Monitoring Volatiles using a Mobile Real-Time Mass Spectrometer

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PRESENTATION OVERVIEW

1. How SIFT-MS works
2. Clean Air Roadshow
3. Interesting findings
4. Other mobile applications

WHAT MAKES SIFT-MS SO SPECIAL?

Single analysis detects a wide variety of compounds

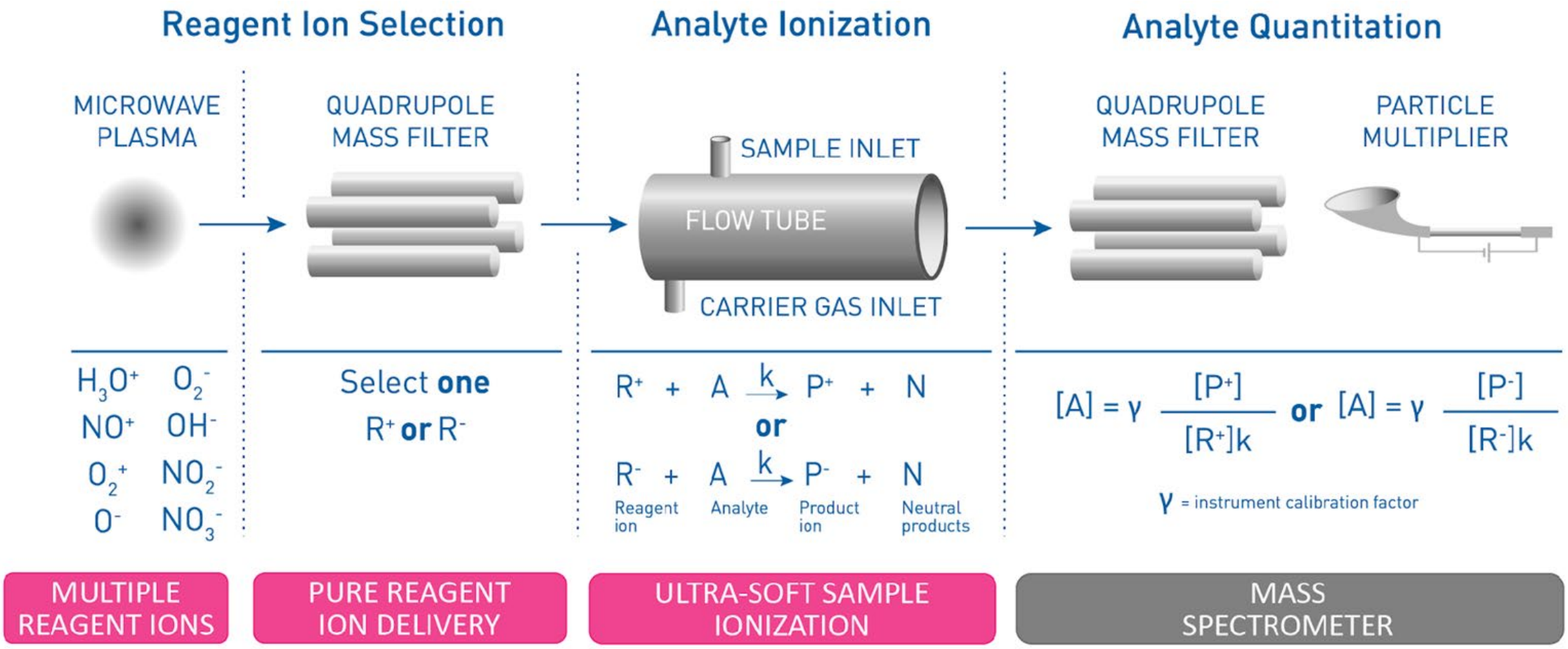
Real-time, dynamic, and repeatable analysis

High selectivity and sensitivity (pptv)

No sample preparation

Low operating costs and long-term stability

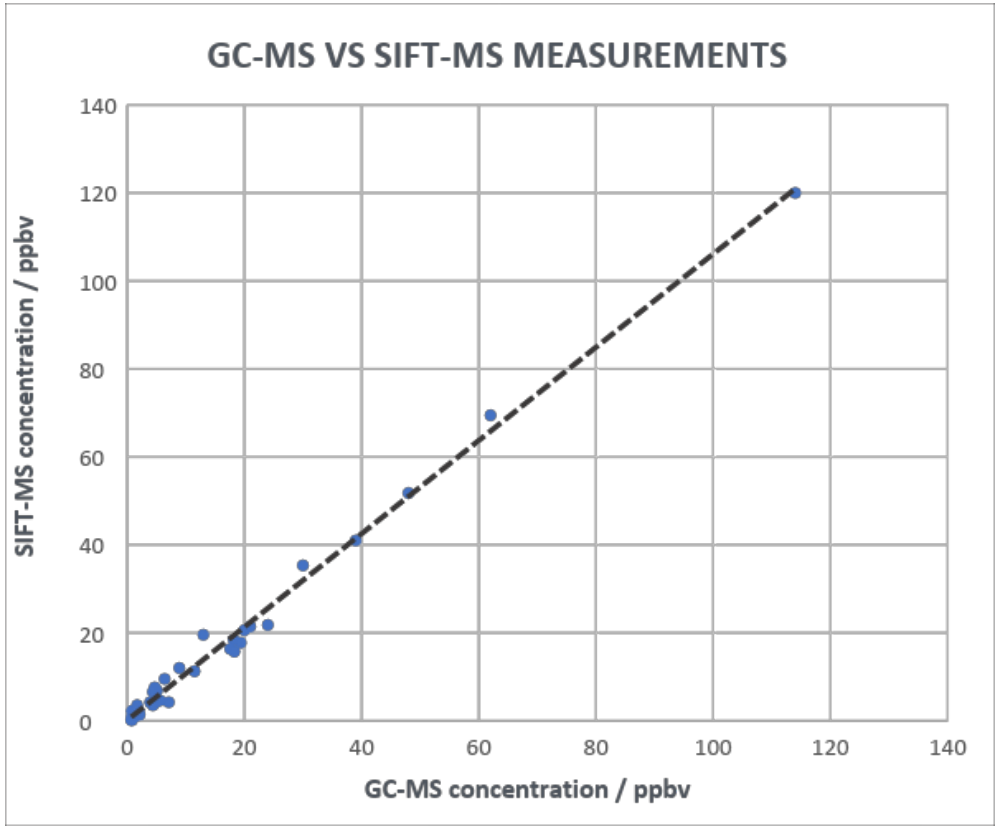
SIFT-MS: HOW THIS SOFT CHEMICAL IONIZATION TECHNIQUE WORKS



SEPARATION THROUGH GAS PHASE ION-MOLECULE CHEMISTRY

Chemical Mechanism	H_3O^+	NO^+	O_2^+	OH^-	O^-	O_2^-	NO_2^-	NO_3^-
Proton transfer (PT)	✓							
Electron transfer (ET)		✓	✓			✓		
Dissociative ET		✓	✓					
Hydride abstraction		✓						
Association	✓	✓		✓	✓	✓		
Proton abstraction				✓	✓	✓	✓	✓
Hydrogen atom transfer					✓			
Associative detachment				✓	✓	✓		
Displacement				✓	✓			
Elimination				✓	✓			

