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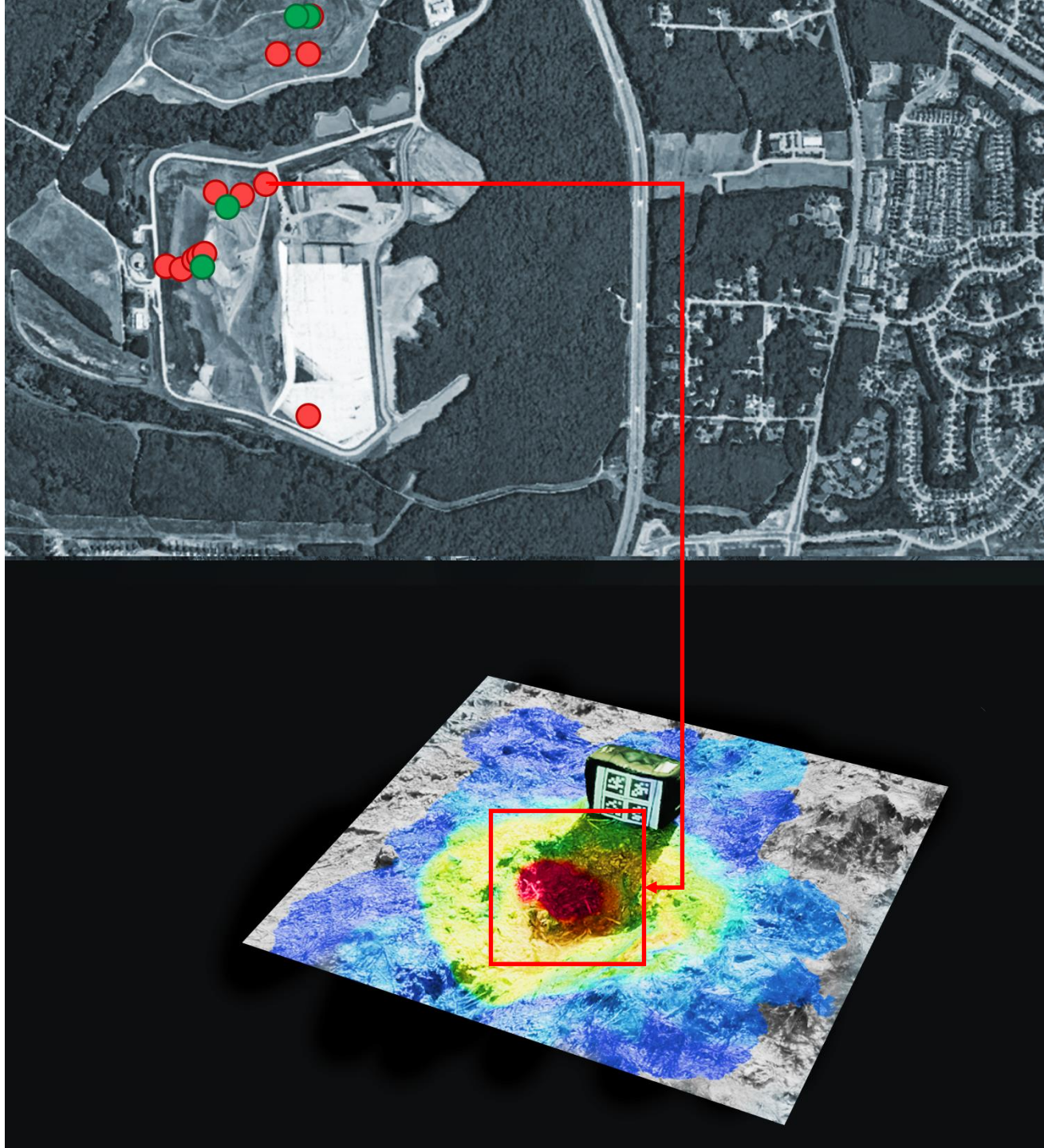
Methane Emissions Quantification Solution for Landfill Applications

