



ITT

Methane to Markets Partnership Expo.
Remote Sensing - Aerial Leak Detection and Measurement

ANGEL Service
Airborne Natural Gas Emission Lidar

Wednesday, October 31, 2007

Daniel Brake

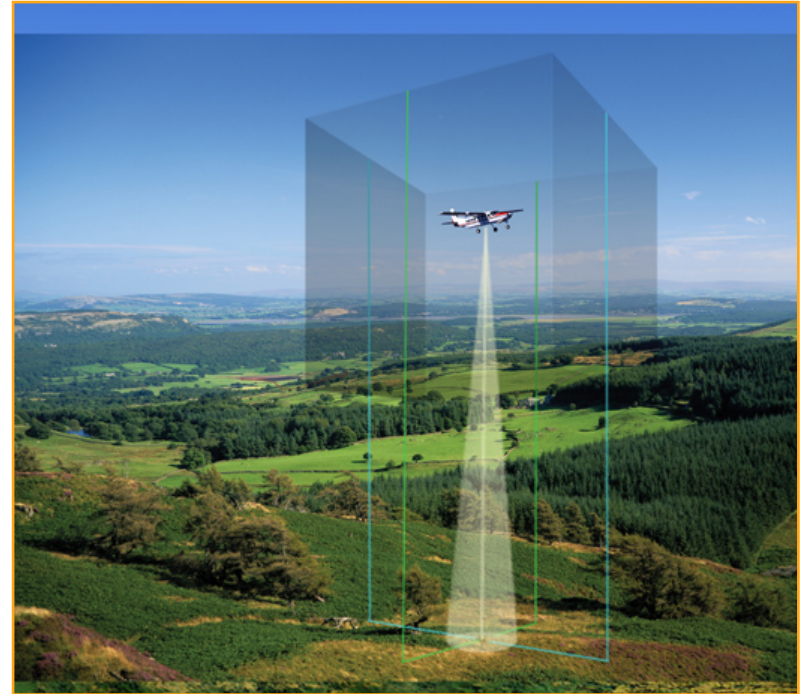
Director, ANGEL Service

Engineered for life

ANGEL Service -

comprehensive aerial pipeline leak detection and monitoring service

- Developed specifically for the energy industry to provide aerial leak survey, corridor mapping, and geospatial patrol video.
- Utilizes the ***latest technology*** to detect, quantify, image and pinpoint natural gas emissions.



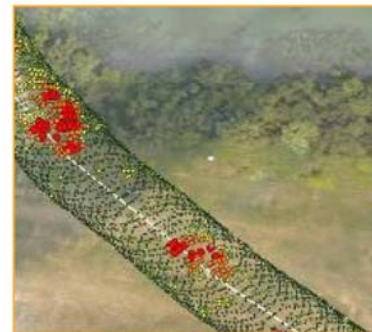
Taking Leak Surveys and Corridor Monitoring to New Heights

ANGEL Service Captures:

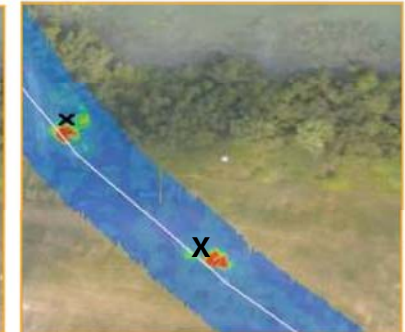
- Differential Absorption LIDAR (DIAL) laser technology provides accurate leak detection and quantification.
 - Aerial orthophotography of pipeline corridor and surrounding areas.
 - Digital geospatial video of pipeline corridor and surrounding areas.
- All reports are delivered in a GIS format which assures project was thoroughly completed.