COMPARABLE QUANTITATION WITH CONVENTIONAL TECHNIQUES



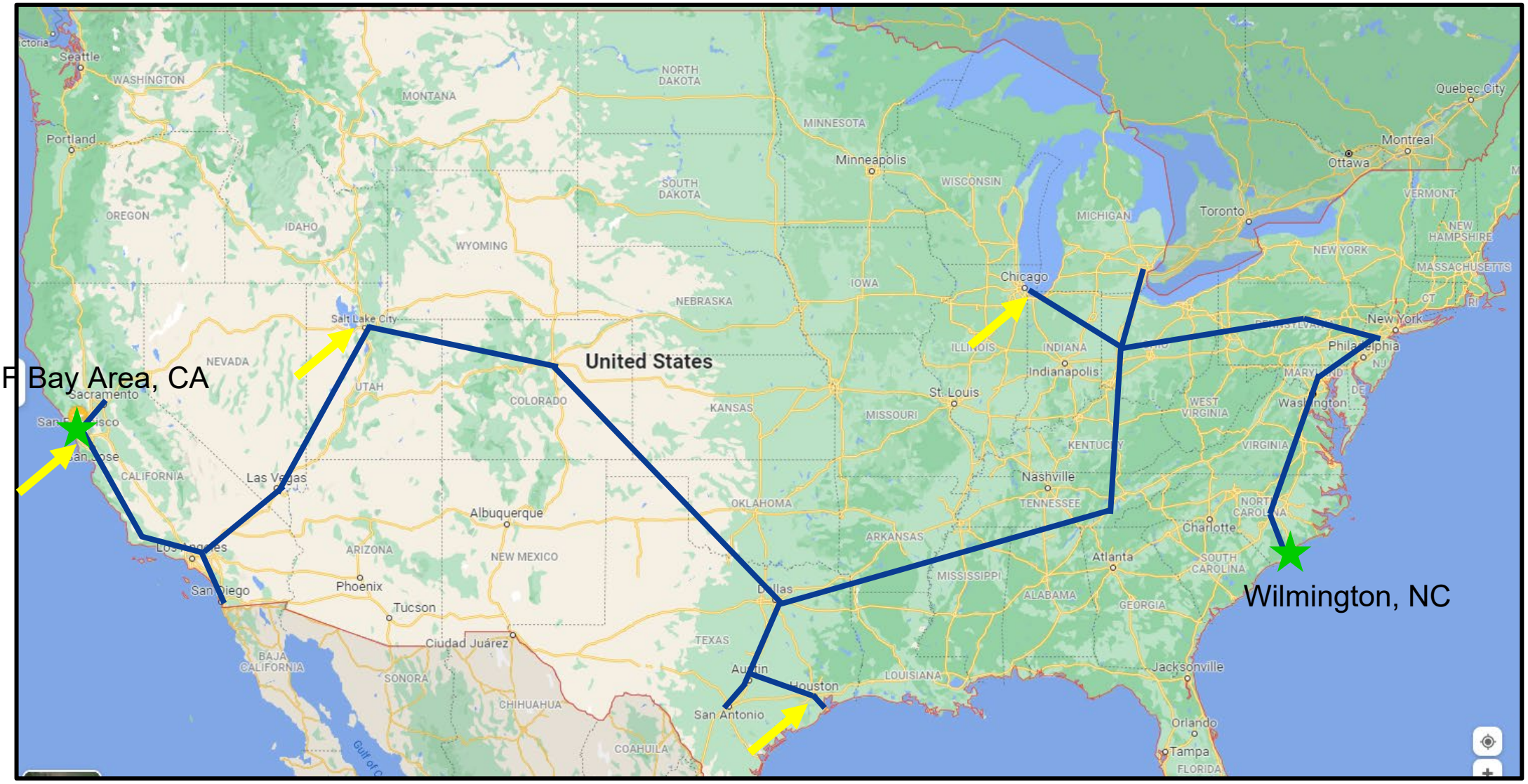
Rapid Commun. Mass Spectrom. **2014**, *28*, 10–18

THE SYFT USA MOBILE LAB

TAKE AWAYS FROM ROADSHOW VISITS

- Instrument start up takes 30-45 minutes.
- Method creation from library takes <5 minutes.
- Data analysis is easy and operator friendly.
- Data output from GPS software is real time!

CLEAN AIR ROADSHOW

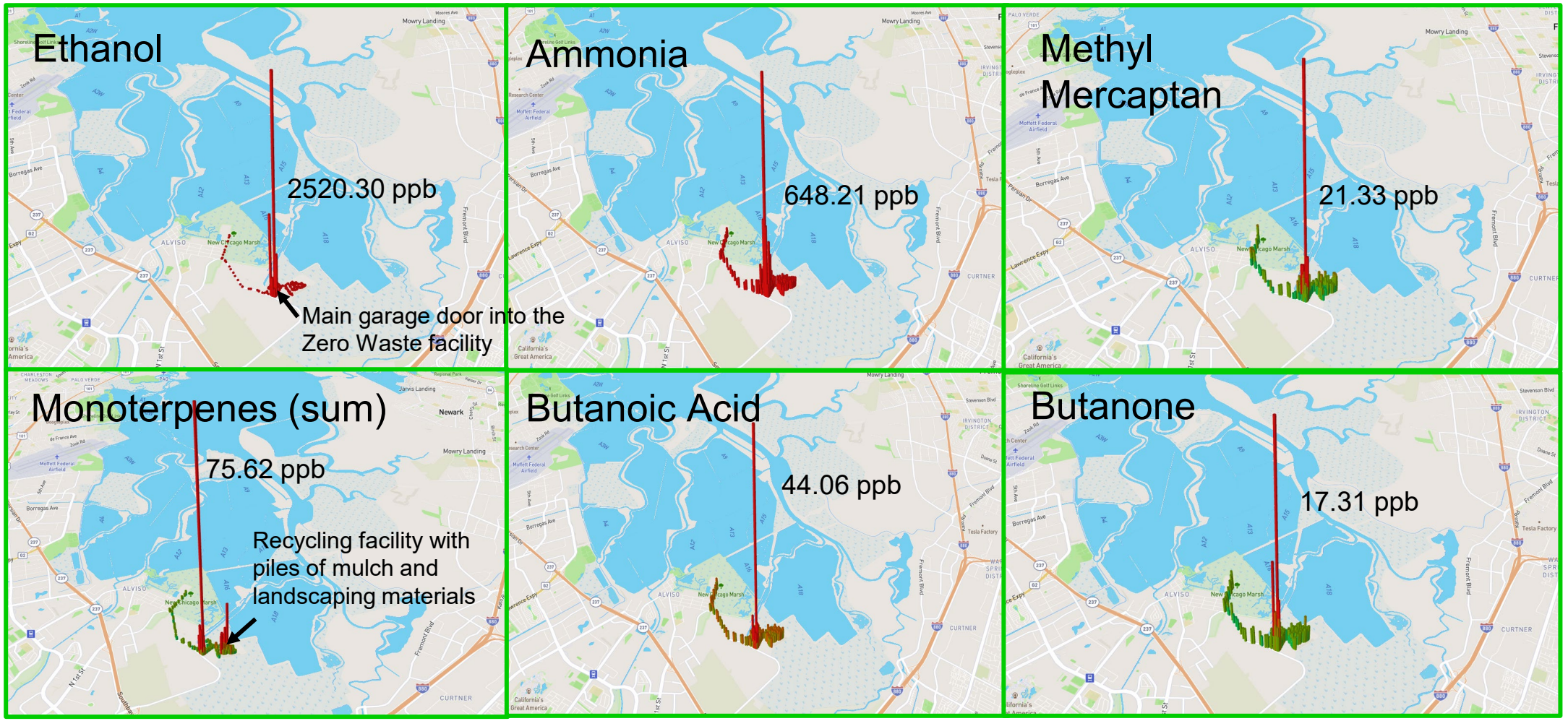


ZERO WASTE FACILITY, MILPITAS, CA

- Milpitas is home to various waste disposal, recycling and compost facilities
- There are frequent odor complaints from the adjacent communities
- Most odorous VOCs have detection thresholds lower than what can be measured
- There are no federal regulations on odorous VOCs

