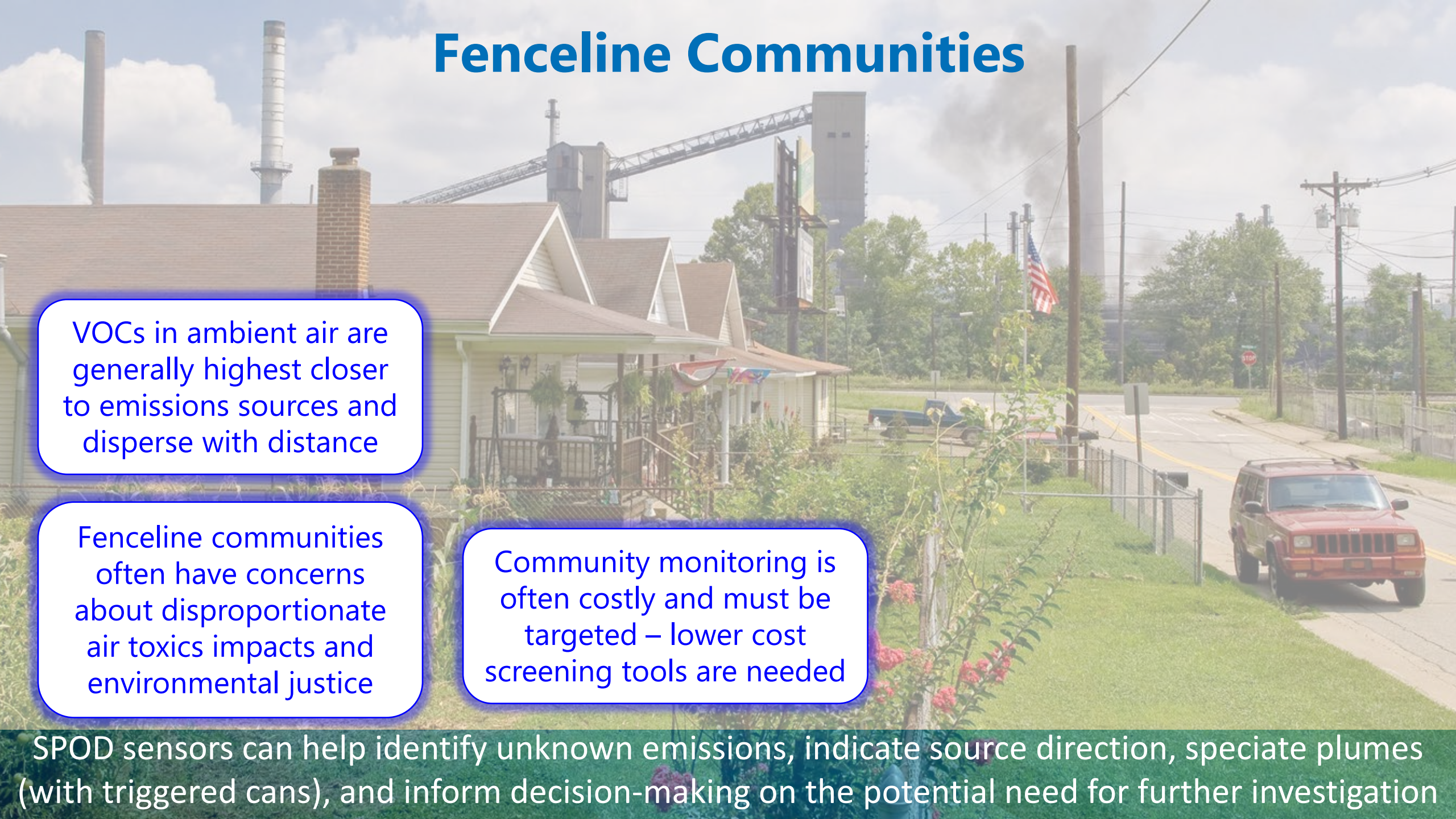
Hazardous Area Rated

Emission

In-plant Leak Detection

Today's Focus

Fenceline Communities

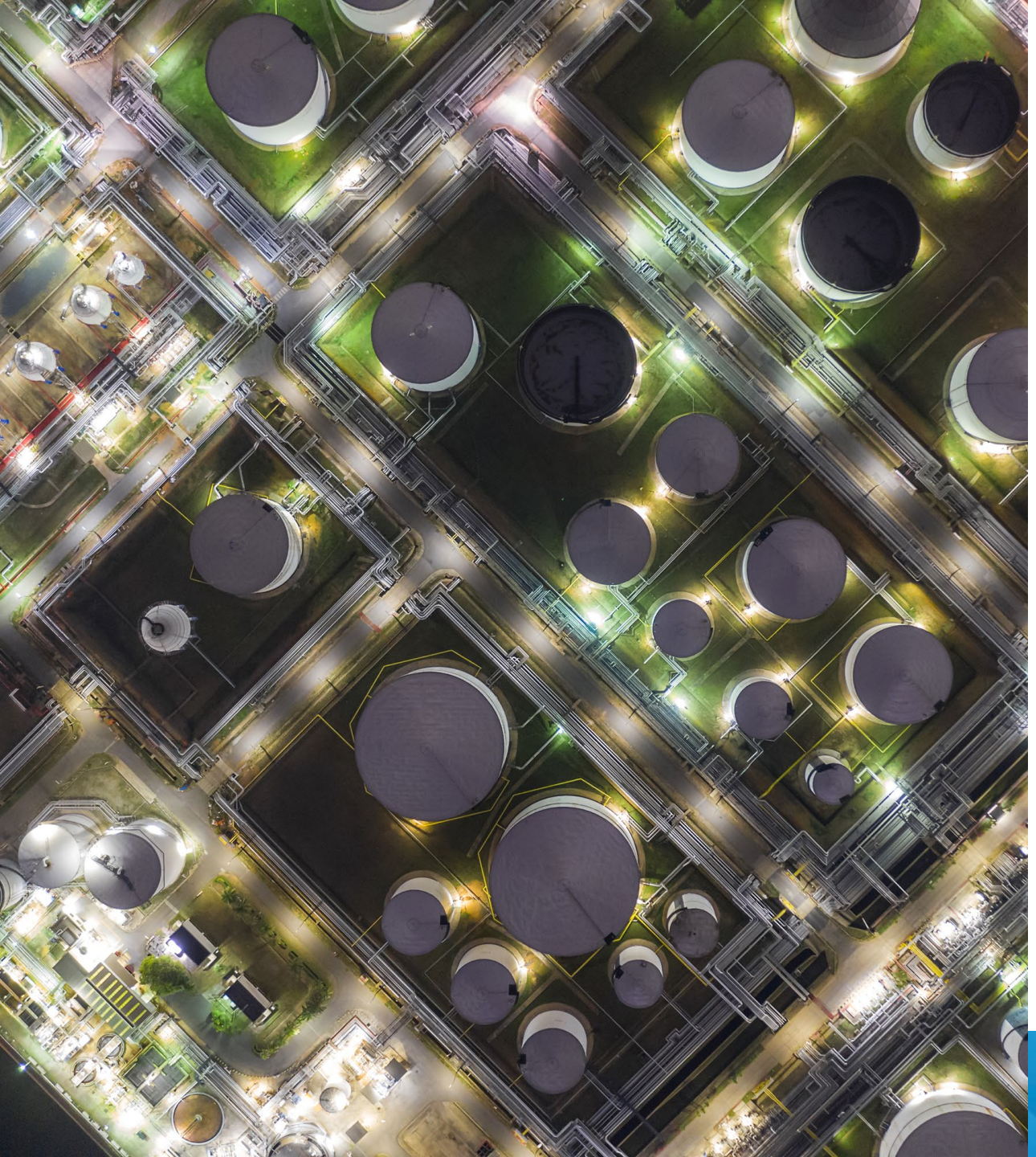


VOCs in ambient air are generally highest closer to emissions sources and disperse with distance

Fenceline communities often have concerns about disproportionate air toxics impacts and environmental justice

Community monitoring is often costly and must be targeted – lower cost screening tools are needed