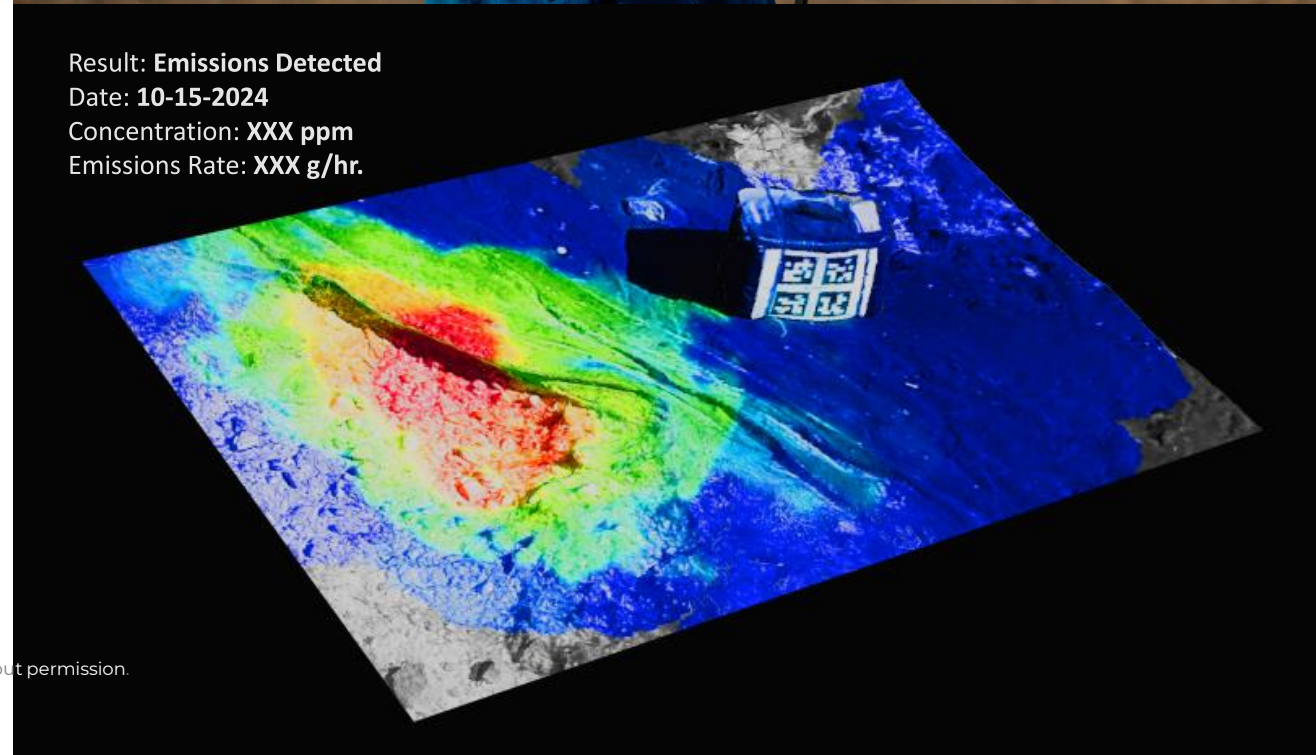
October 2024

World Oil AWARDS 2022 WINNER Health, Safety, Environment/Sustainable Development Onshore Award



Fully digital methane emissions detection and quantification solution for landfill applications

- → **Does not require thermal contrast between gas and background**
- → **Meets the DOI 1 g/hr. sensitivity requirement**
- → **Provides BOTH detection & quantification with one sensor**
- → **The most accurate detection technology per METEC results published to-date** (98% true positive, 2% false positive)
- → **Fully digital data and model flow** (field to database and reporting)



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We are building momentum with both customers and regulators

56 customers

837 facilities

7 countries on 4 continents

With a team of 15 in only 24 months

2022 World Oil Award

Recipient of the World Oil Award in Health, Safety, Environment and Sustainable Development

2023 Most Accurate Tech

Results from DOE-sponsored METEC certify us as the most accurate detection technology

2024 DOE Contract

For emissions quantification of abandoned orphan wells in the Osage Nation

2024 Colorado Approval

Completed the technology review process for approval in the state as an accepted methane detection solution

2025 EPA Approval pending

"Completeness determination" received from the EPA, requested revisions have been submitted

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Xplorobot Laser OGI

Accepted under Subpart W, OOOO Alternative Test Method application pending

Anemometer and Thermometer

Continuous measurement of wind speed and ambient temperature

USB Ports

For data backup and software updates

Ethernet LAN Port

For data transfer from sensor to external computer for data processing

High Resolution Visual Camera

Localizes all methane concentration measurements, collects data for 3D modeling

Tunable Diode Laser Absorption Spectroscopy (TDLAS)

Sensor acquires methane concentration data (PPM-m) at a rate of 10 Hz.