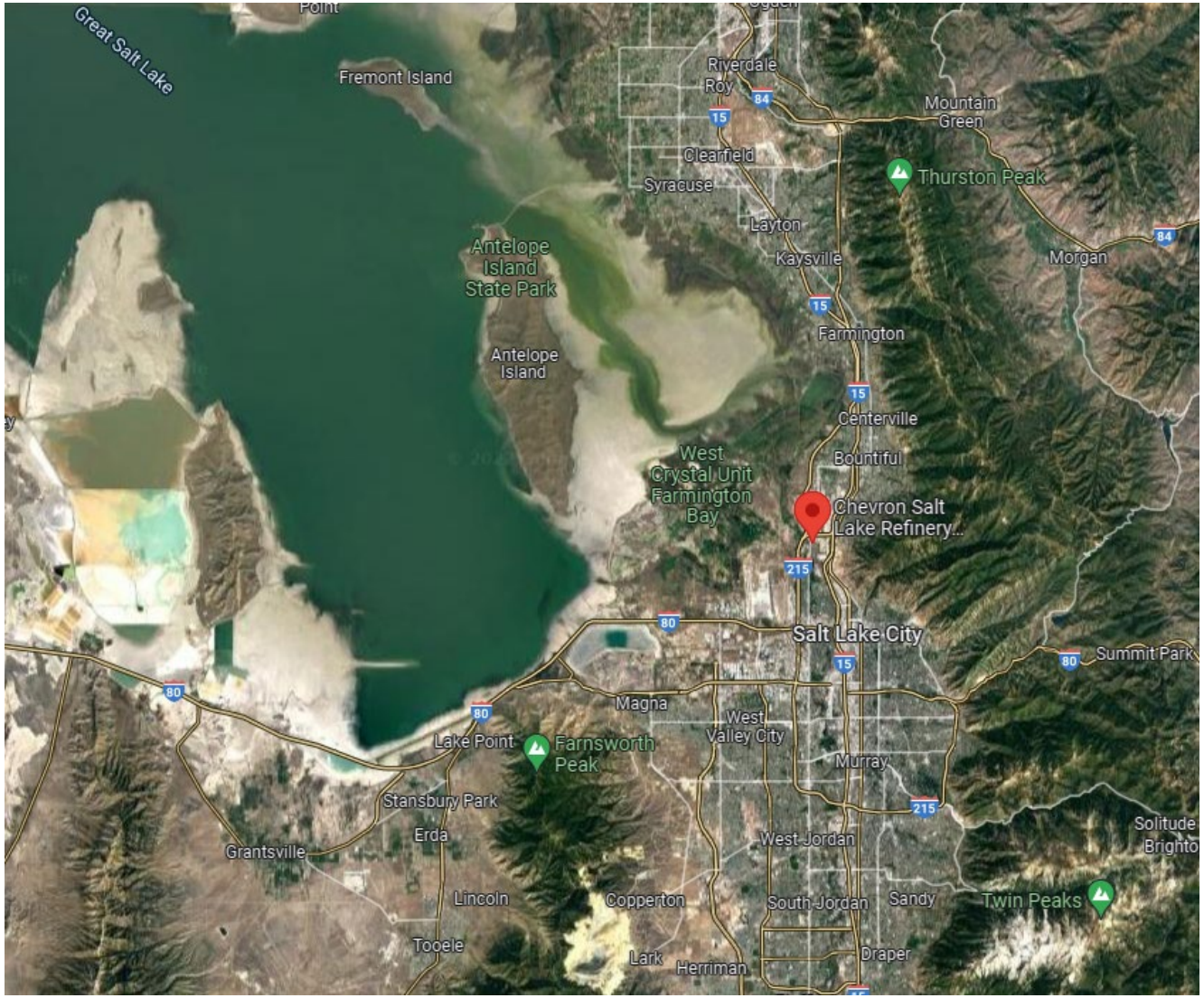
In collaboration with Eric Stevenson (BAAQMD) and Smartex