SPOD sensors can help identify unknown emissions, indicate source direction, speciate plumes (with triggered cans), and inform decision-making on the potential need for further investigation

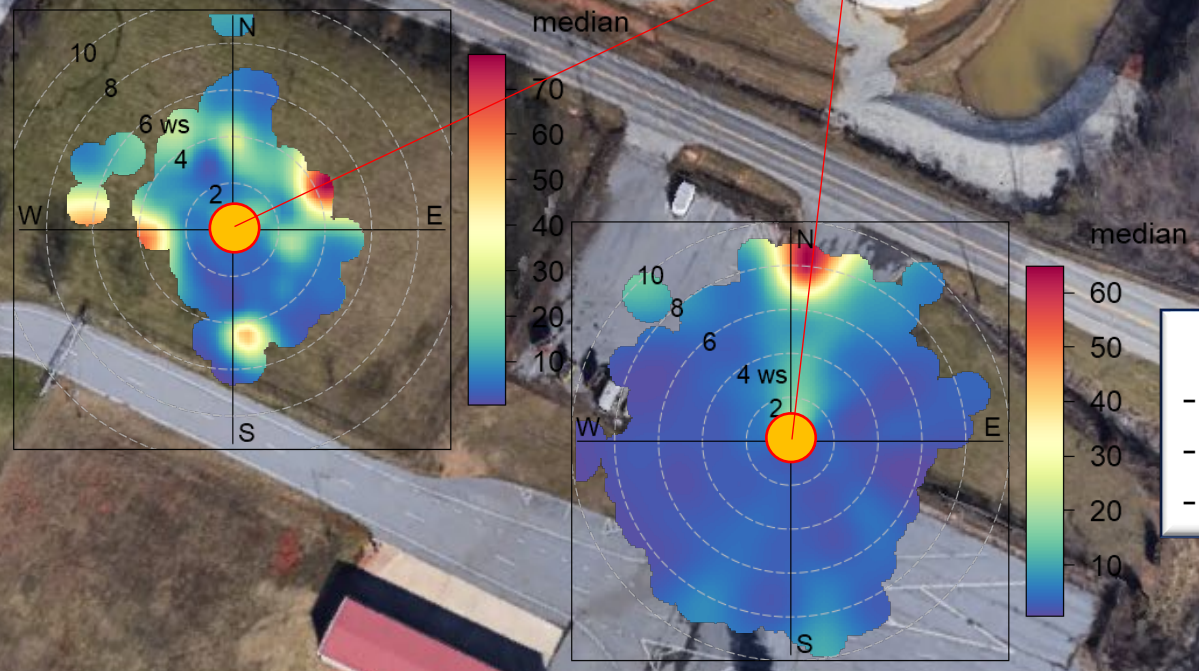


VOC Fenceline Studies

- State and local agencies often want to sample for VOCs in areas of concern, but are limited to 24-hour samples or random grab samples
  - SPODs allow for continuous VOC data and targeted grab samples
  - Useful when there are multiple VOC sources clustered

