THIS PRESENTATION WILL

- Present the current challenges with measuring fugitive emissions
- Present an innovative technology for measuring fugitive emissions
  - Demonstrate its capabilities through 2 case studies

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Nature of emissions	What is needed
Can occur in unsuspected locations	Large spatial coverage
Emission rates vary over time	Continuous monitoring
Confirmation bias	Undirected (unbiased) monitoring

Periodic monitoring approaches frequently miss fugitive emissions.

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Dennis Prince, Airdar

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Sonar

Radar

Dennis Prince, Airdar

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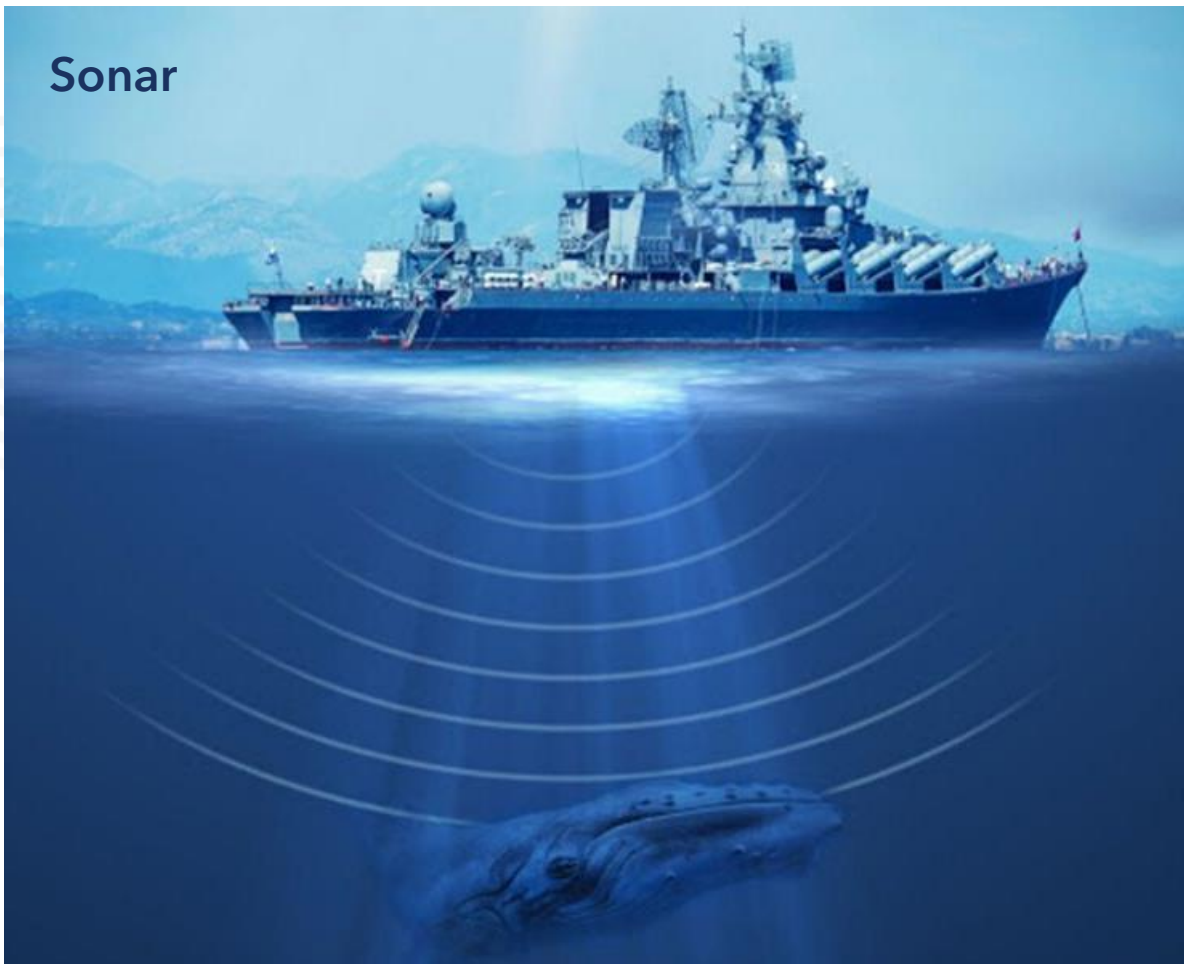
The nose: standard detectors