GPS

Inside the device, autonomously allocates inspection results to specific equipment

Computer

Inside the device, runs the acquisition, stores the data, creates auditable trail for each methane measurement

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Xplorobot is offering an integrated methane compliance solution

Sensor

Equipment Scan

Emission Tag

Repair

Re-inspection

Mobile App

Labeling

Notification

Workorder

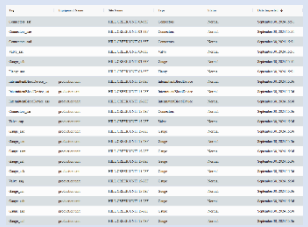
Close-out

Cloud

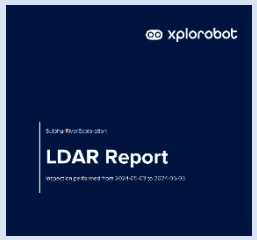
Storage

Certification

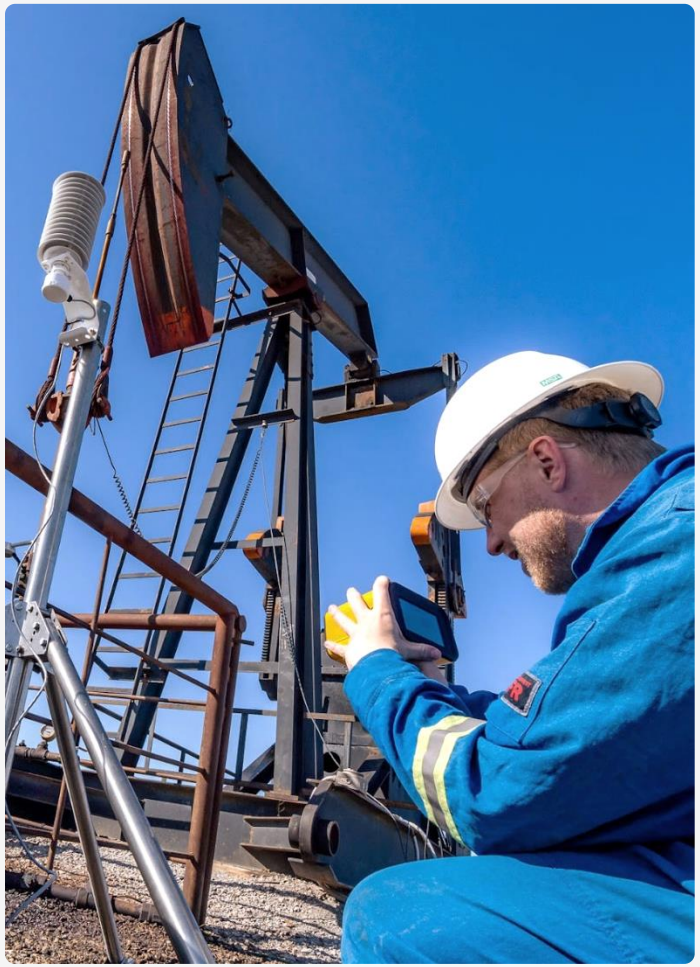
Catalogue



Reporting



U.S. Government Agency Technology Validation Campaign



Results

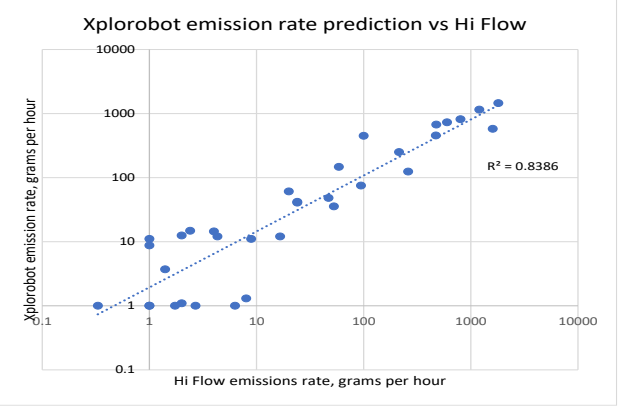
Efficient Deployment:
57 orphaned wells scanned in 3 days.

Emission Rates Detected:
Ranged from 0.3 g/h to 1,600 g/h.

Accurate Emission Rate Predictions:
Down to 10 g/h.