SPod Signal Triangulation

SPOD Sites located near a terminal storage facilities in Greensboro, NC



Site 1A

- 1 sensor
- 6/30/22 – 9/27/22
- 13,720 5-min values

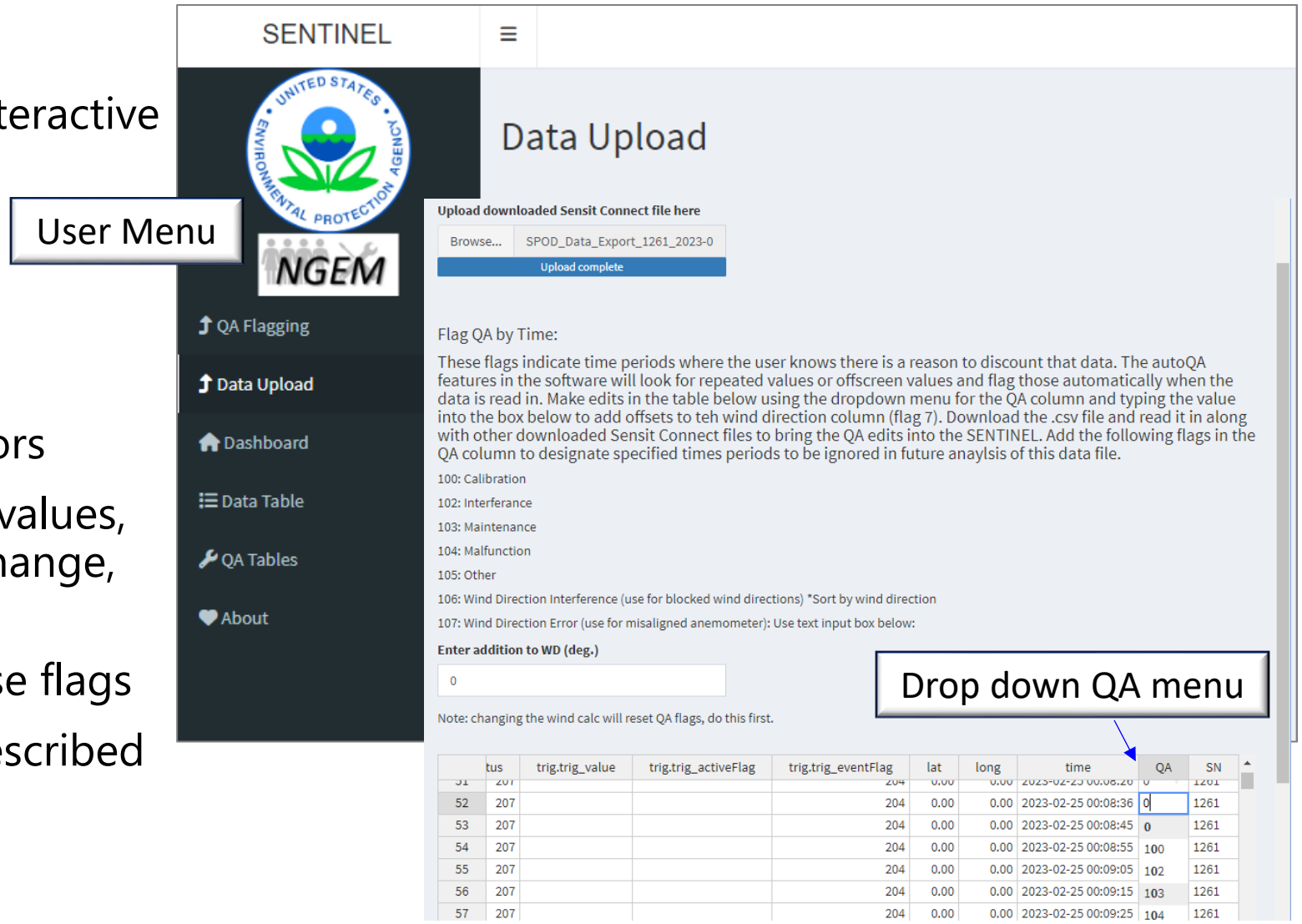
Site 1

- 4 sensors (2 collocated)
- 10/26/21 – 10/17/22
- 178,468 5-min values

SENTINEL Data Processing App: QA

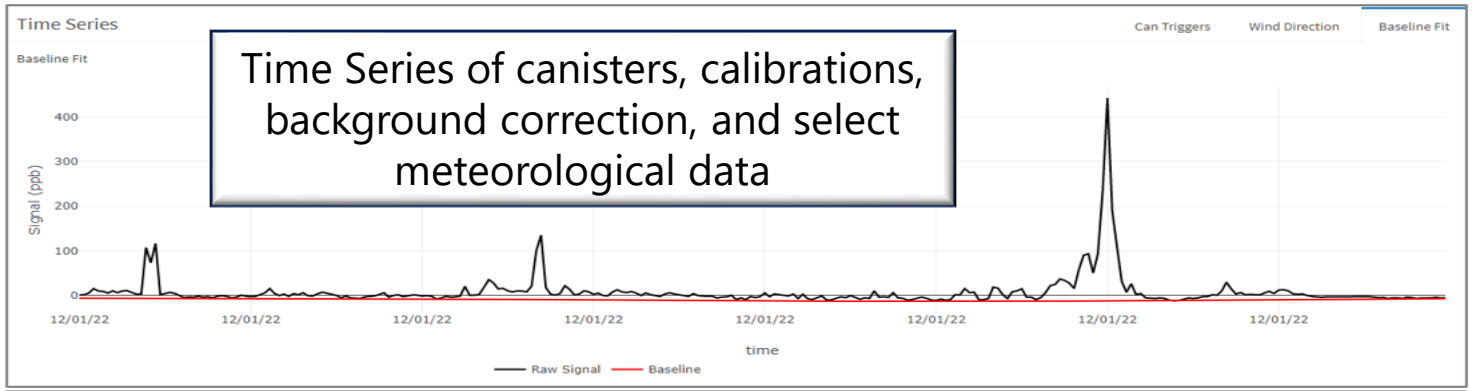
User-friendly, Automated Quality Assurance (QA), Batch-processing, Visualization

- Sensit Connect files uploaded to interactive QA screen for user to flag
  - Calibrations
  - Malfunctions
  - Maintenance
  - Anemometer interferences/errors
- AutoQA in code flags for repeated values, off-screen values, rapid humidity change, and more
- Option to export .csv files with these flags
- Users can generate QA tables as described in Sensit SOP