ZERO WASTE FACILITY, MILPITAS, CA

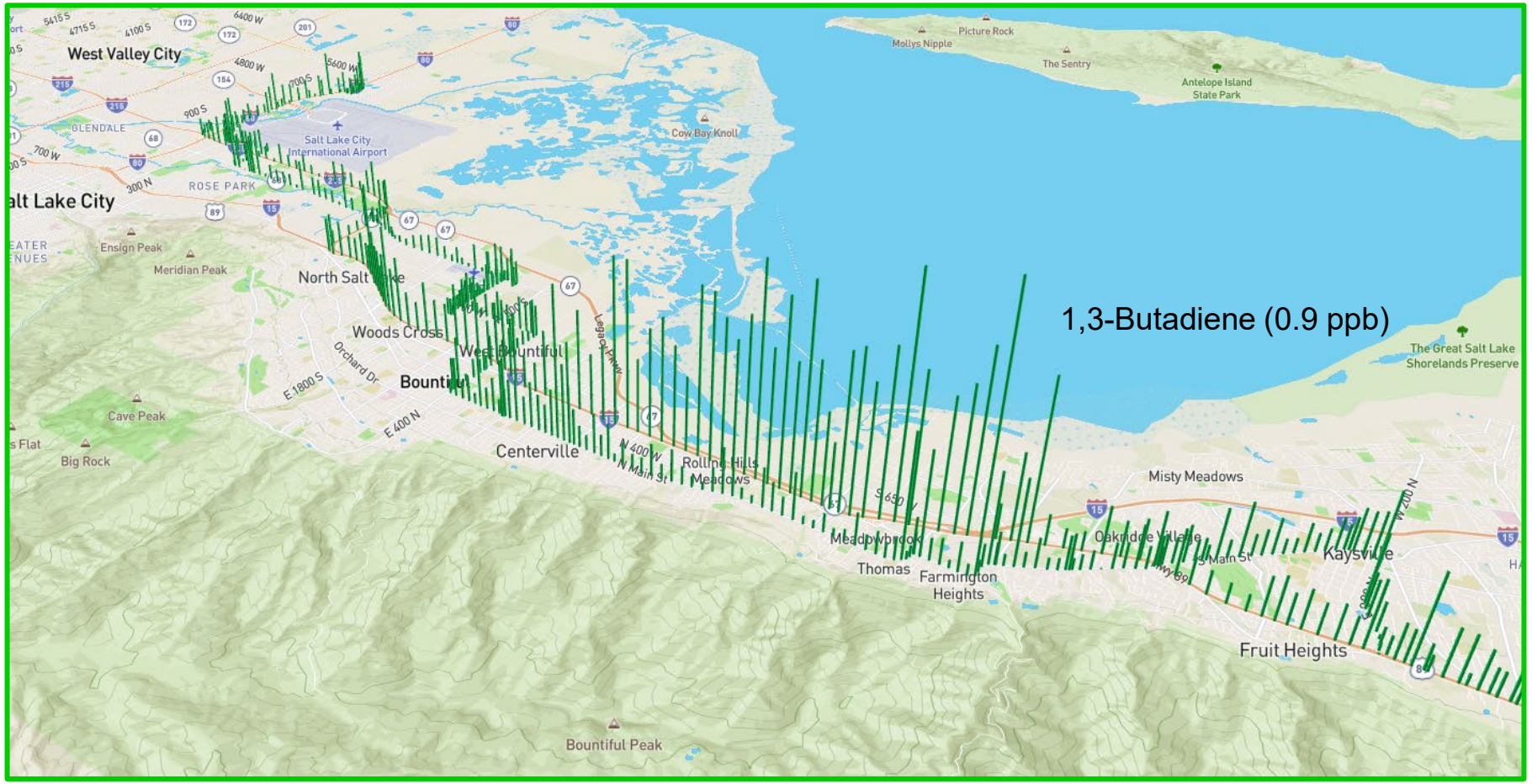


REFINERY DRIVE-BY – SALT LAKE CITY, UT

- Our path east was guided by locations where we had set up demonstrations
- Asked locals where there were air quality concerns in their city
- Chevron Refinery, SE side of the Great Salt Lake