***Further neural network training is required to improve predictions below 10 g/h.**

Well Name	Rate, g/hr	FLIR Detection	Xplorobot Detection
Porter Run 2	Zero Emission	Zero Emission	Zero Emission
Private #7	<1.0	No detection	Detection
Private #2	<1.0	Not tested	Detection
Rutherford Nancy 2	1.0	No detection	Detection
USA Joy 1	1.0	No detection	Detection
Edward Wiles #3	1.4	Not tested	Detection
USA #19	2.0	Not tested	Detection
Martin James #1	2.0	No detection	Detection
Edward Wiles #3	2.4	Not tested	Detection
Private #3	4.0	Not tested	Detection
Rutherford Nancy 3	8.0	No detection	Detection
Private #1	20.0	Not tested	Detection
Holiday Rueben #6	24.0	No detection	Detection
Zwick Bros #3	24.0	Not tested	Detection
Grace Joy 1	52.7	Detection	Detection
Undocumented 1	58.5	Detection	Detection
Private #5	100	Detection	Detection
Private 8	600	Detection	Detection
Charles Hall #6	800	Detection	Detection
Westbrook WM B	1,200	Detection	Detection
Private #9	1,600	Not tested	Detection



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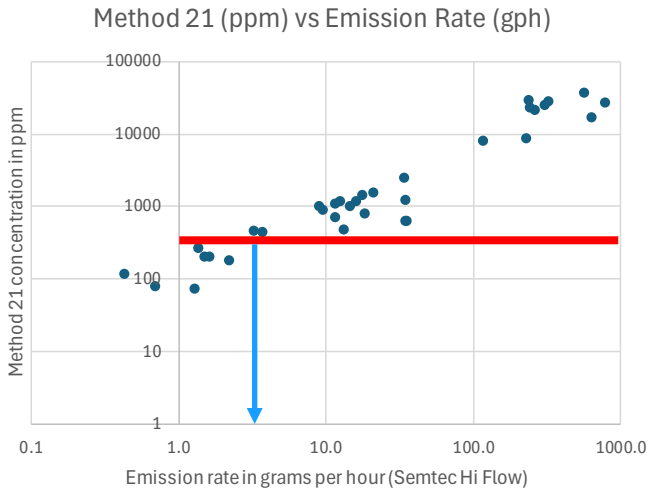
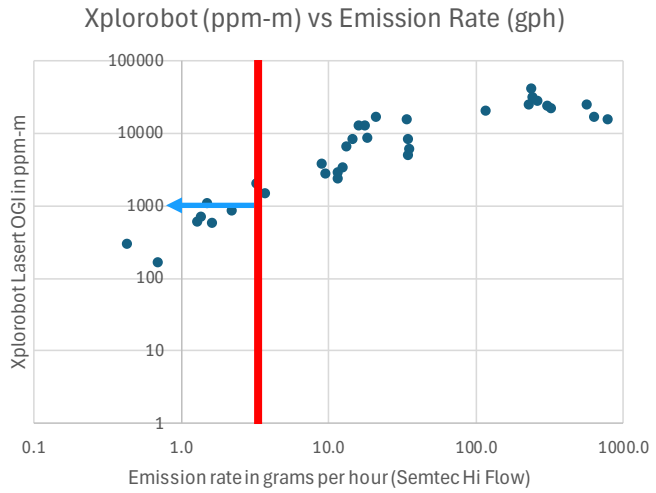
Xplorobot Laser OGI equivalency to Method 21 sniffer

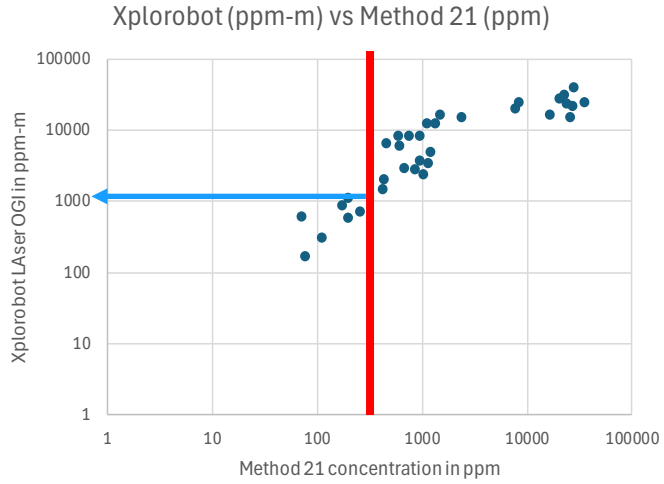
Method 21 ppm vs emissions rate in grams per hour



Xplorobot Laser OGI ppm-m vs emission rate in grams per hour



Xplorobot Laser OGI ppm-m vs Method 21 ppm



500 ppm Method 21 threshold corresponds to 1,000ppm-m threshold on Xplorobot Laser OGI