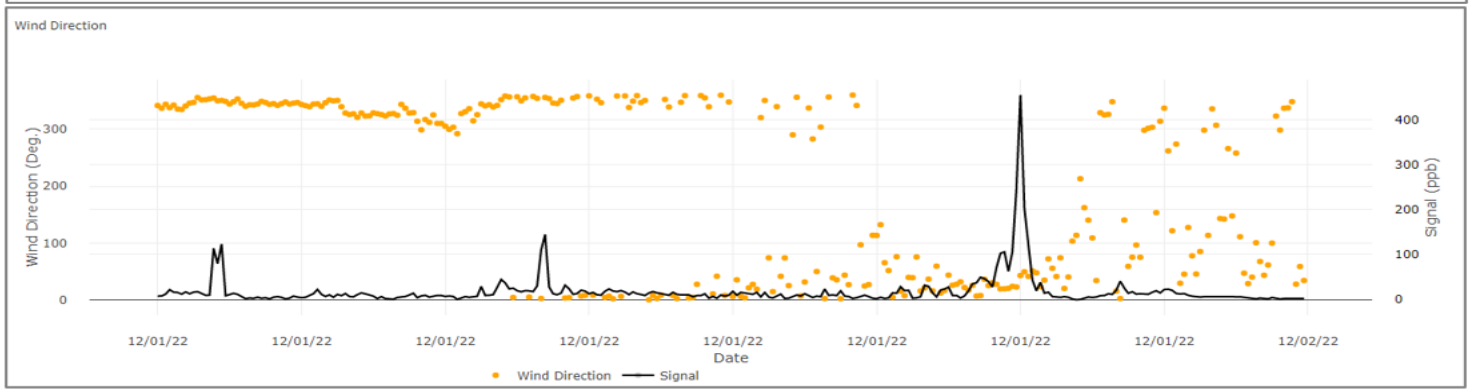


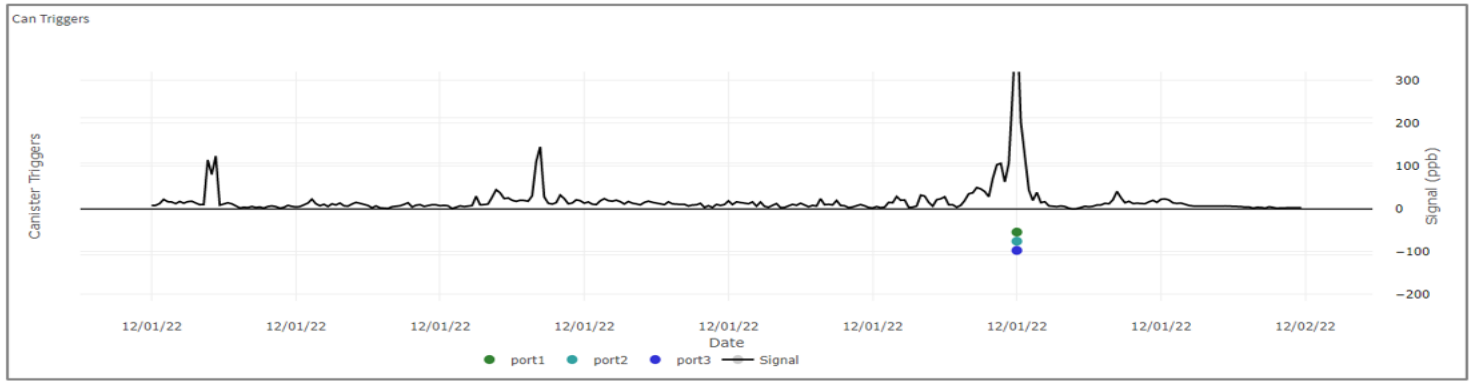
SENTINEL Data Processing App: Dashboard

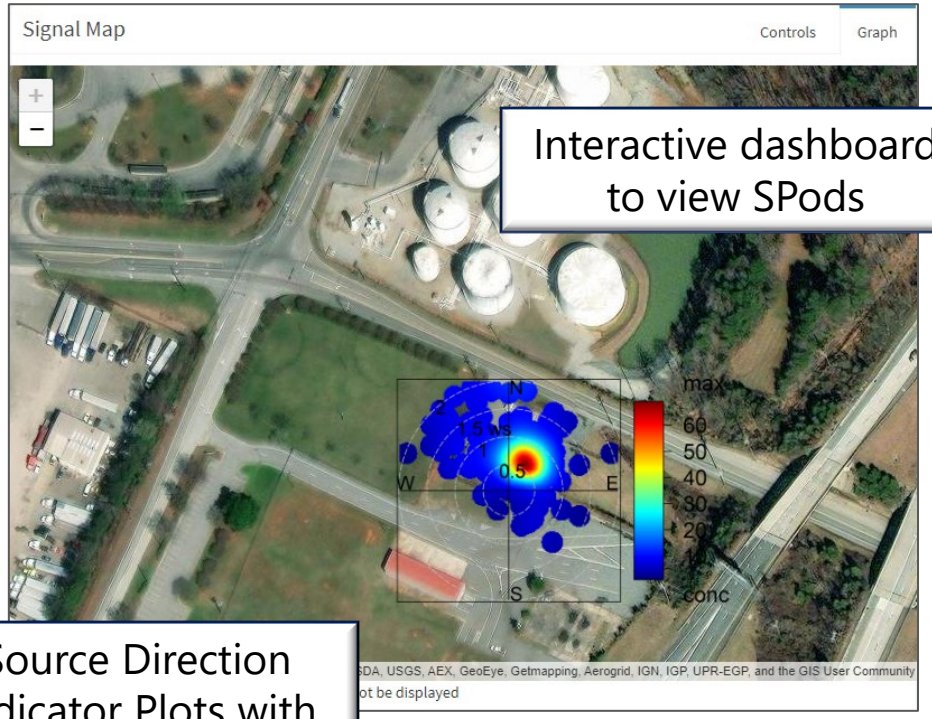
User-friendly, Automated Quality Assurance (QA), Batch-processing, Visualization



Time Series of canisters, calibrations, background correction, and select meteorological data