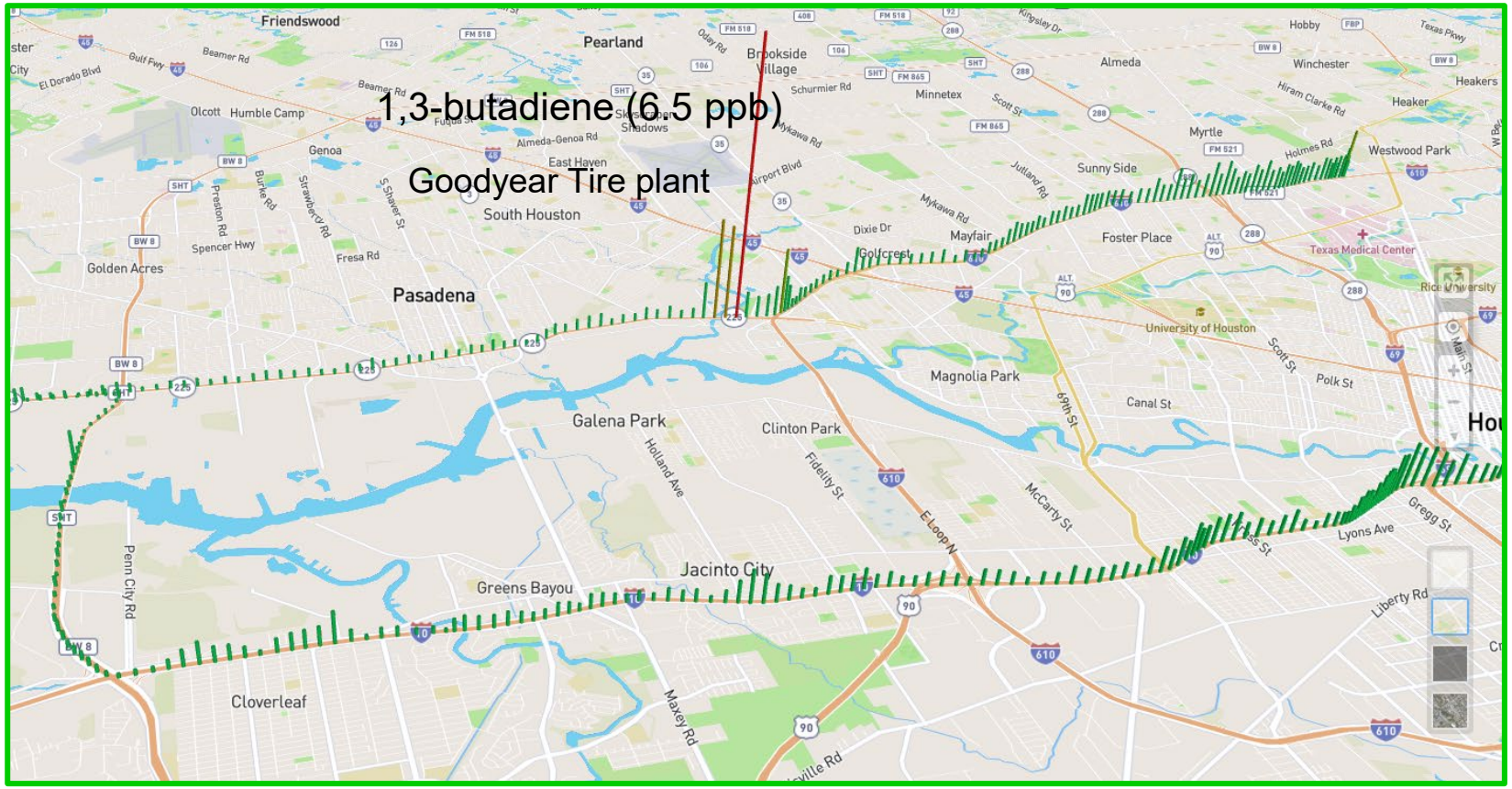
REFINERY DRIVE-BY – SALT LAKE CITY, UT



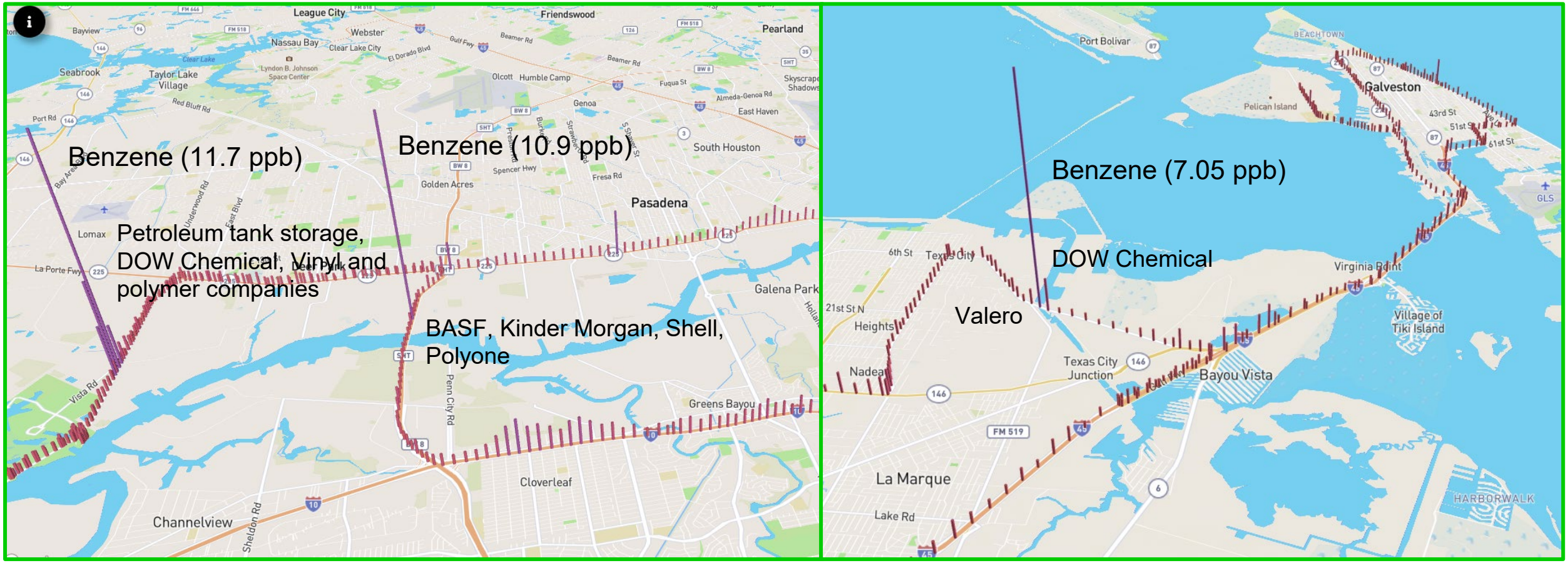
SAMPLING FROM HOUSTON TO THE GULF OF MEXICO

- One Breath Houston suggested we drive by the refineries and chemical plants southeast of Houston