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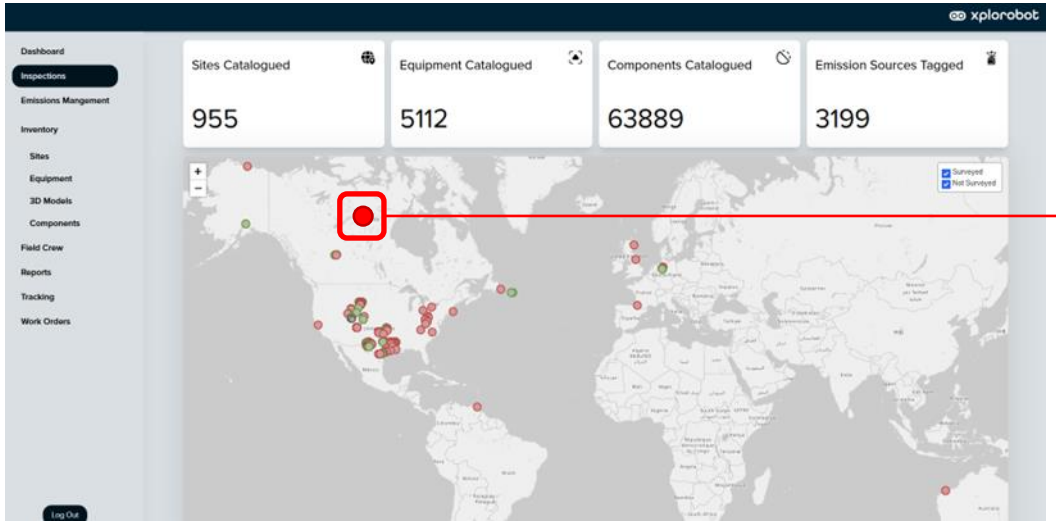
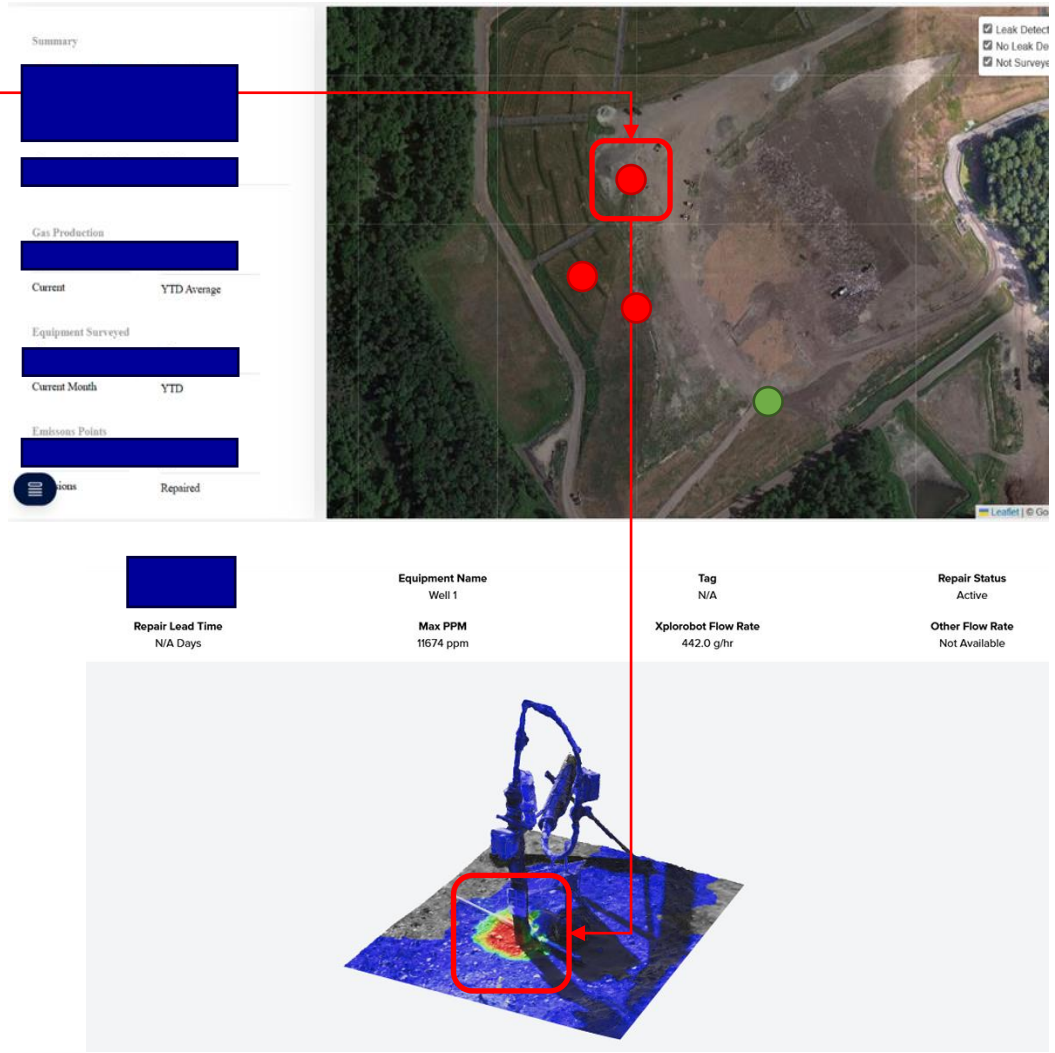
Results presented of the Methane Performance Dashboard