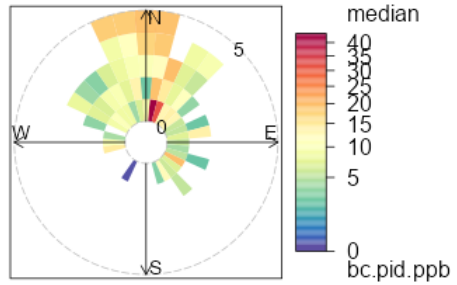


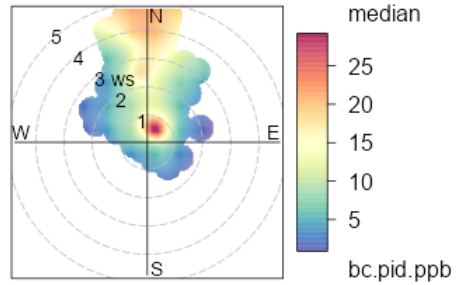




Interactive dashboard to view SPods

Source Direction Indicator Plots with multiple statistics





EPA Region 4 Sensor Loan Program

- EPA Region 4 Program to loan commercial SPODs to state, local, or tribal partners
- Sensor kit with all supplies for deployment:
  - SPOD/tripod/solar panel
  - Canister grab sample system
  - Calibration gear
- SENTINEL open-source data analysis code
- Technical guidance and assistance provided
  - SPOD Operating Procedures
  - SENTINEL App User Guide
- Piloted with Louisville (KY) Metro Air Pollution Control District and Georgia EPD

