APPLICATIONS OF CONTINUOUS MONITORING WITH INTELLIGENT ANALYTICS

For Fugitive Emissions Monitoring in the Australian Oil & Gas Sector

Michelle Liu and Dennis Prince

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THIS PRESENTATION WILL:

- Discuss the challenges with measuring fugitive emissions
- Compare emerging monitoring technologies with traditional approaches
- Present the capabilities of continuous monitoring with intelligent analytics

EMISSIONS MONITORING - WHY?

- Protect the environment and communities
- Make site improvements
- Effectively use existing resources
- Decrease potential product loss
- Increase site safety
- Control the narrative

NATURE OF EMISSIONS

Fugitive emissions are challenging to measure due to their intermittent and uncertain nature.

The challenge	What is needed
Emissions can occur in unsuspected locations	Large spatial coverage
Emissions rates vary over time	Frequent monitoring
Confirmation bias	Undirected (unbiased) monitoring

TRADITIONAL APPROACH

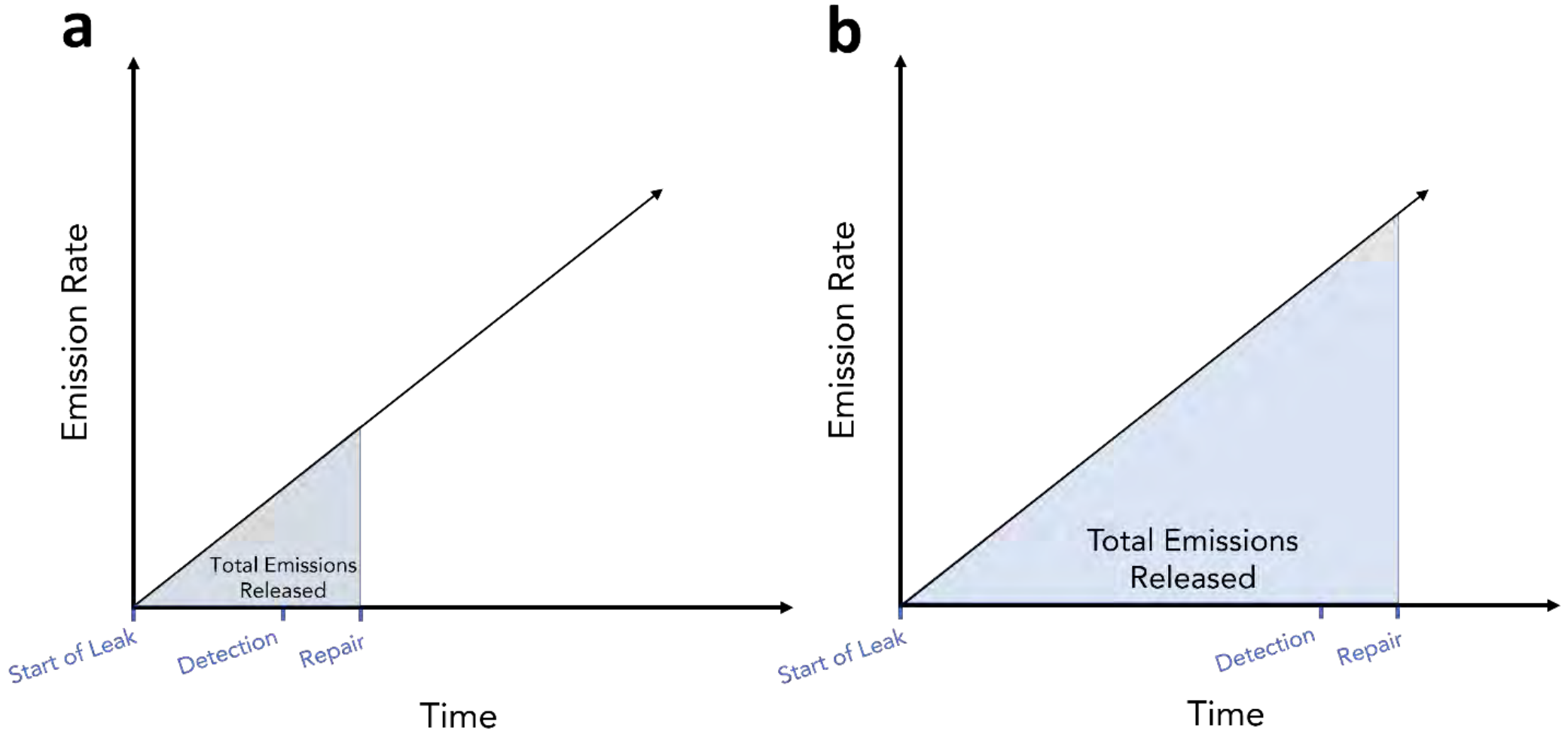
Method 21 (Handheld Instruments)

- Performed a few times a year
- Labor intensive and slow
- Can’t detect unexpected sources

OGI Cameras

- Perform surveys more quickly
- Able to detect unexpected sources

TRADITIONAL APPROACH



ADVANCED TECHNOLOGIES

Vehicles

Satellites

Aircraft

Drones

- Easily monitor large geographical areas
- Less confirmation bias
- Periodic frequency