Concentrations <u>continuously</u> measured

The brain: data analytics

Tracks plumes back to their sources and quantify emissions

Dennis Prince, Airdar

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HOW IT WORKS

1. Visualizes a plume in data

2. Finds the direction to the source

3. Triangulates from multiple sampling points

4. Quantifies emissions once distance to source is known

Concentration

Wind direction
1-360°

Wind speed

High   Low

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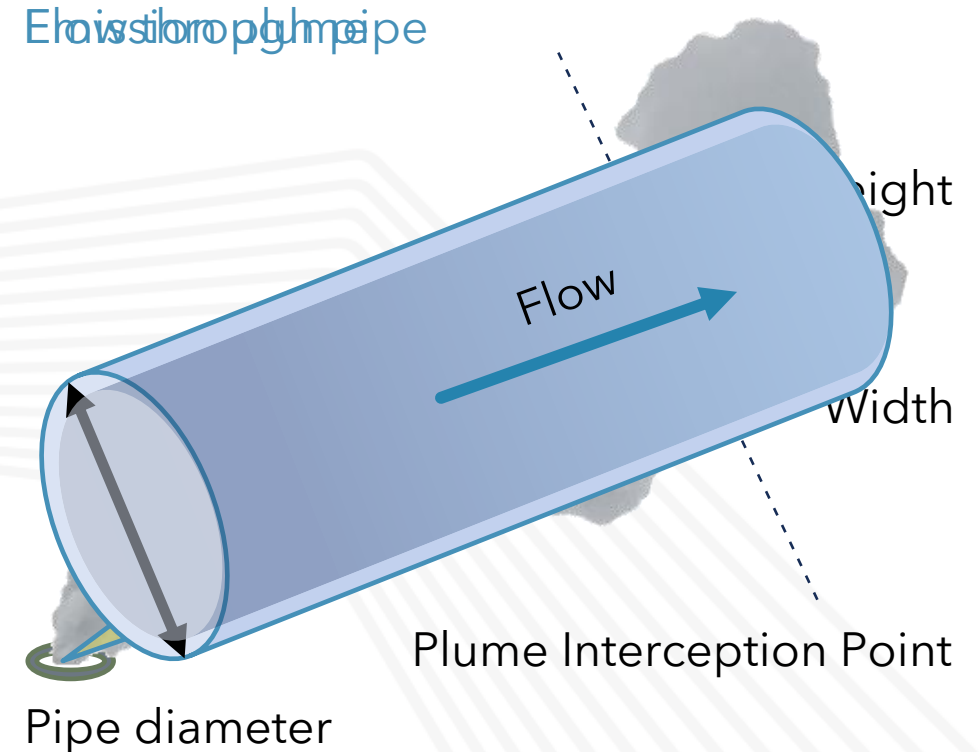
Dennis Prince, Airdar
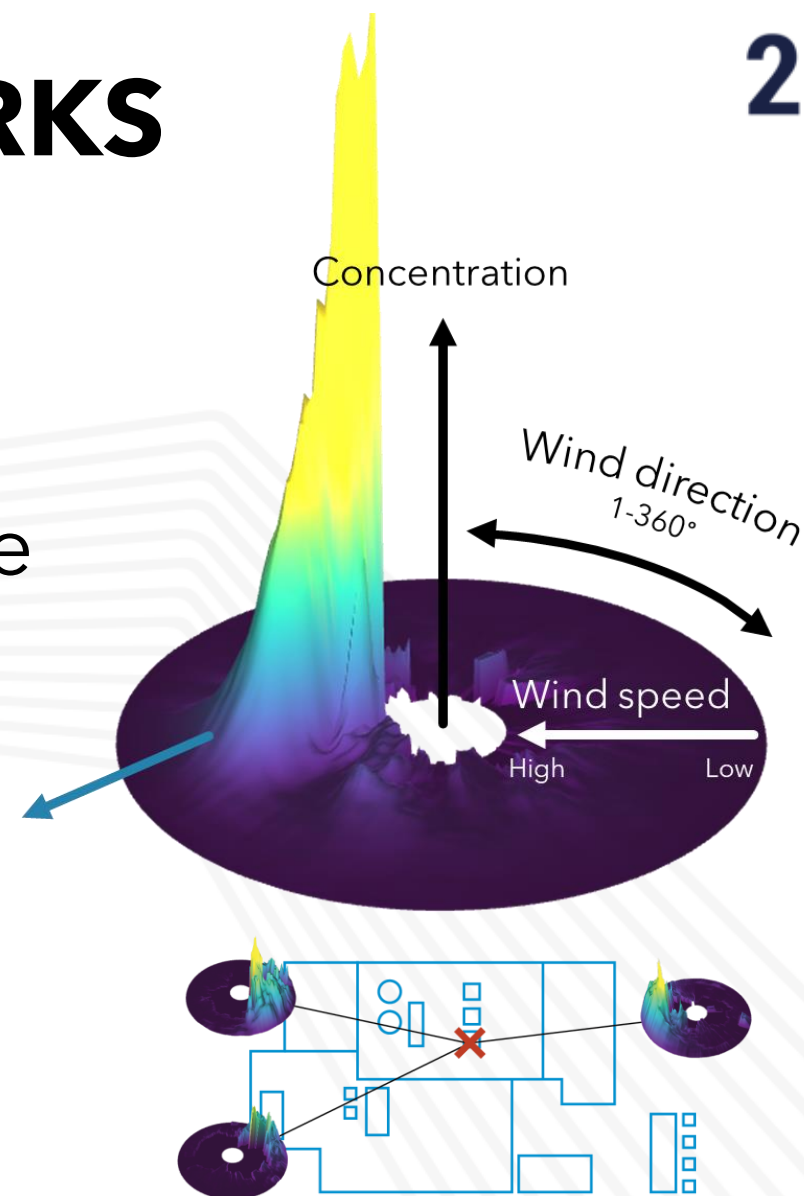
HOW IT WORKS