Loan Program SPOD Deployment

Ground or elevated mounting (e.g., billboard) with canister enclosure

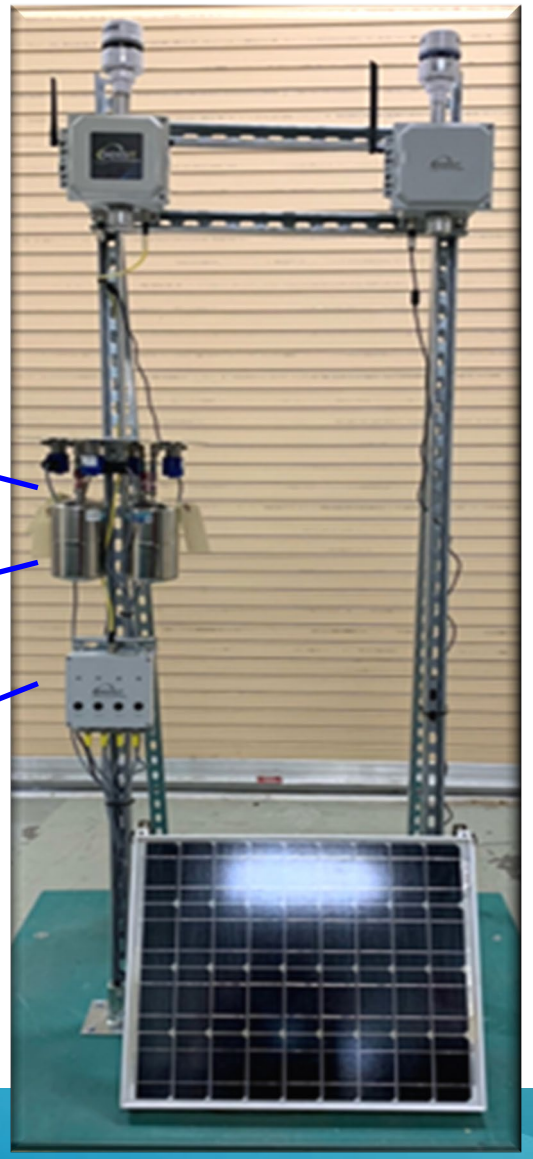
Isobutylene calibration gas

Power Options

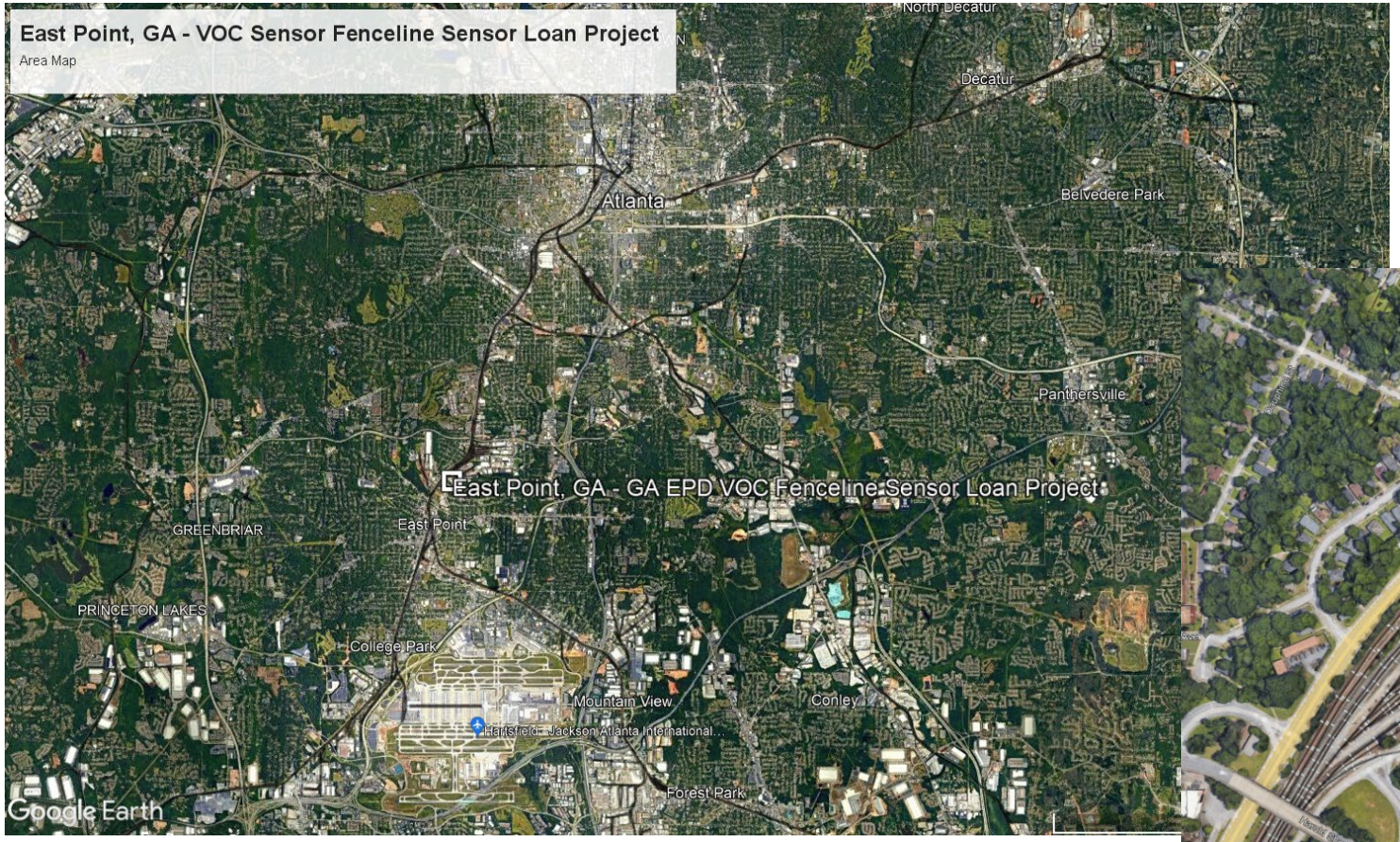
Solar or land power

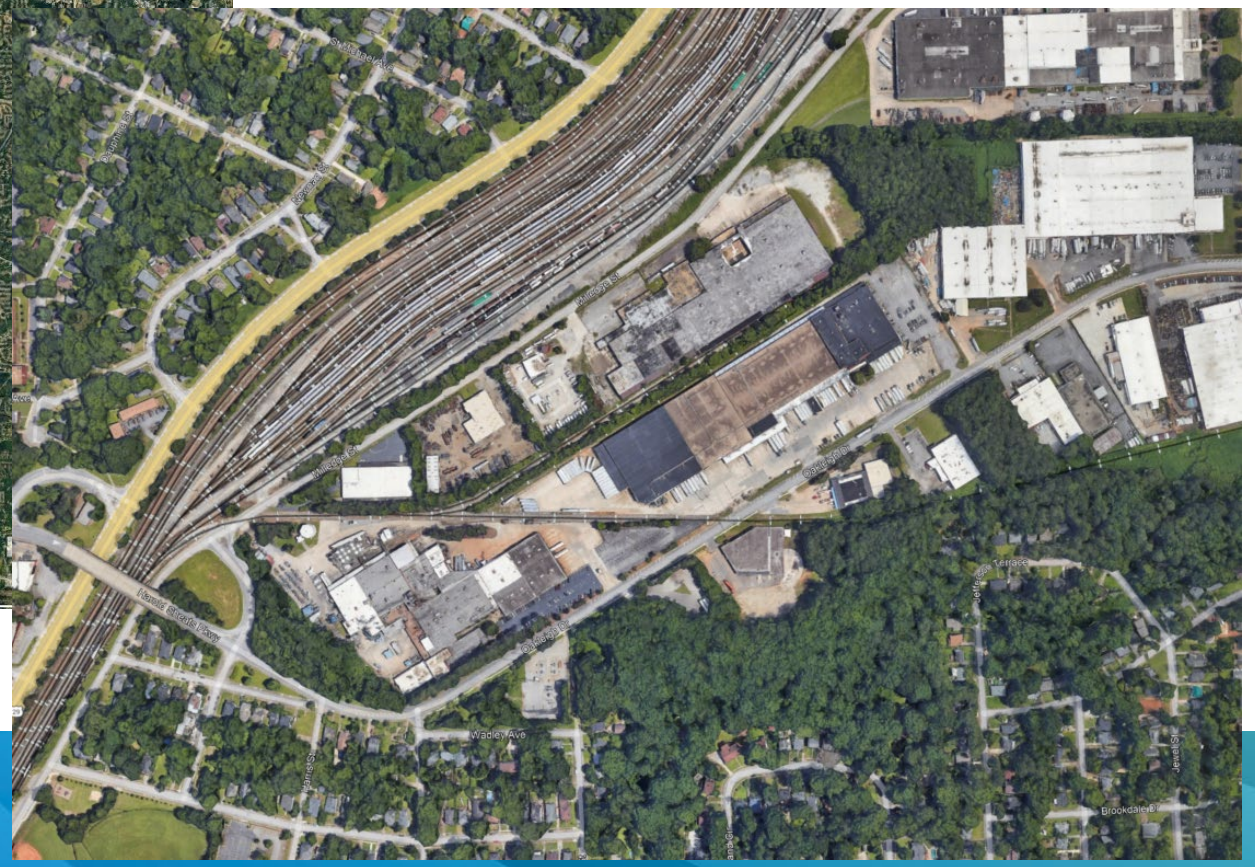
Loan Program Canister Grab Samples

- SPODs can automatically trigger a canister grab sample
- User-defined VOC trigger thresholds or triggered by wind sector
- We use “mini-cans” for the grab samples (easy to ship)
- Canisters analyzed in the Laboratory (e.g., TO-15 Method)
- Speciated VOC data can be compared to PID response factors to calibrate plume response