Xplorobot solution provides a digital record of methane emissions or lack thereof that can be aggregated at a plant and regional level.

Daily alerts can be set up based on the operations management preferences and regulatory requirements.

Reporting for regulatory purposes or for Clean Gas accreditation is automated and streamlined.

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Example of Inspection Results

Results

Fugitive Emission

Max Concentration

XXX ppm

Emissions Rate

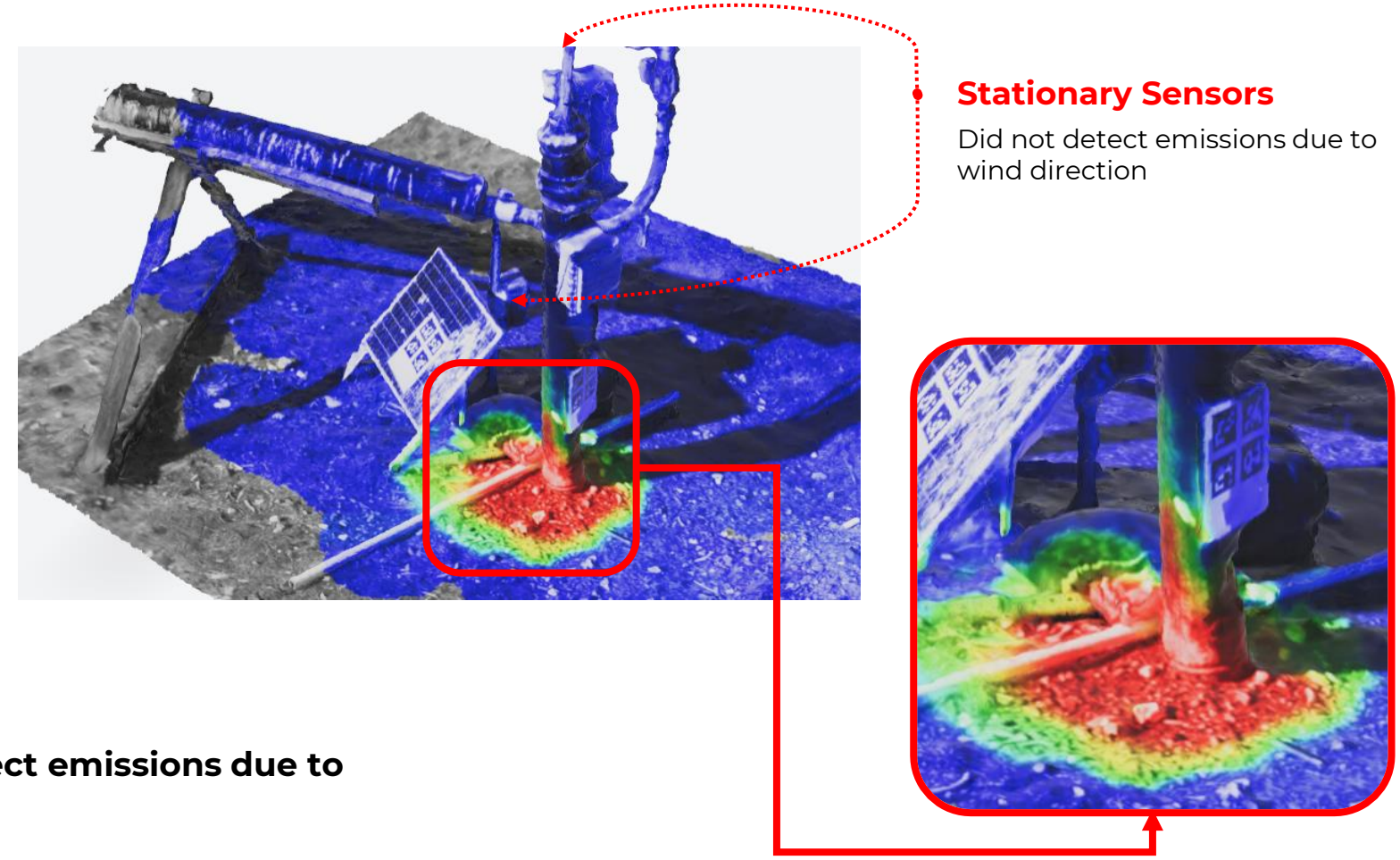
XXX grams per hour