- Sampling south of Houston to the Gulf of Mexico was conducted over two days in late June 2021.

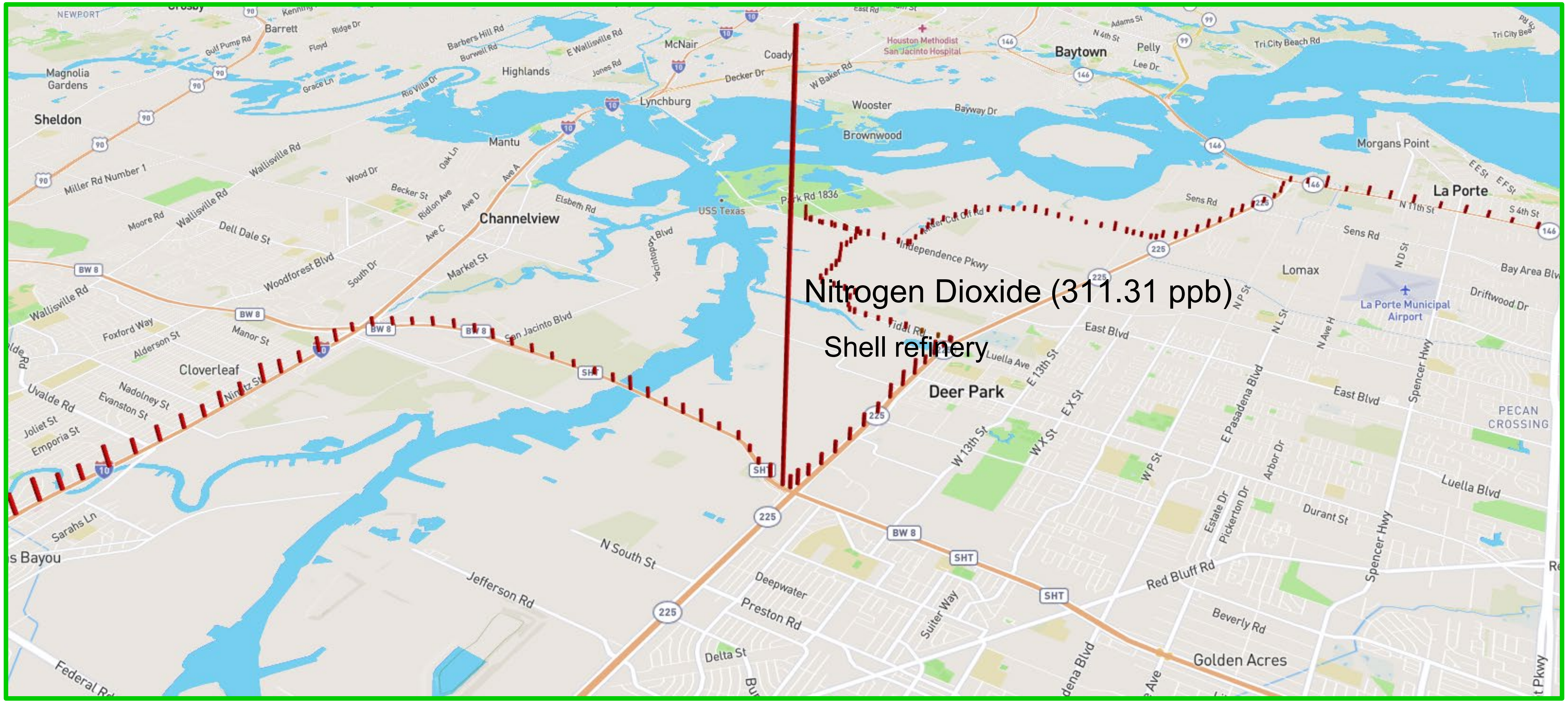
REAL-TIME MEASUREMENT OF 1,3-BUTADIENE IN TEXAS



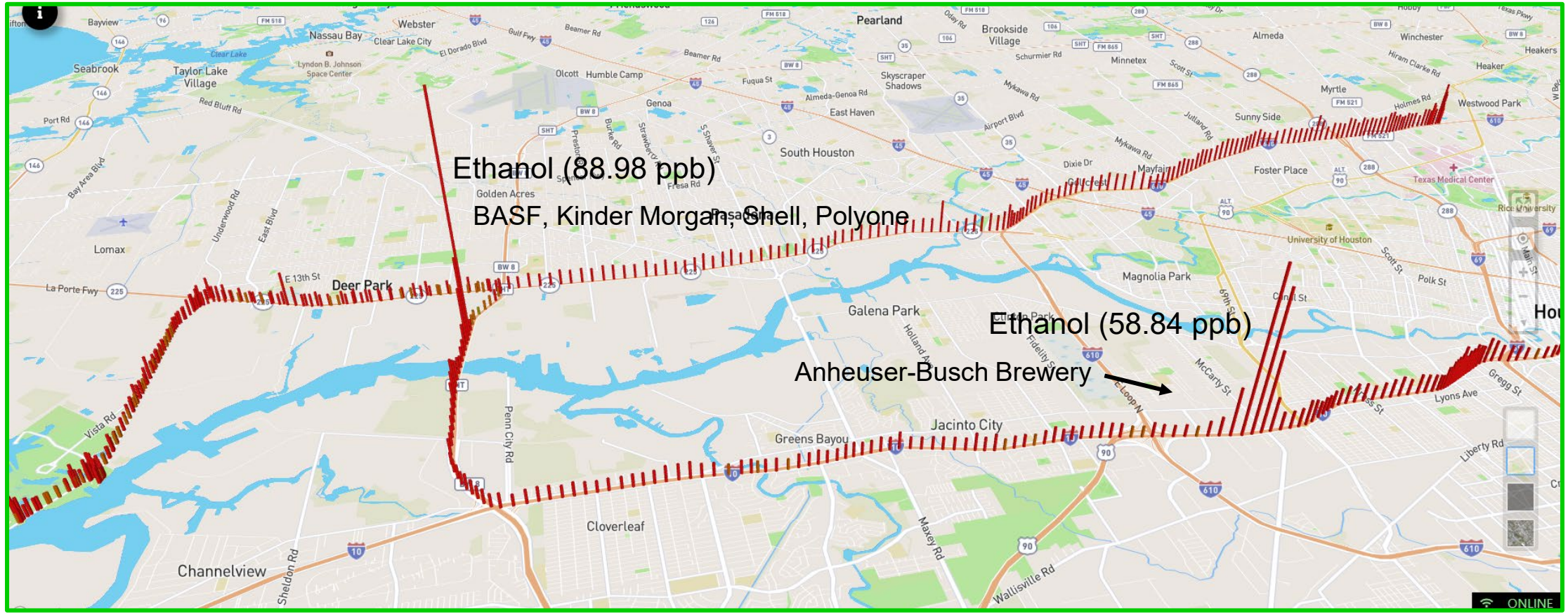
REAL-TIME MEASUREMENT OF BENZENE IN TEXAS