AIRDAR: AIR DETECTION AND RANGING

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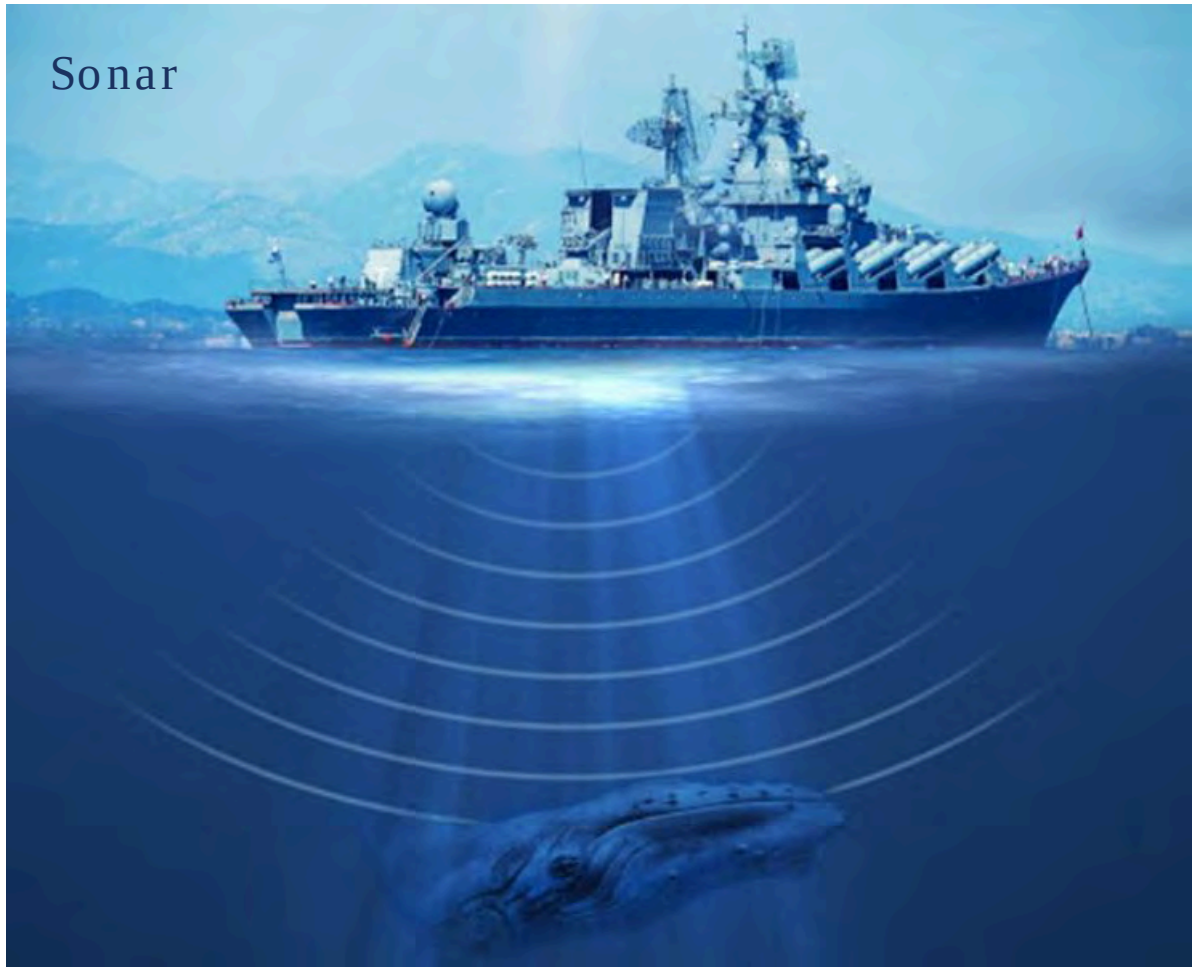