1. Find cross-sectional area

2. Determine flux

Concentration x Fluid Velocity = Flux

3. Get flow rate

Area x Flux = Flow (Emission) Rate

Emission plume

how it works pipe

Flow

Height

Width

Plume Interception Point

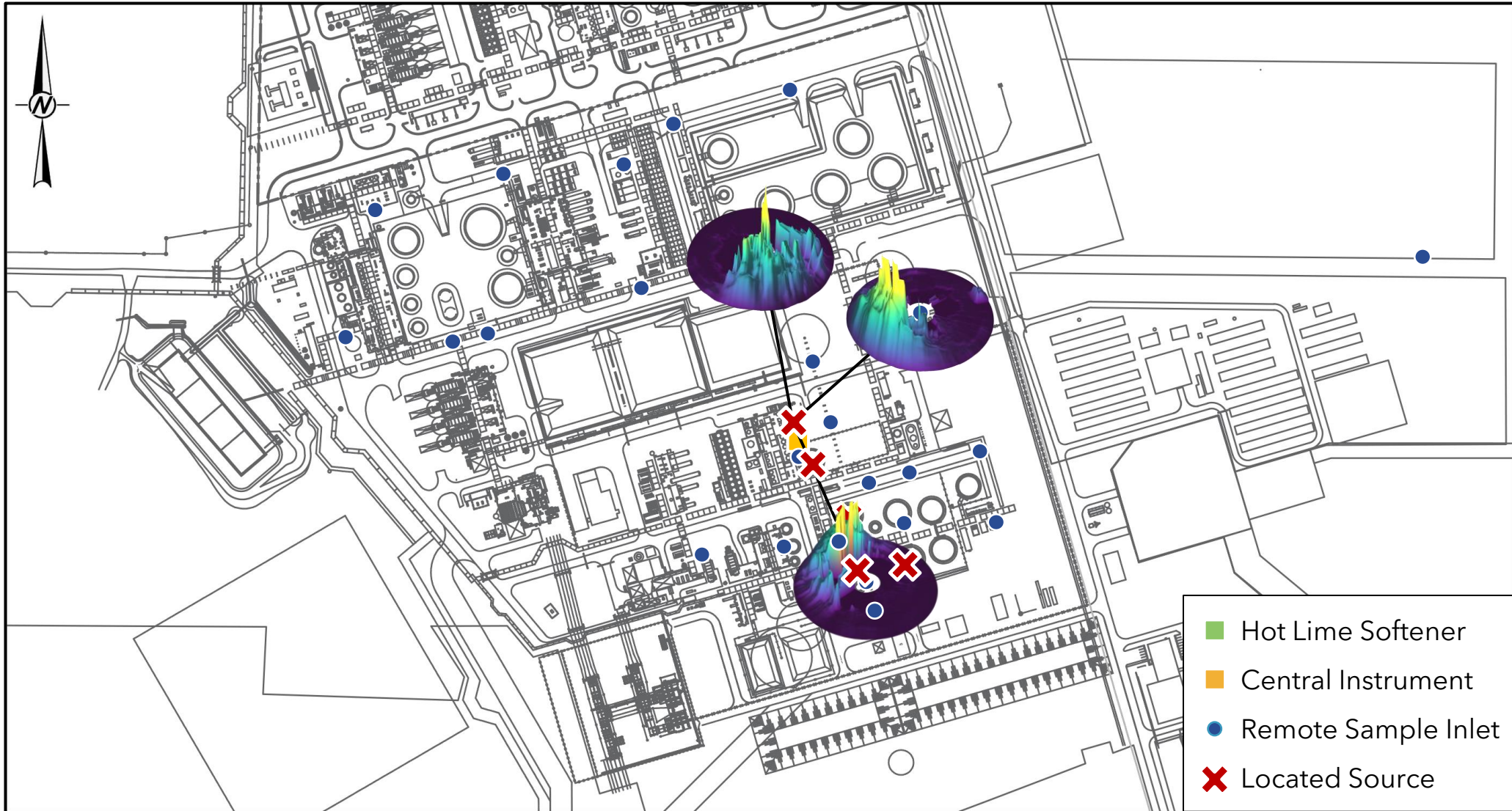Pipe diameter

More details can be found in U.S. Patent 8,510,059
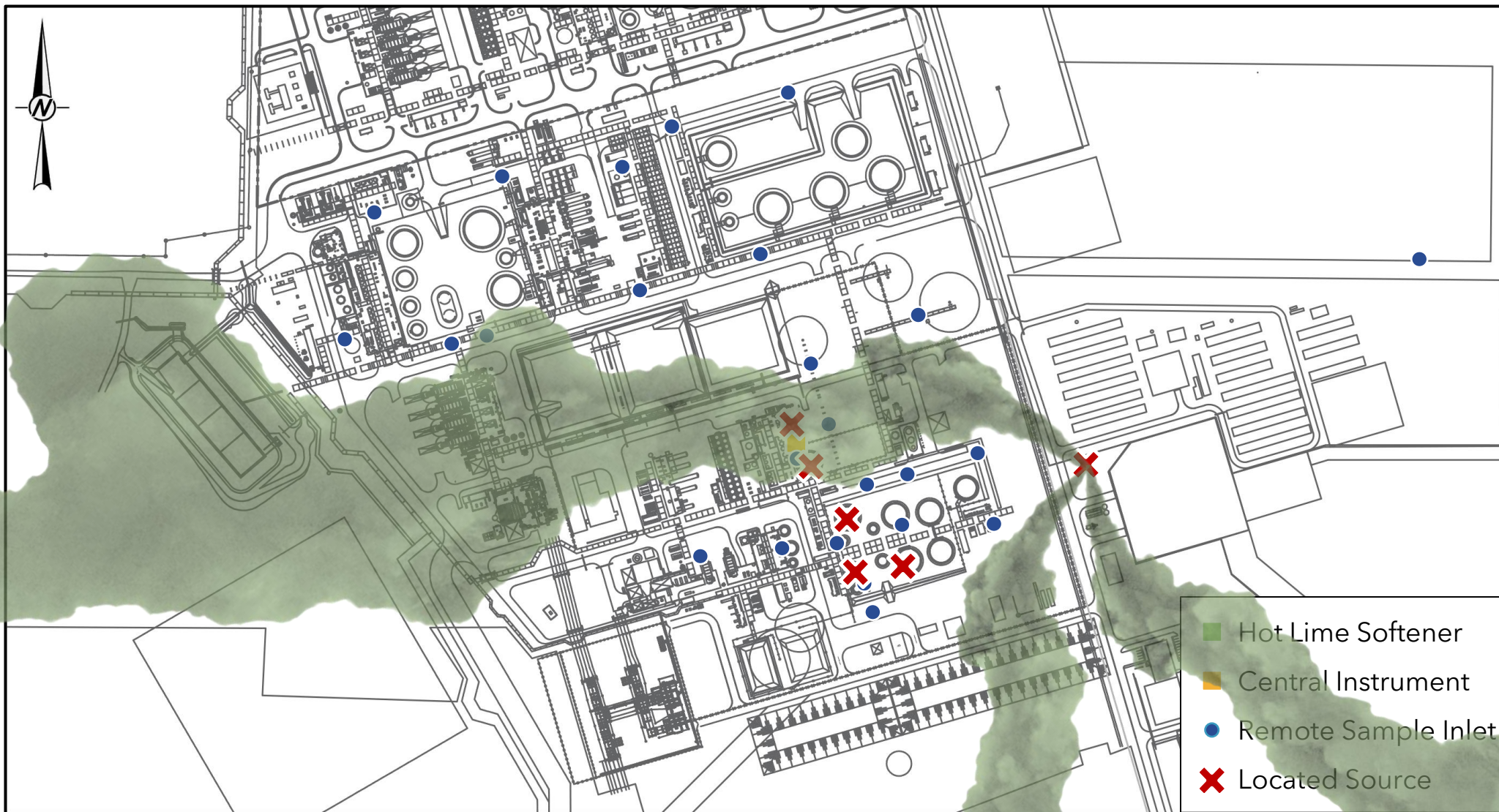
Dennis Prince, Airdar

ADVANTAGES

- Continuous monitoring of <u>all</u> emission sources
- Unattended operations