REAL-TIME MEASUREMENT OF NITROGEN DIOXIDE IN TEXAS



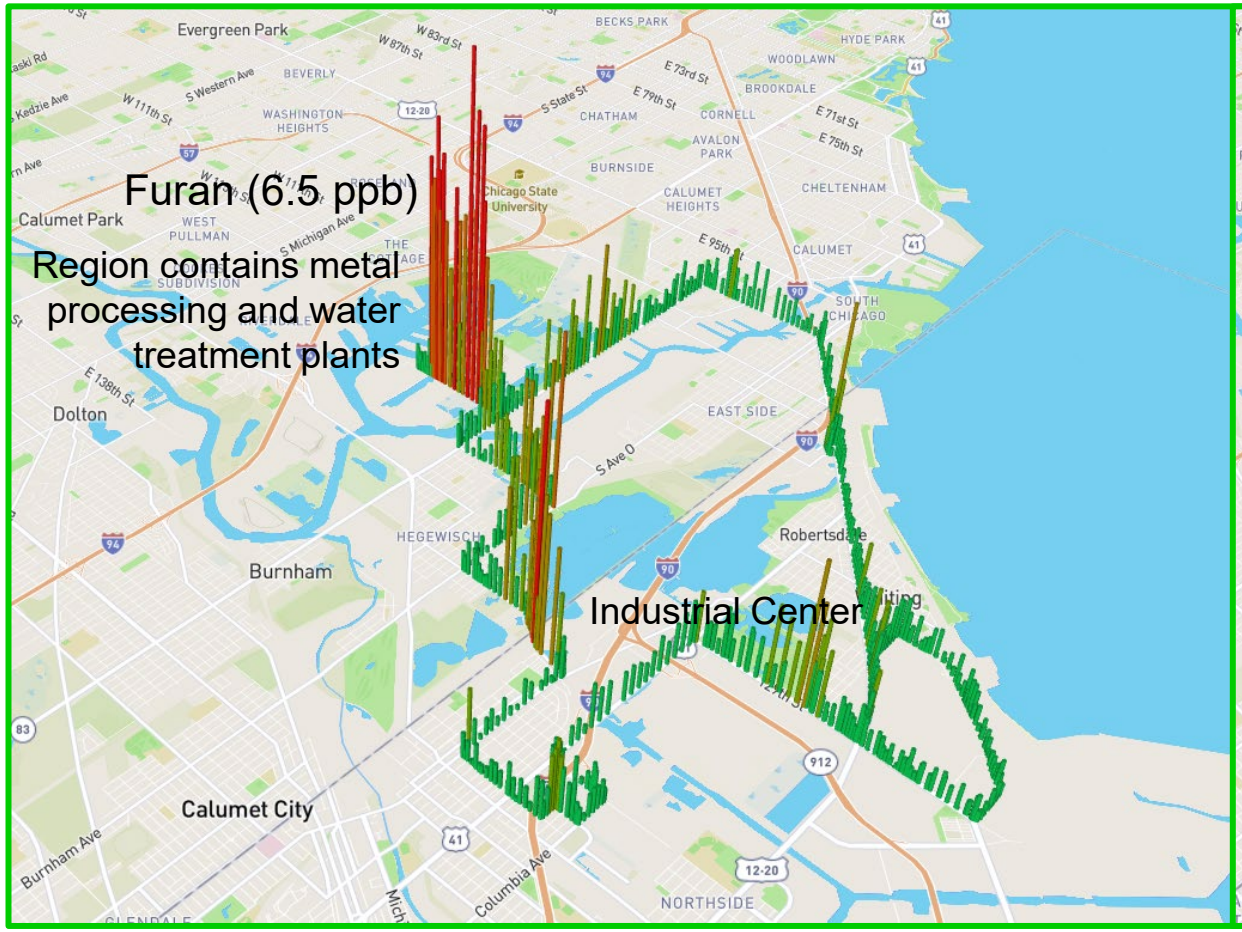
REAL-TIME MEASUREMENT OF ETHANOL IN TEXAS



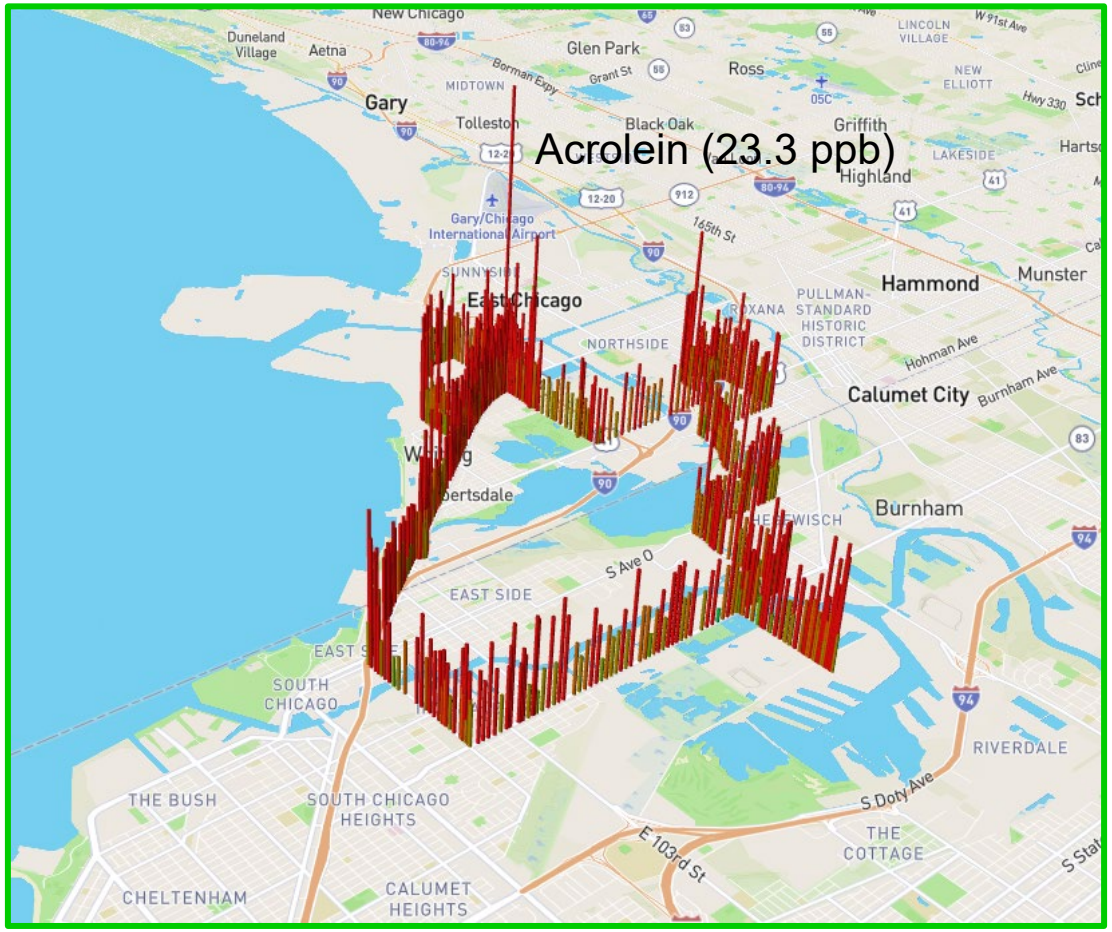
SAMPLING IN WHITING, IN
SIDE-BY-SIDE WITH EPA REGION 5