HOW IT WORKS

The nose: standard detectors

Measure concentrations

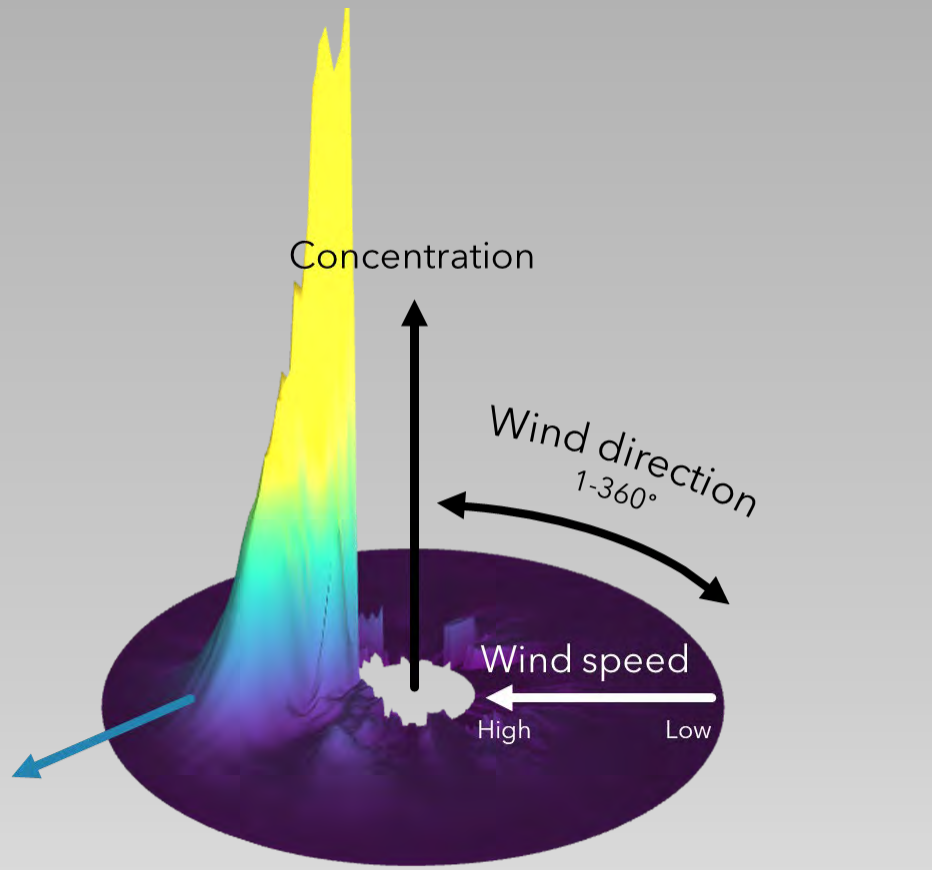
- Traditional monitors
- New sensors

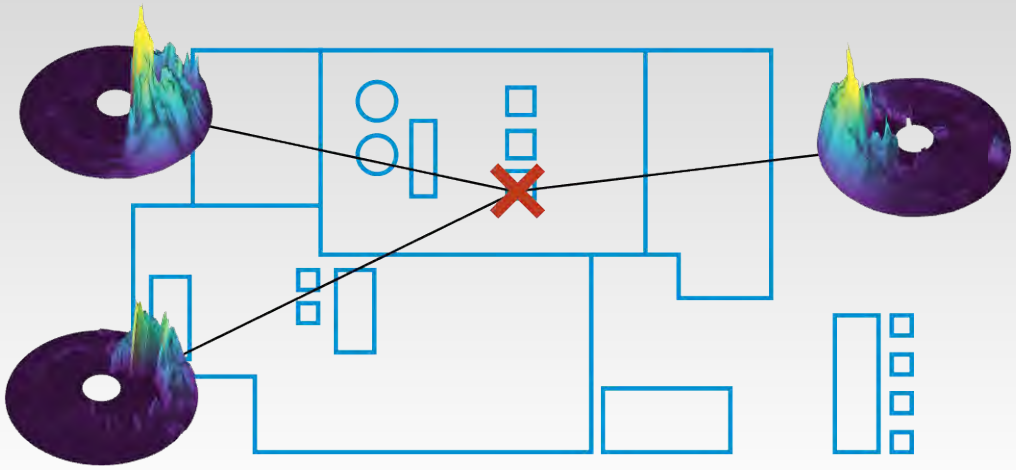
The brain: data analytics

Tracks plumes back to their sources and quantify emissions