- Used for any compound
- On-site and off-site coverage
- Enables cost savings

Dennis Prince, Airdar

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- Facility was experiencing high levels of H_2S
- Known emission sources present
  - Hot Lime Softener (HLS), tanks
  - Relative importance unknown
  - Costly to contain
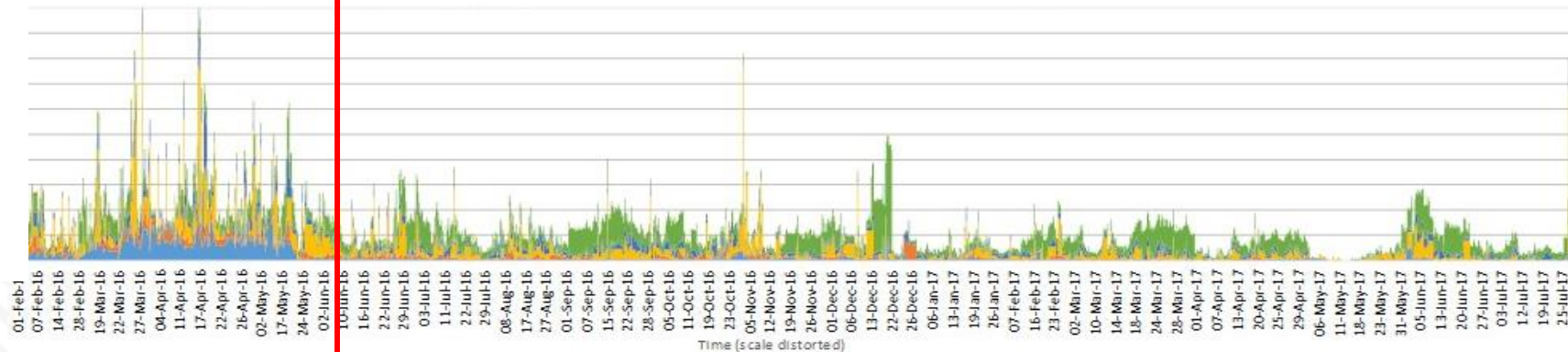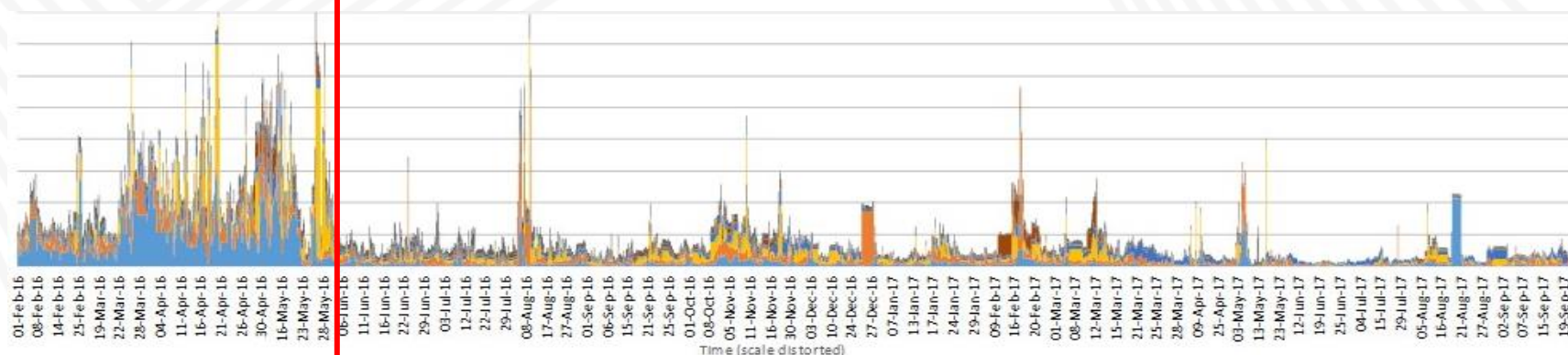- Implemented continuous monitoring of H_2S and methane (THC)