Potential Cause

Bulldozer damage

Observations

Stationary sensors did not detect emissions due to wind direction



Stationary Sensors

Did not detect emissions due to wind direction

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Example of Inspection Results

Results

Fugitive Emission

Max Concentration

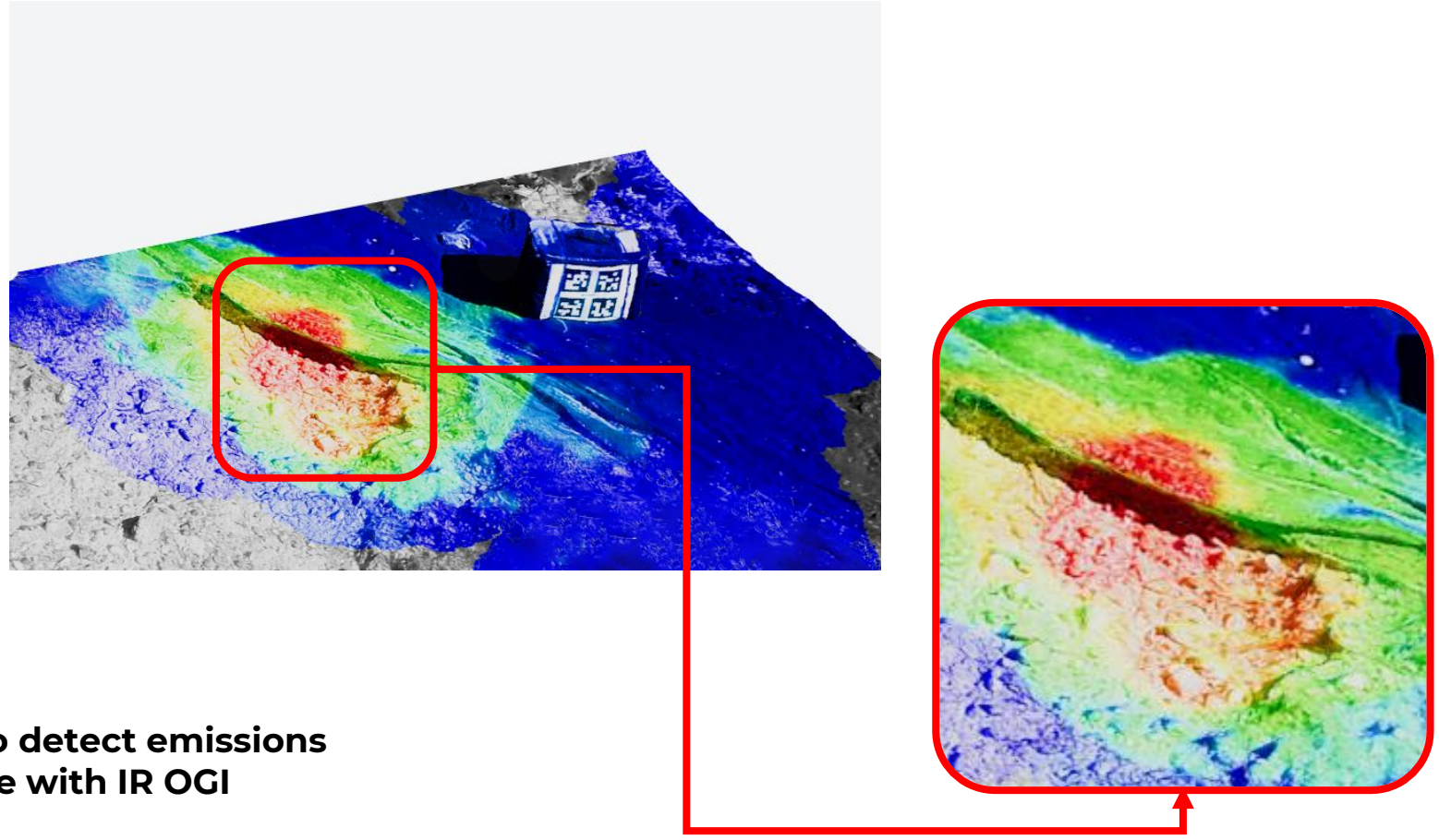
XXX ppm

Emissions Rate

XXX grams per hour

Potential Cause

Membrane crack due to folding



Observations

Xplorobot Laser OGI was able to detect emissions under a membrane, not possible with IR OGI