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





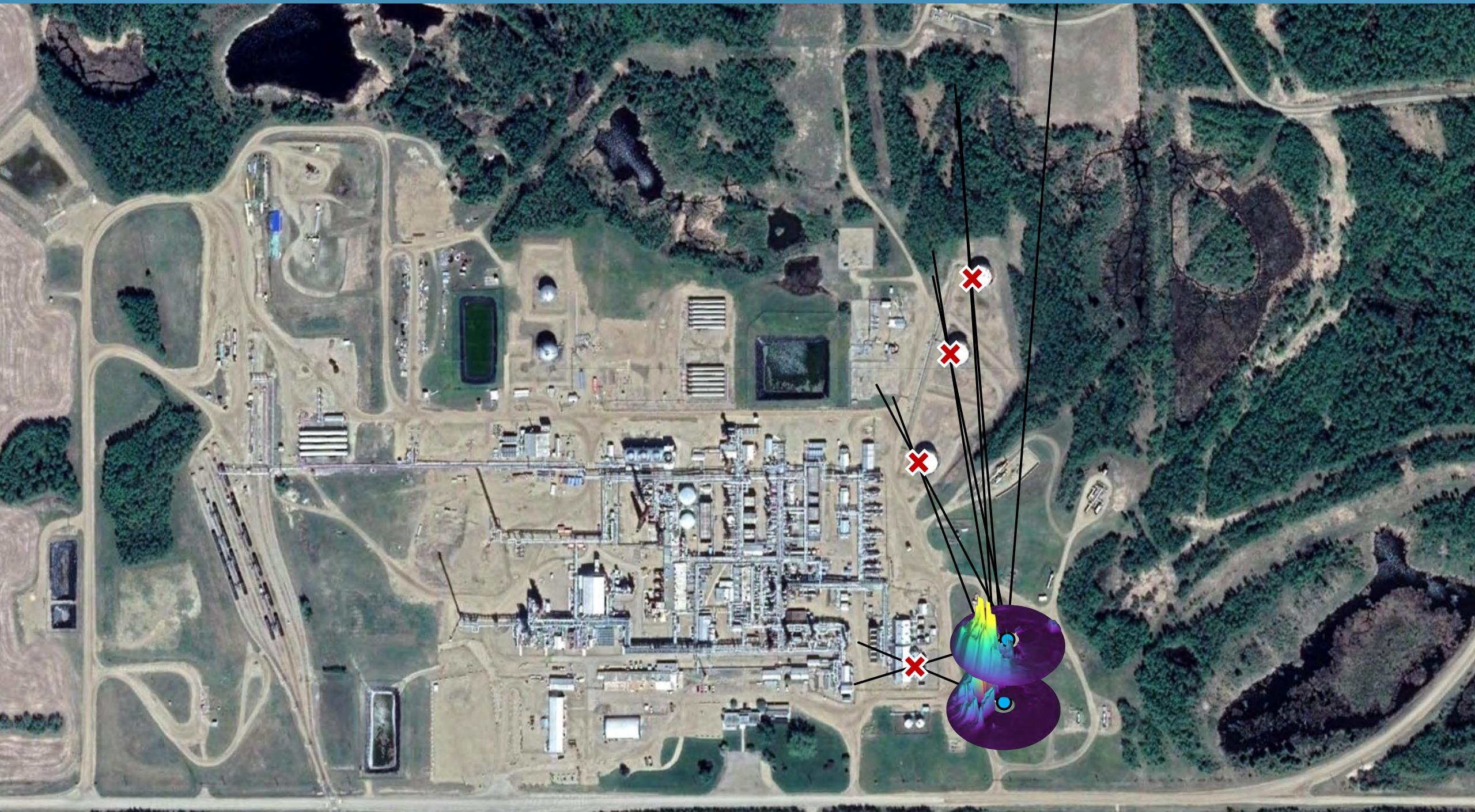
ADVANTAGES

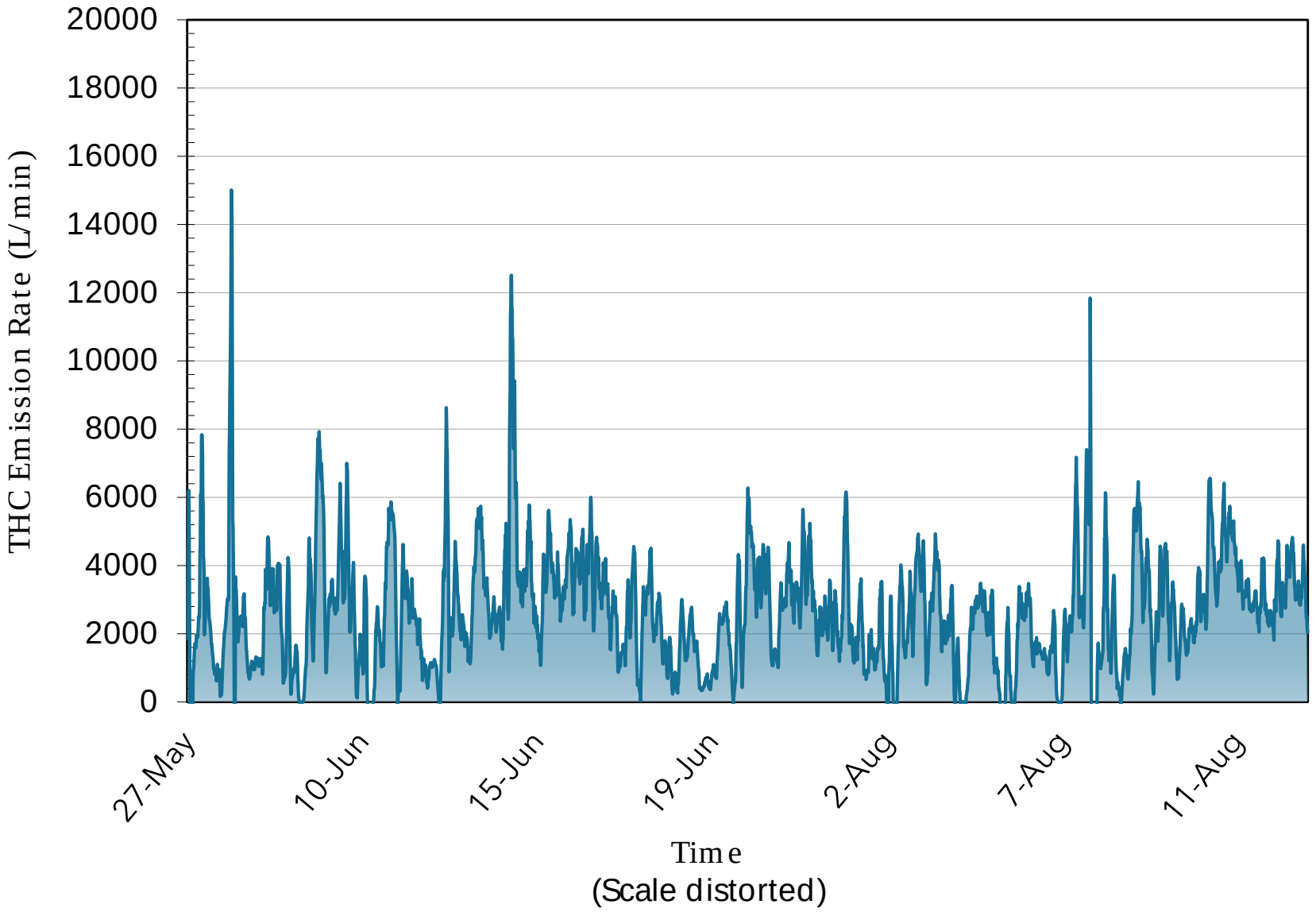
- Constantly monitor all emission sources
  - On-site and off-site coverage
- Operate without needing a technician on-site
- Monitor any compound
- Enables cost savings