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Central Instrument

HLS

Hot Lime Softener

Central Instrument

Remote Sample Inlet

Located Source

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Legend:
- Hot Lime Softener
- Central Instrument
- Remote Sample Inlet
- Located Source

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SITE INTERVENTION

Dramatic emission reductions

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CONTINUOUS MONITORING

2022

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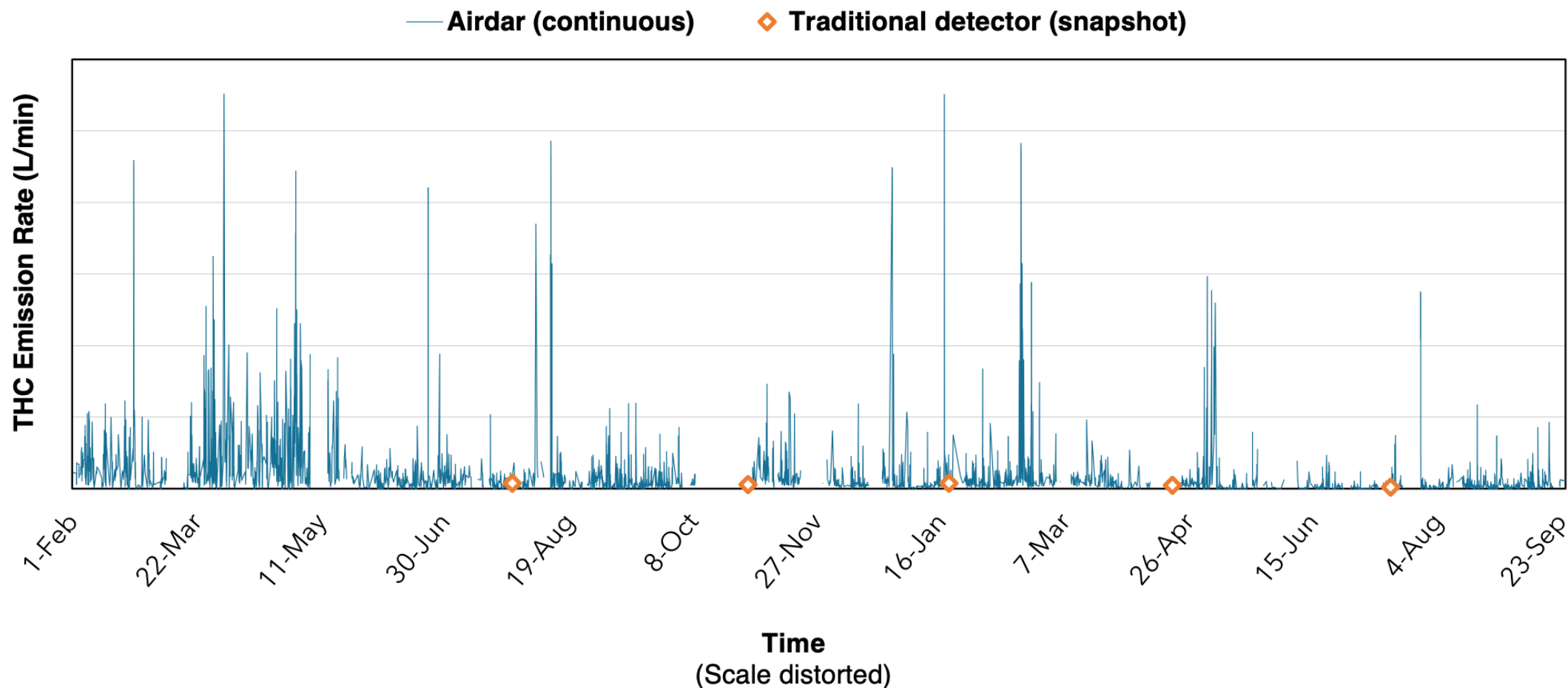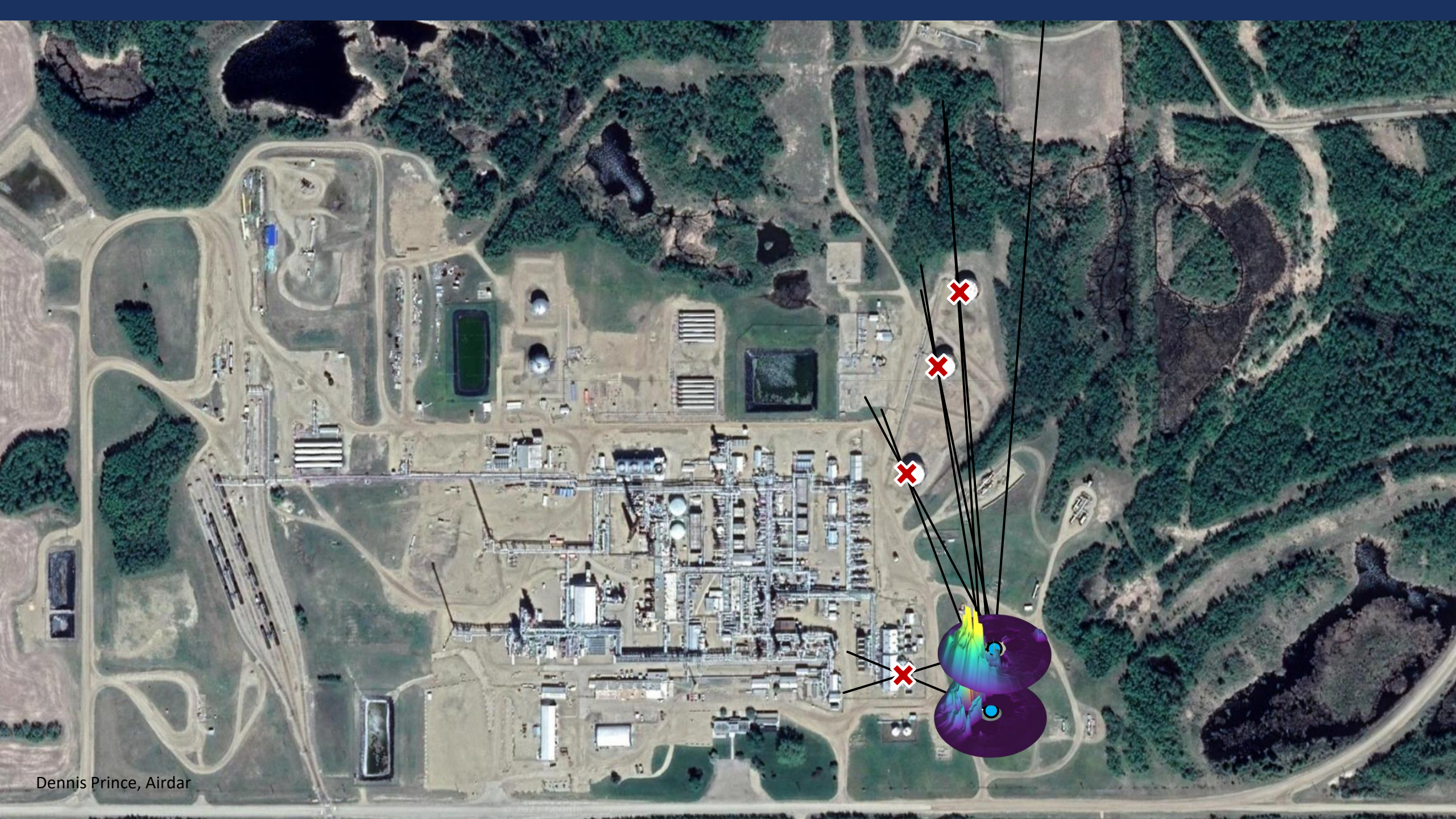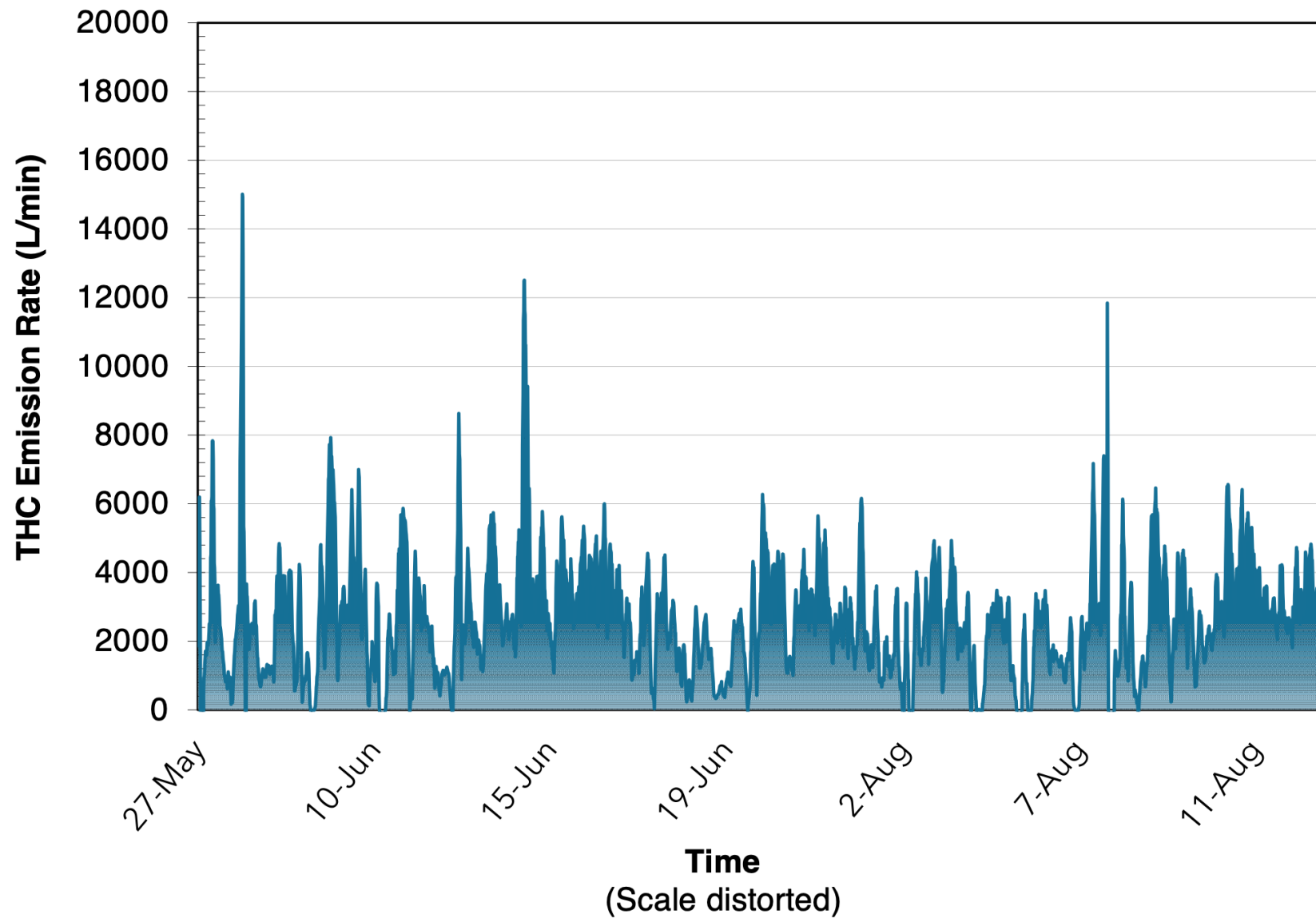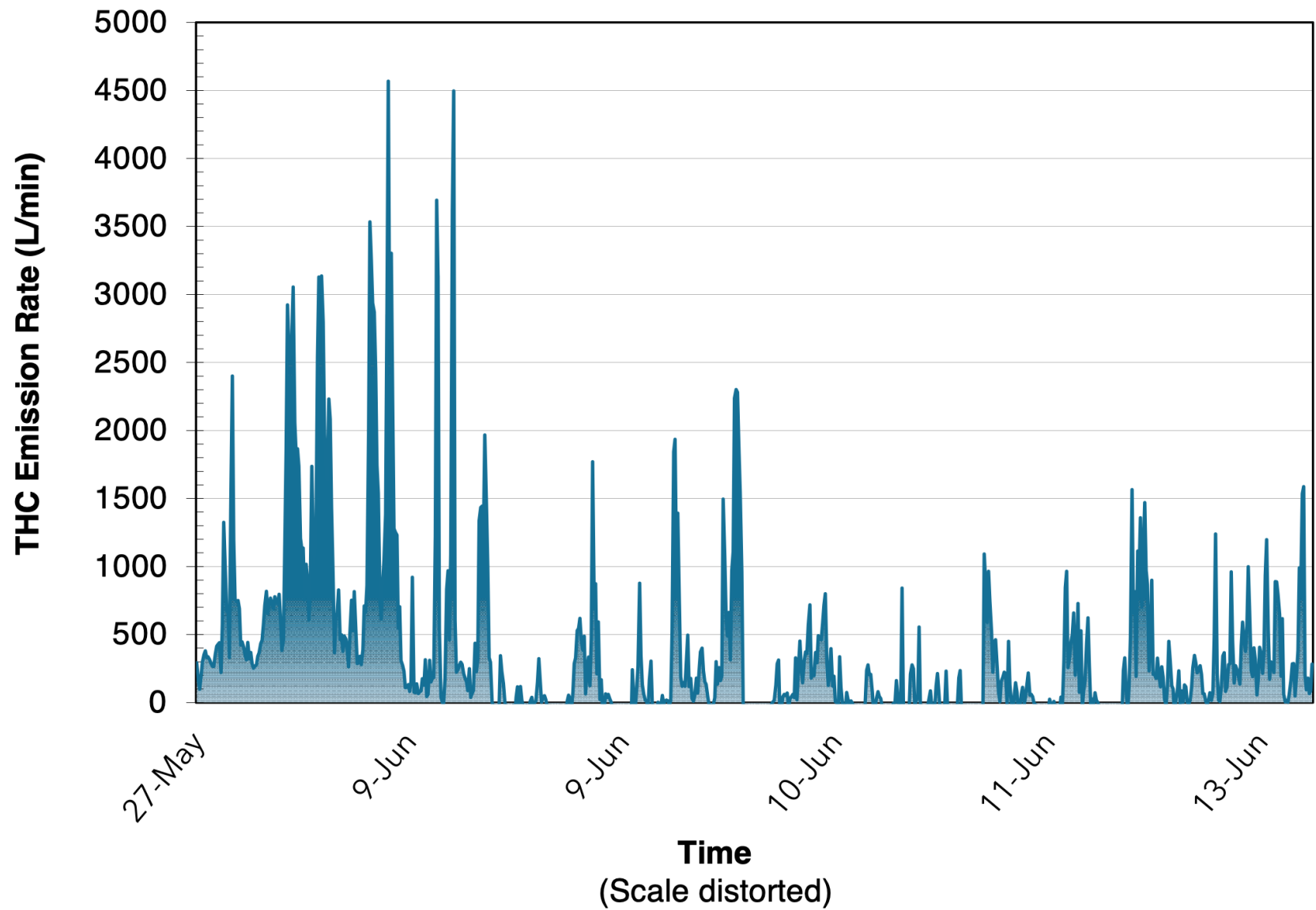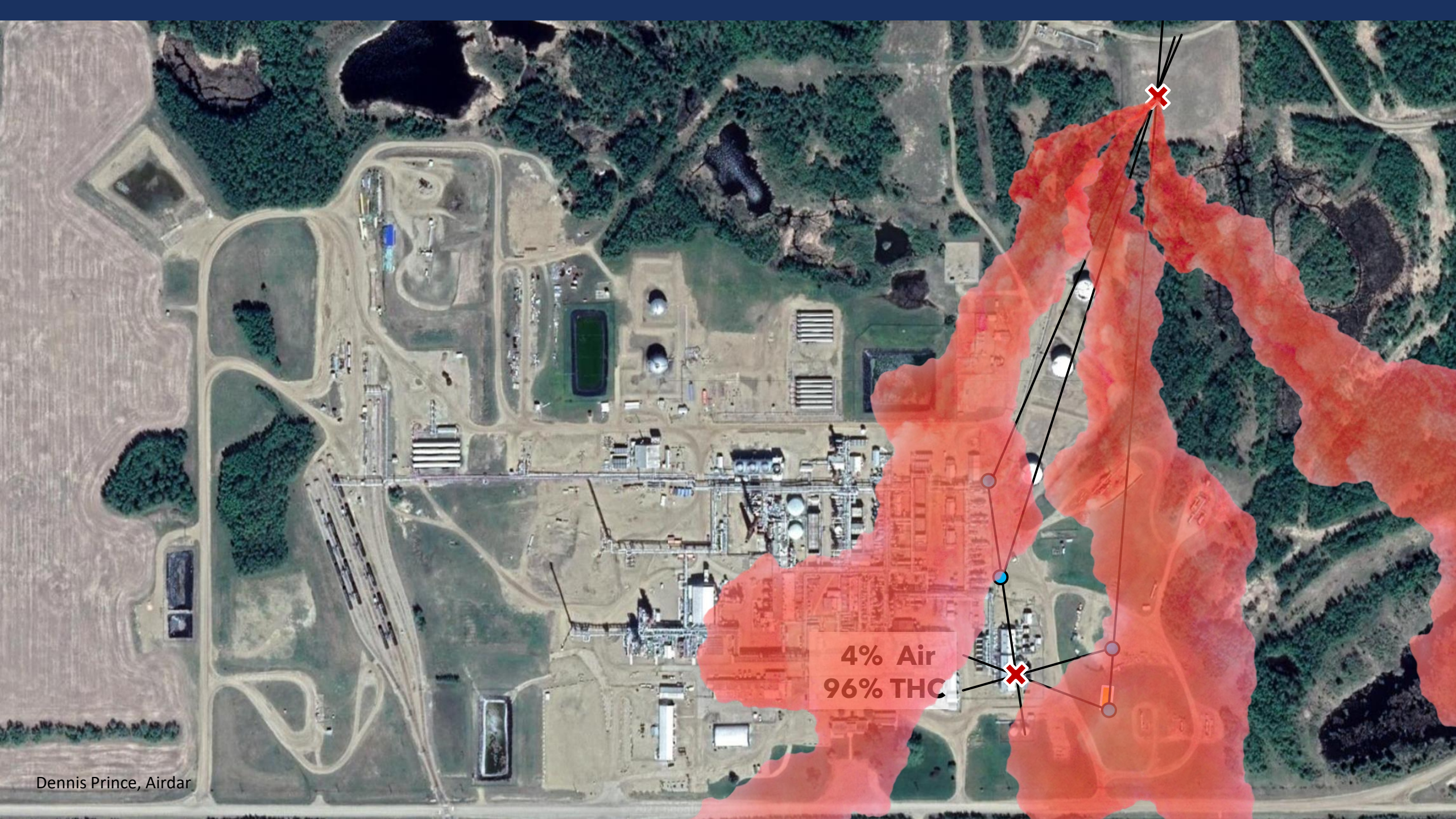
CASE STUDY 2: MIDSTREAM

- Keyera Energy had the opportunity to test Airdar in its first field trial

- A DIAL system had previously indicated an emission source near a compressor building
  - Exact location was not known

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4% Air
96% THC

Dennis Prince, Airdar

Offsite rogue source located

76 L/min THC

Tank emissions reduced 50%

993 L/min THC

Onsite rogue source located
worth $520,000/yr
31 KT/yr CO₂E GHG equivalent

3967 L/min THC

Dennis Prince, Airdar

Dennis Prince, Airdar

SUMMARY

- Continuous monitoring overcomes many challenges with measuring emissions

- Emissions can be directly measured, which was impossible in the past

- Concentration measurements can be used to locate and quantify emission sources

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