Pilot Project: East Point, GA

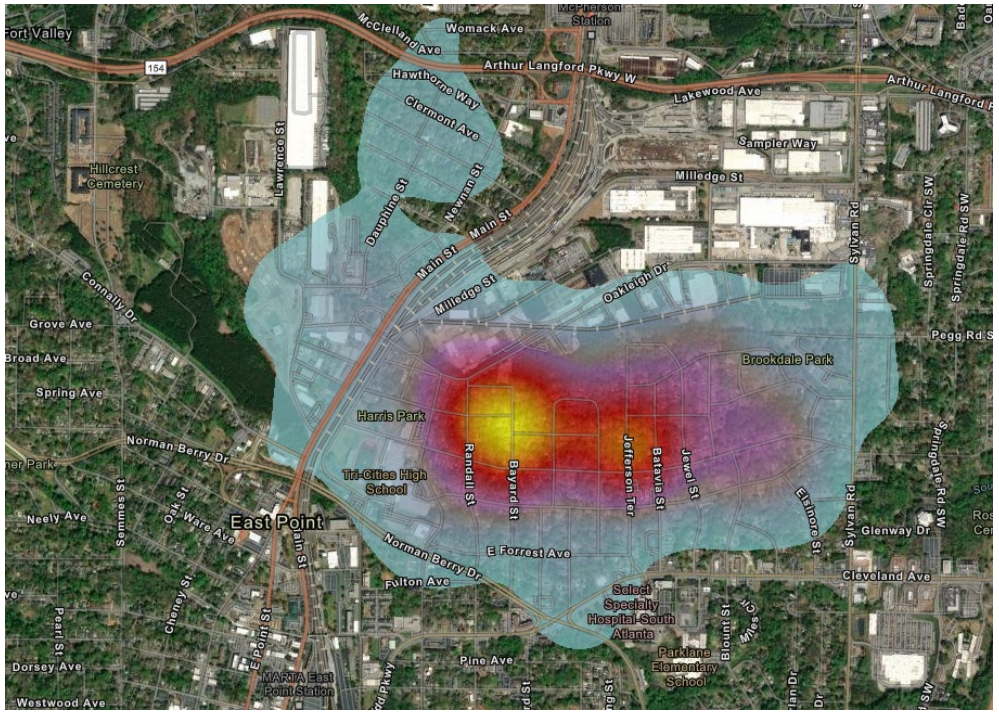




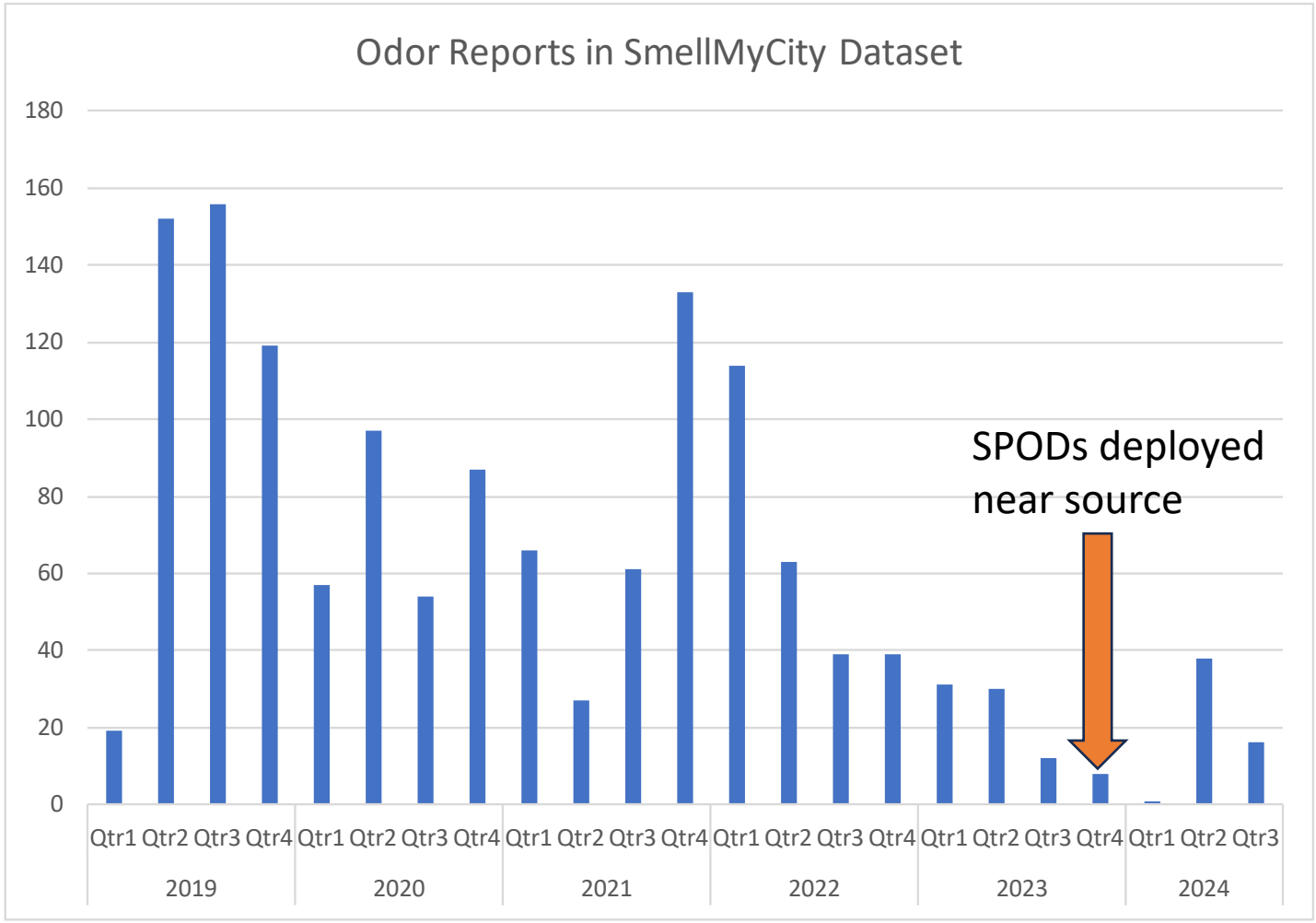
Pilot Project: East Point, GA – Odor Reports