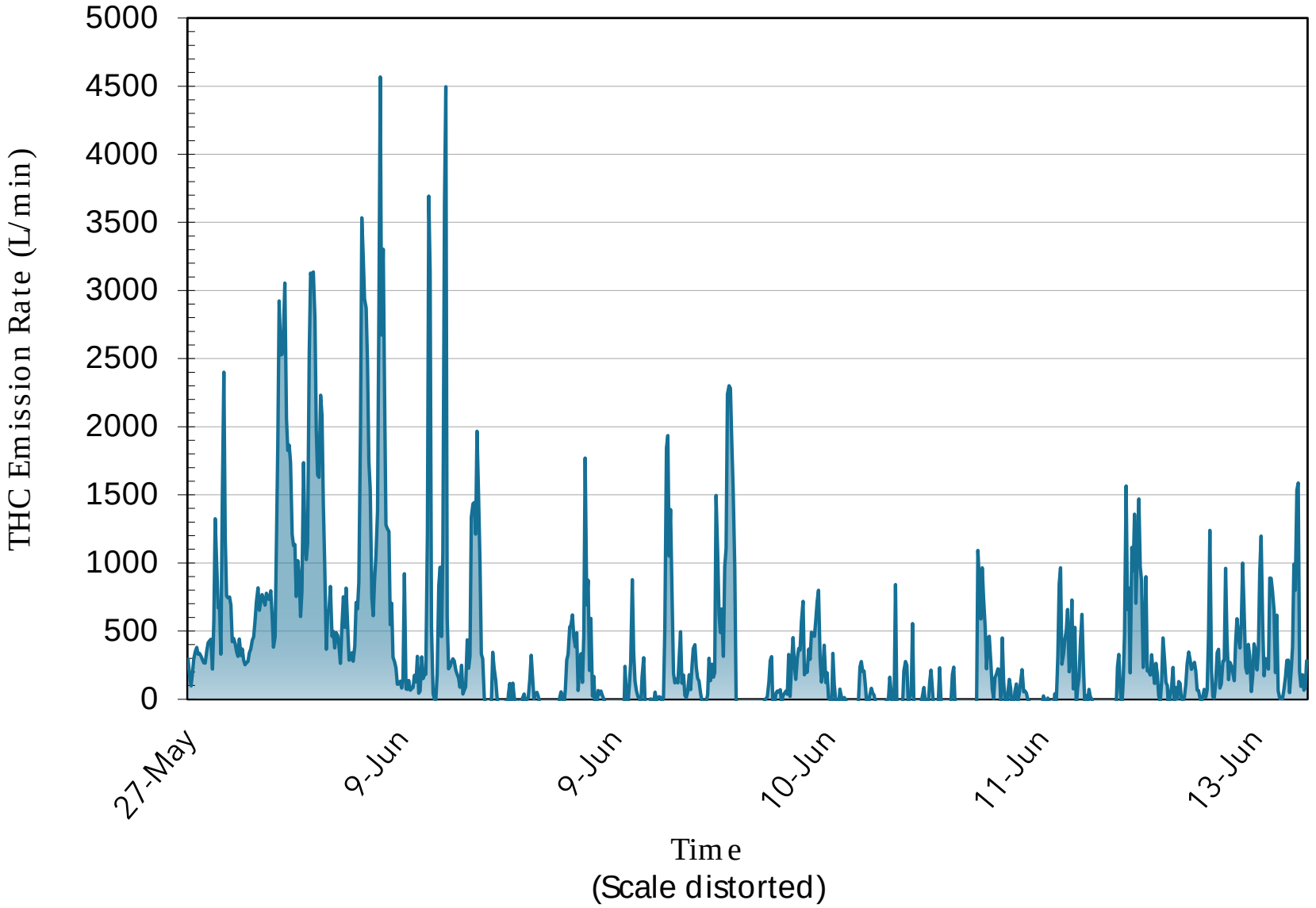
✓ Possible
Δ Sometimes possible

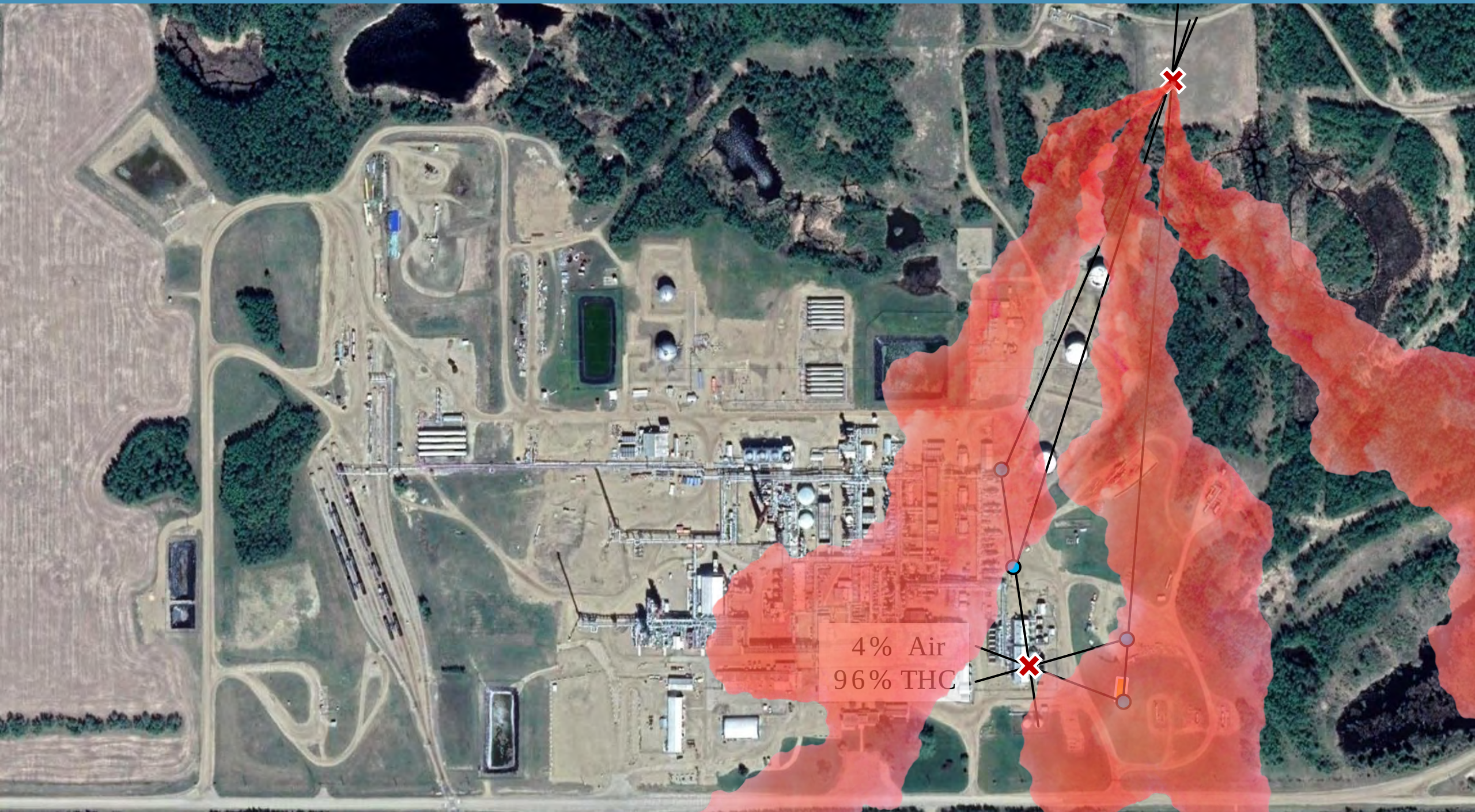
Feature	Continuous	Vehicle	Satellites	Aircraft	UAV	Handheld
Detect suspected sources	✓	✓	✓	✓	✓	✓
Detect unsuspected sources	✓	✓	✓	✓	✓	Δ
Point source quantification	✓	✓		✓	✓	Δ
Site quantification	✓	Δ	✓	Δ	Δ	
Continuous monitoring	✓					
Site-wide surveillance	✓	✓	✓	✓	✓	
Detect off-site sources	✓	✓	✓	✓	✓	
Affected by poor weather	✓	Δ				
No operator safety concerns	✓		✓		✓	