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Example of Inspection Results

Results

Fugitive Emission

Max Concentration

XXX ppm

Emissions Rate

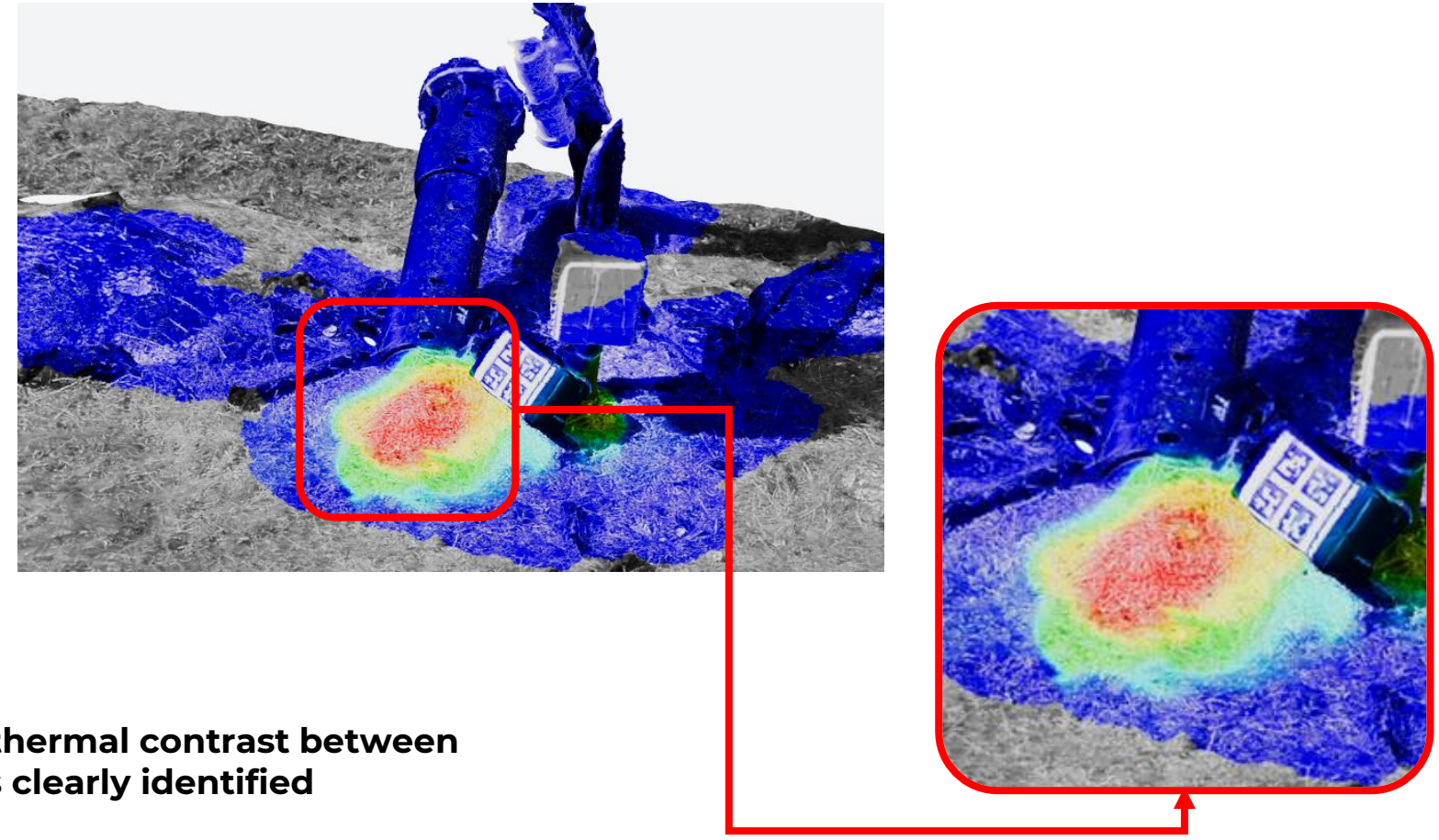
XXX grams per hour

Cause

Hole in piping underground

Observations

Emission from the ground (no thermal contrast between the gas and the background) is clearly identified



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