SMELL my CITY

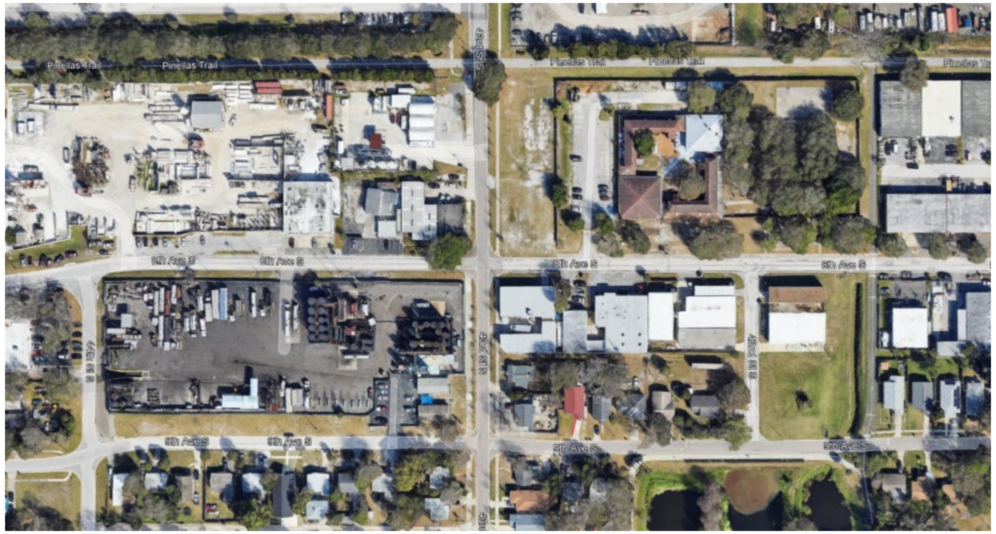
Carnegie Mellon University
CREATE Lab



SmellMyCity Reports Over Time



New Project: Pinellas County, FL



Tampa Bay Times

NEWS / ST. PETERSBURG

St. Petersburg report addresses Childs Park odor, suggests more investigation

A top issue for the majority-Black neighborhood is part of a report set to be presented to City Council members on Thursday.

PINELLAS COUNTY

What's causing the foul smell in Child's Park? Residents hope study will provide answers

by: Annie Mapp
Posted: Oct 18, 2023 / 06:34 PM EDT
Updated: Oct 18, 2023 / 07:27 PM EDT

News Channel 8 on your side

New EPA monitors installed to help solve Childs Park smell mystery

BY SAUNDRA WEATHERS | PINELLAS COUNTY
PUBLISHED 8:41 PM ET APR. 18, 2024

SPOD Resources

EPA Prototype SPOD Research

2019 Rubbertown Study

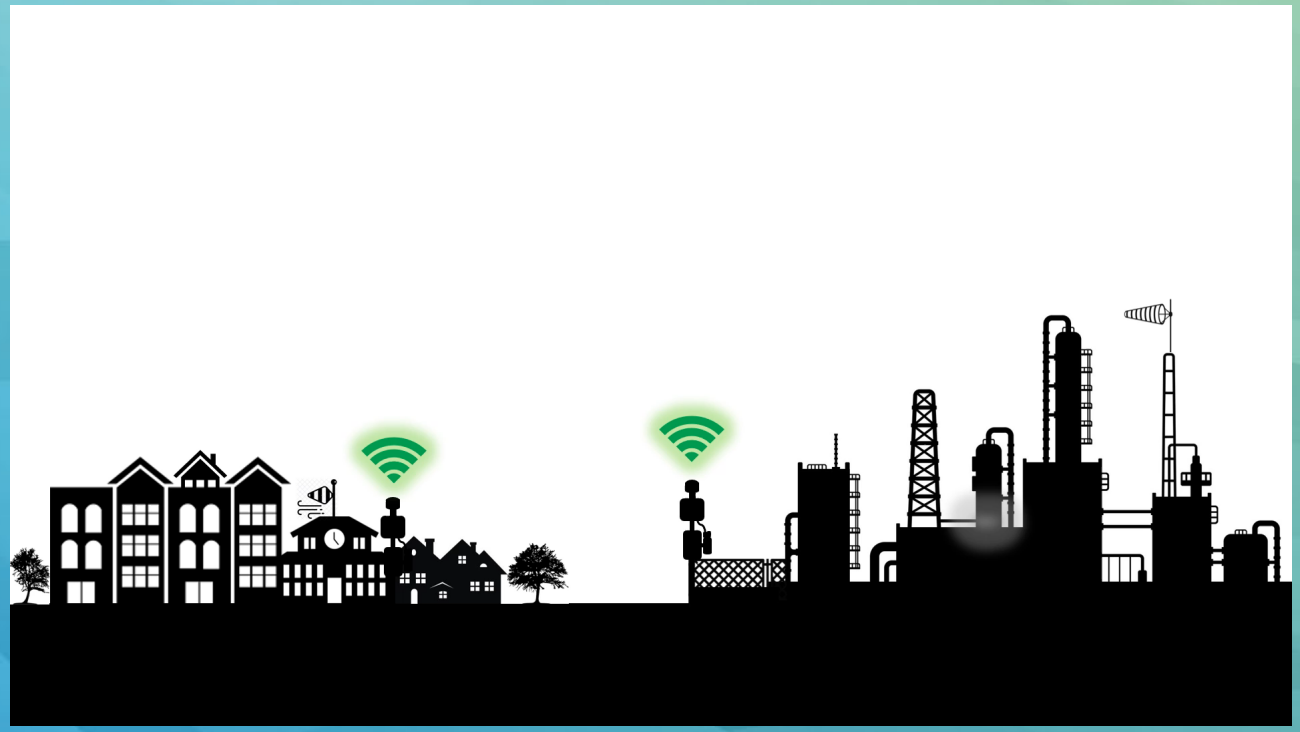
2022 Rubbertown Study

Ongoing SPOD Research and Analytics

NGEM Advancements Seminar

Fenceline and Community Sensor Comparison Presentation

Tools and Training Webinar on SPods



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https://www.epa.gov/ga/epa-region-4-air-sensor-loan-programs

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