KEYERA GAS PLANT




THC Emission Rate (L/min)
20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
27-May
10-Jun
15-Jun
19-Jun
2-Aug
7-Aug
11-Aug
Time
(Scale distorted)


THC Emission Rate (L/min)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
27-May
9-Jun
9-Jun
10-Jun
11-Jun
13-Jun
Time
(Scale distorted)


4% Air
96% THC

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 CO_2E GHG equivalent
3967 L/min THC

SAGD FACILITY

BACKGROUND

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

GOLDER

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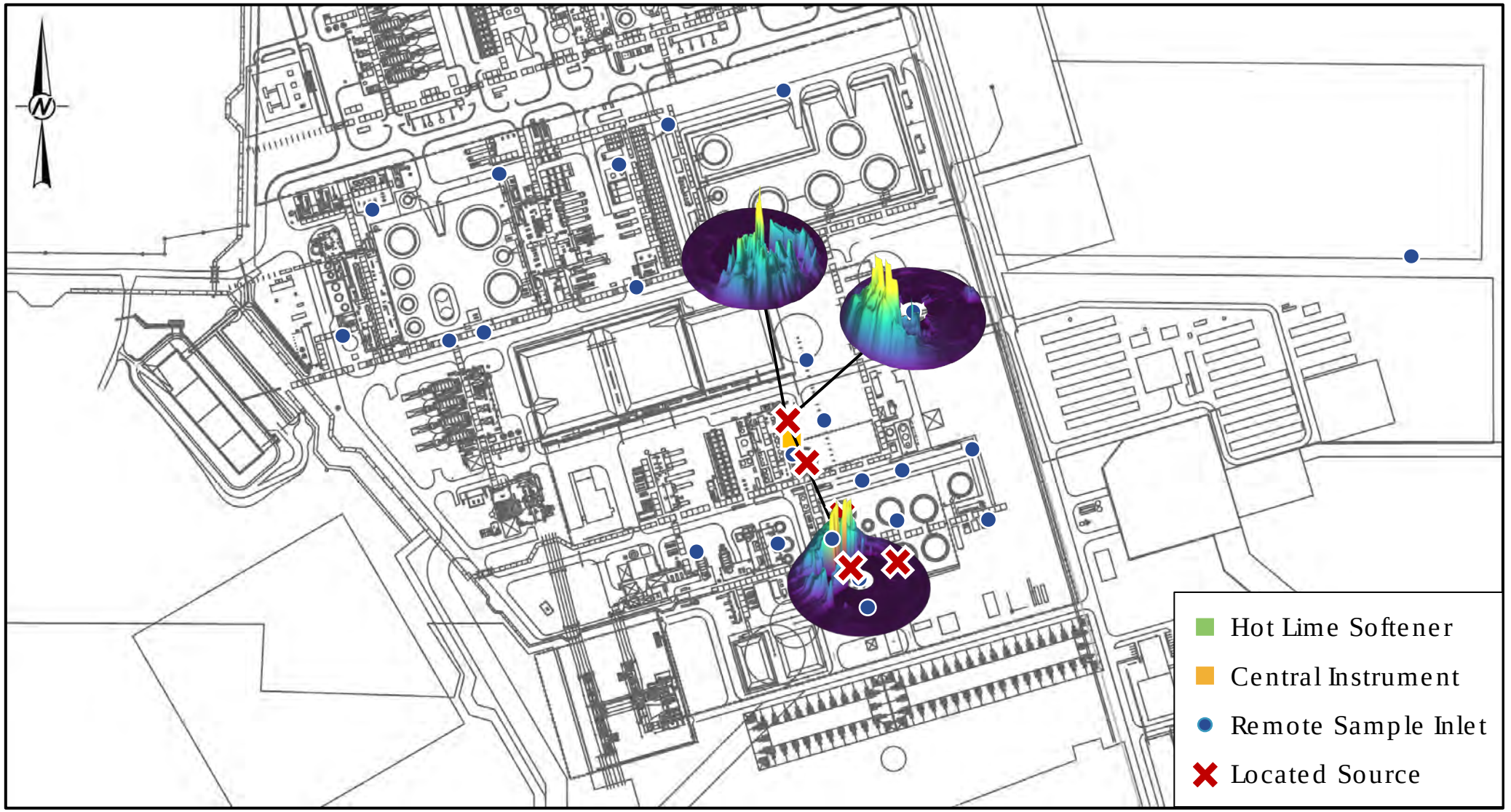