- EPA Region 5 was conducting sampling in Whiting, IN in August 2021

REAL-TIME MEASUREMENT OF FURAN & BTEX IN WHITING, IN

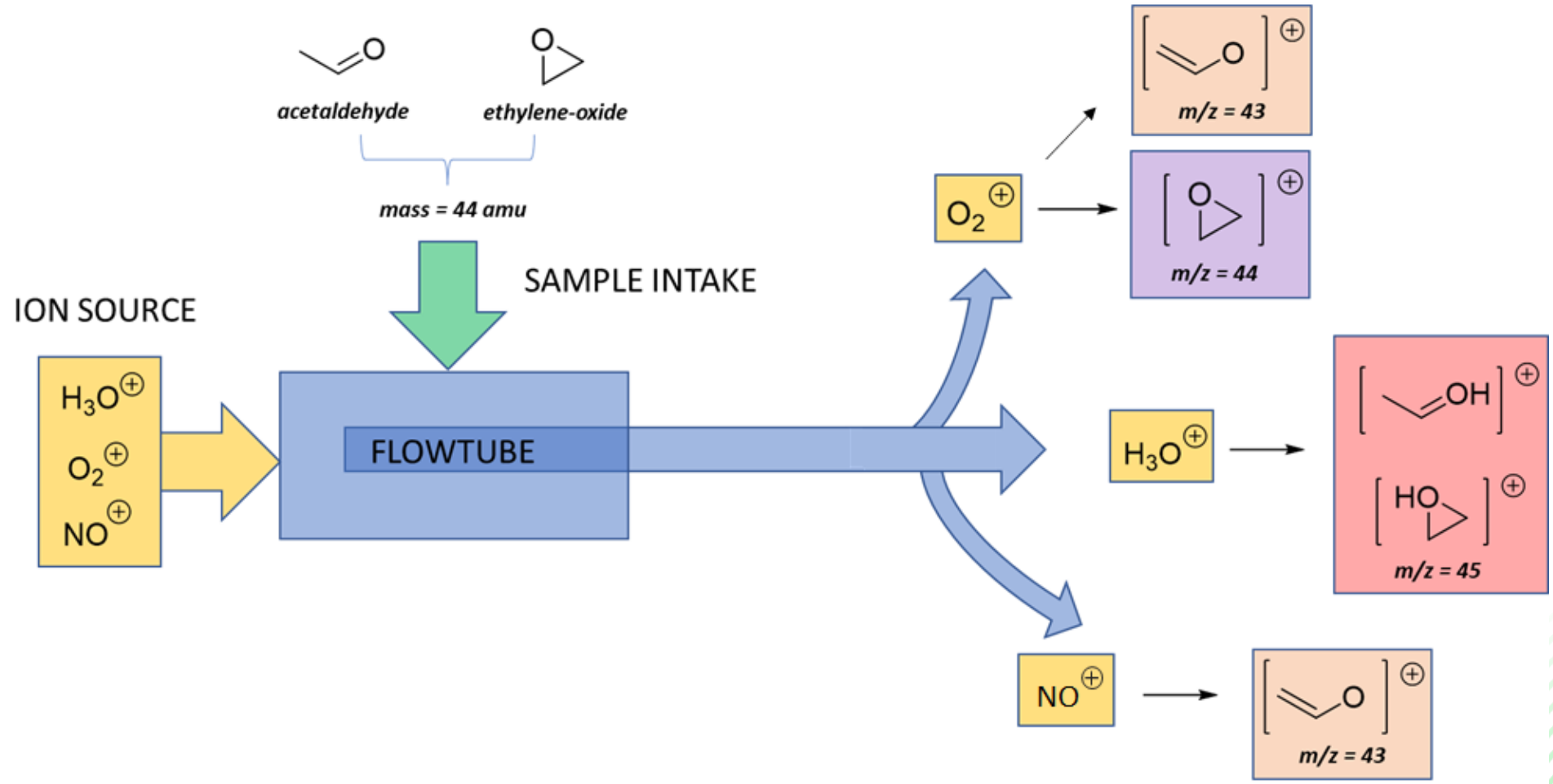


REAL-TIME MEASUREMENT OF ACROLEIN IN WHITING, IN



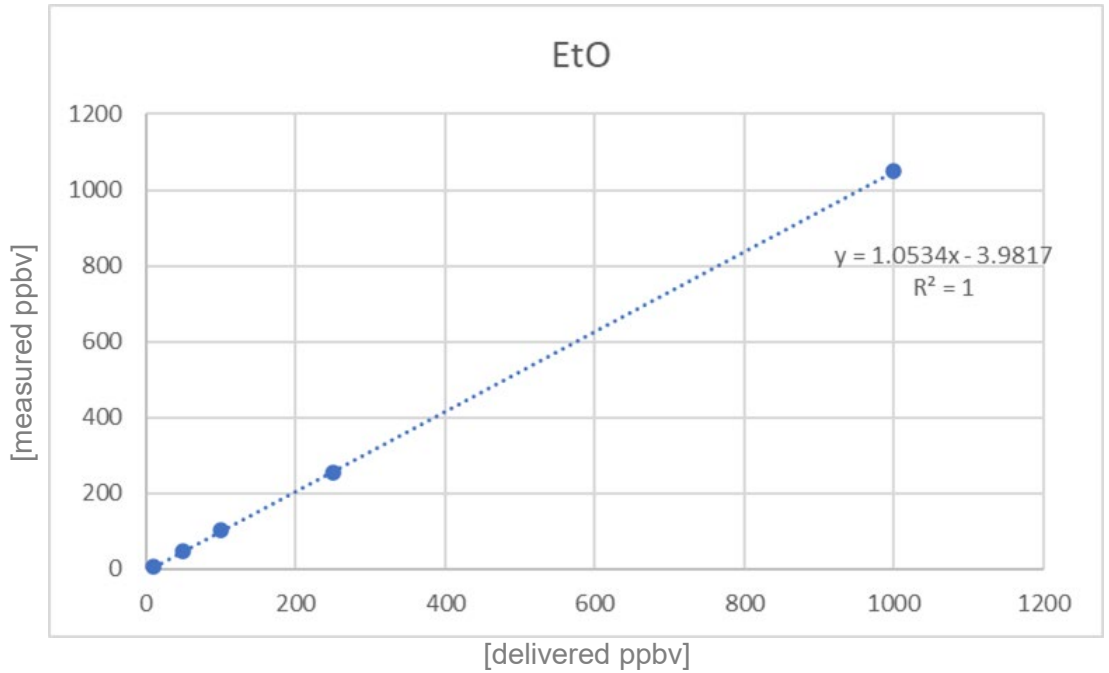
ETHYLENE OXIDE

Addressing key challenges using SIFT-MS



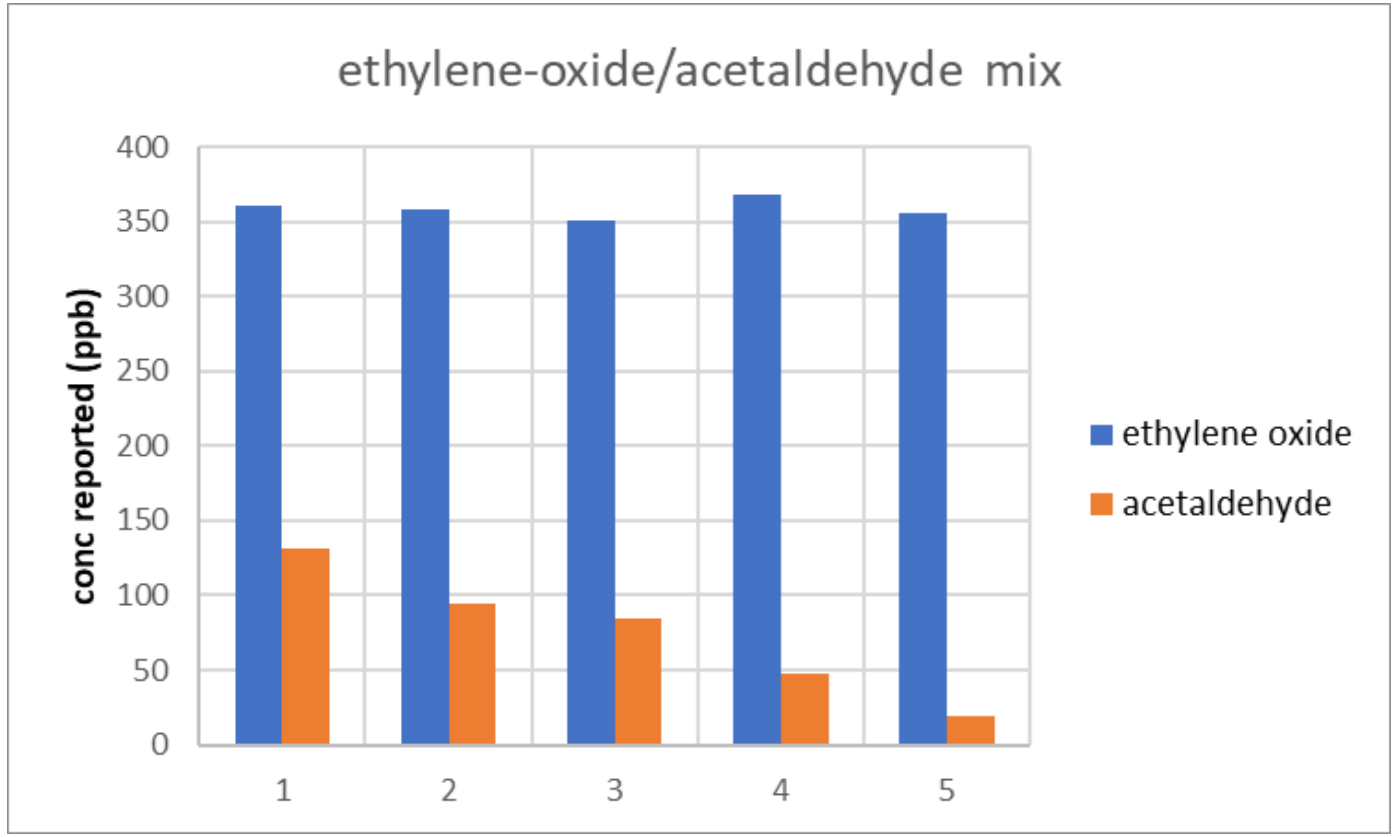
ETHYLENE OXIDE

Preliminary results from our mobile lab

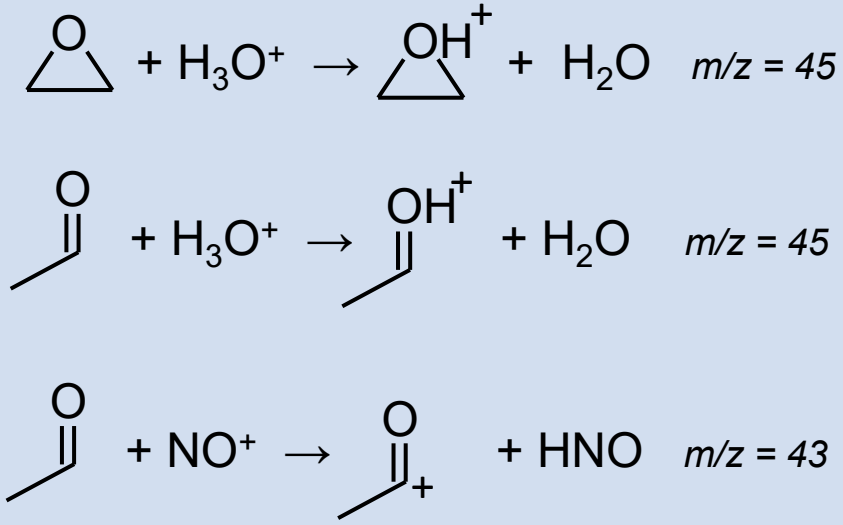


Experiments are ongoing to determine **LODs** and **LOQs** in a mobile setting (Collaboration with Sonoma Tech)

CONSISTENT REPORTING OF EtO WITH VARIABLE ACETALDEHYDE



Resolving acetaldehyde and ethylene oxide with ion chemistry



SUMMARY

Syft Technologies is a global, fast-growing company with a focus on building robust solutions for industry.

SIFT-MS has unique characteristics that make it well suited to air quality measurement. Most notably the selectivity that comes from multiple rapidly switchable reagent ions.

Syft instruments have a track record of robust performance in a mobile setting

The findings shown from our Clean Air Roadshow were generated in real-time with minimal method development or optimization.

ACKNOWLEDGEMENTS

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