GOLDER

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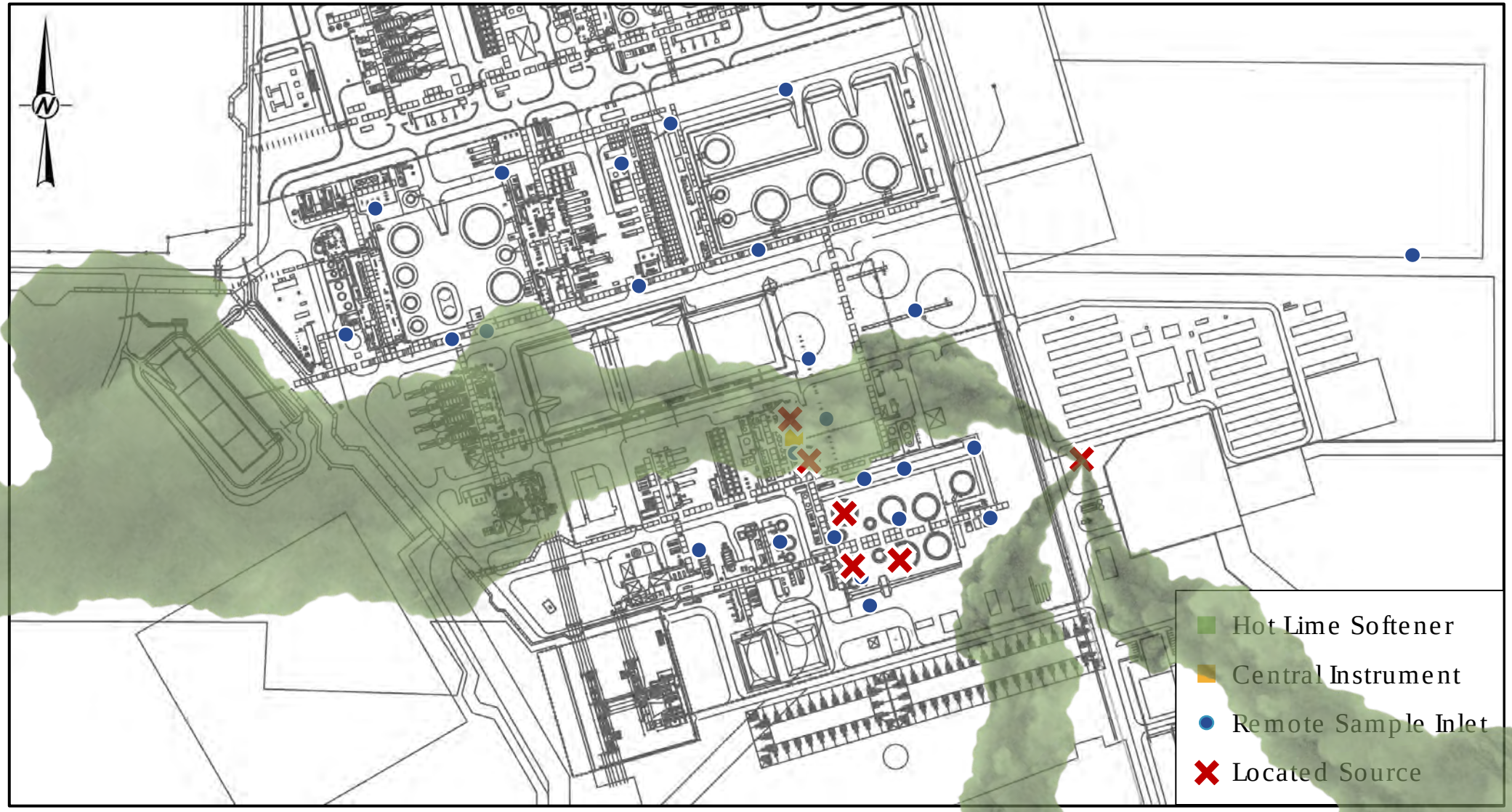
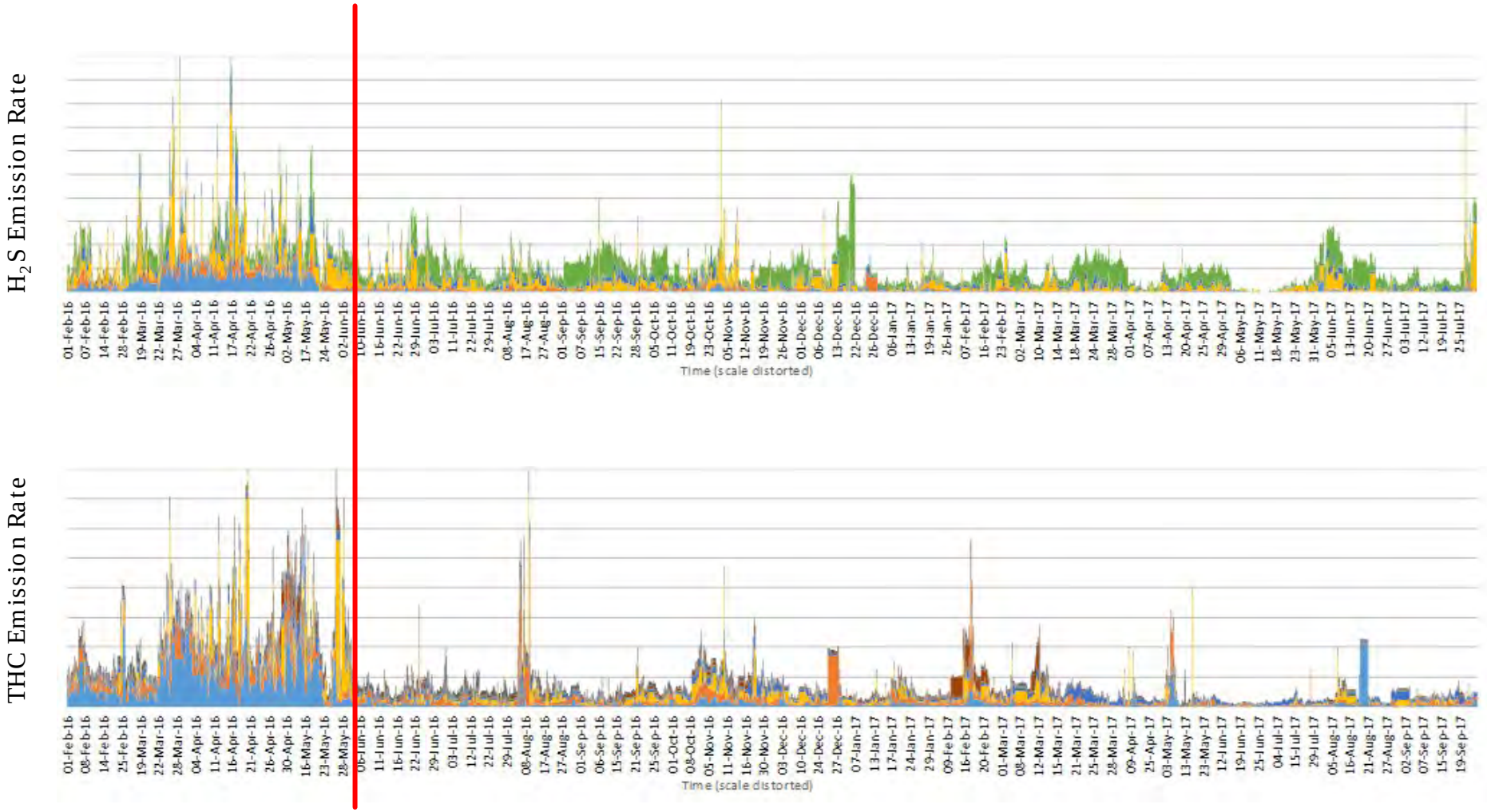
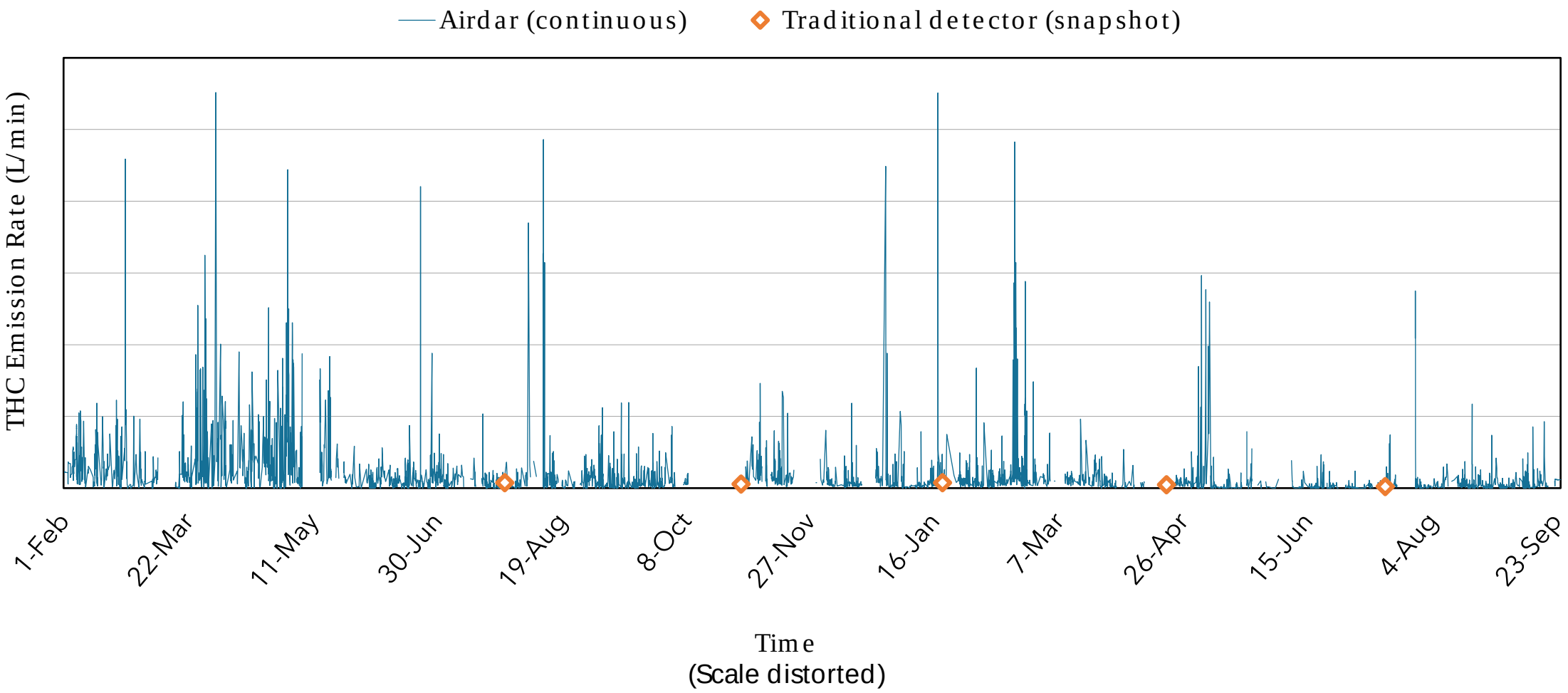

Hot Lime Softener
Central Instrument
Remote Sample Inlet
Located Source

Site intervention – visible emission reductions



Green – HLS | Yellow – Tanks | Light blue – Tank farm (area 2) | Orange – Tank farm (area 1)

CONTINUOUS MONITORING



Applications in Australia

- Remote operations are challenging to monitor
- Opportunities at small and large sites
  - Gas fields
  - Compressor stations
  - Pipeline networks
- Learn from experiences in North America

SUMMARY

- Continuous monitoring overcomes challenges in monitoring fugitive emissions
  - Catch leaks sooner
  - Capture variability in emissions
  - Direct resources to the most important issues
- Emissions can be directly measured
  - Can use concentrations to locate and quantify leaks

QUESTIONS?

info@airdar.com

linkedin.com/company/airdar

Thank you for listening!

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