ANGEL Collection Aircraft and Sensors



DIAL Scan Pattern



DIAL Results-Leaks Detected

Differential Absorption LIDAR (DIAL)

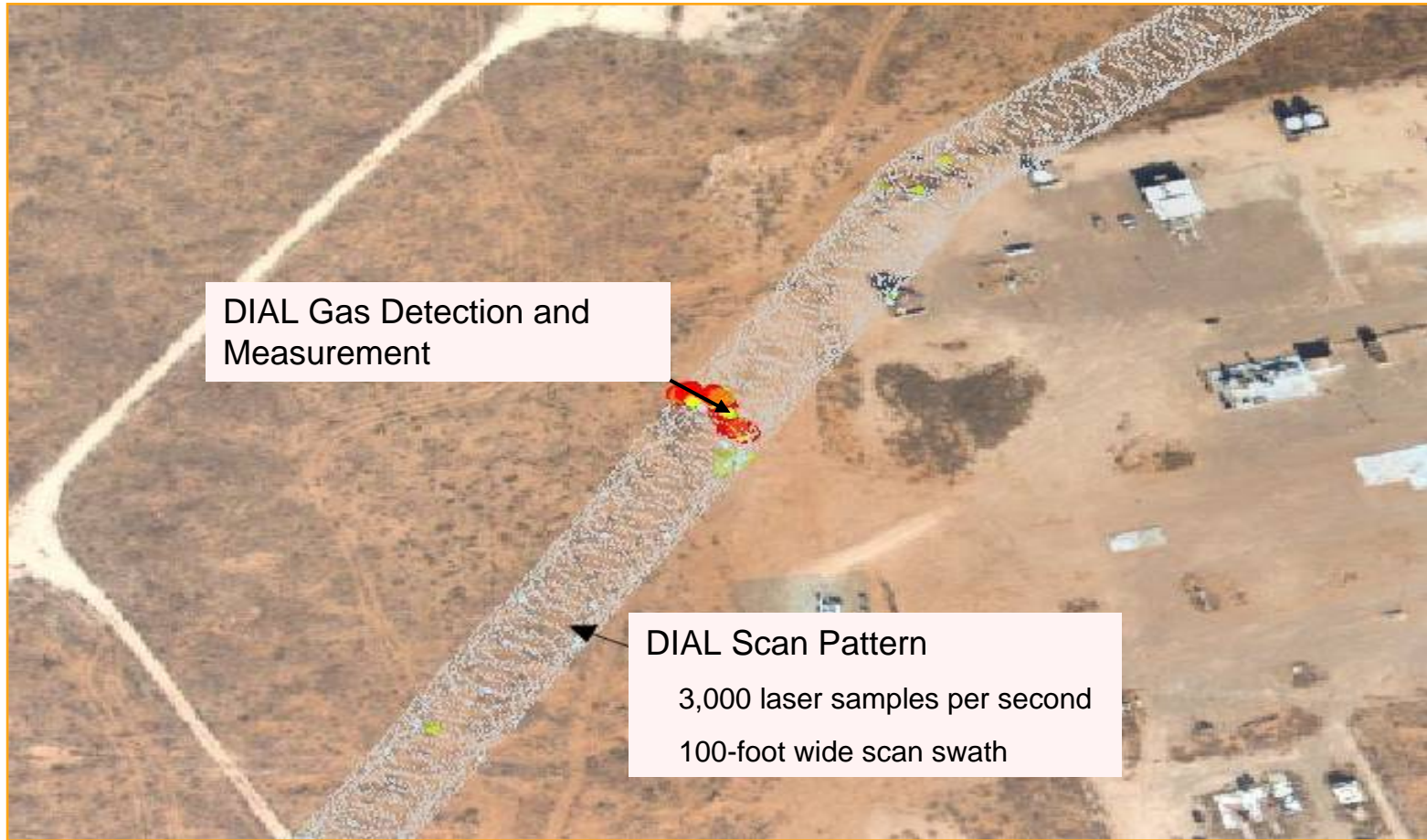
An active remote sensing laser technology

- Detects, measures, and pinpoints natural gas pipeline leaks and facility emissions.
- Broad area coverage—100' wide swath provides 400 times greater coverage than traditional walking methods.
- Full 3-Dimensional leak survey coverage over pipeline corridor and facilities.
- Laser pointing and scanning system guarantees pipeline survey coverage of >99%.
- Operates independent of terrain and weather conditions.

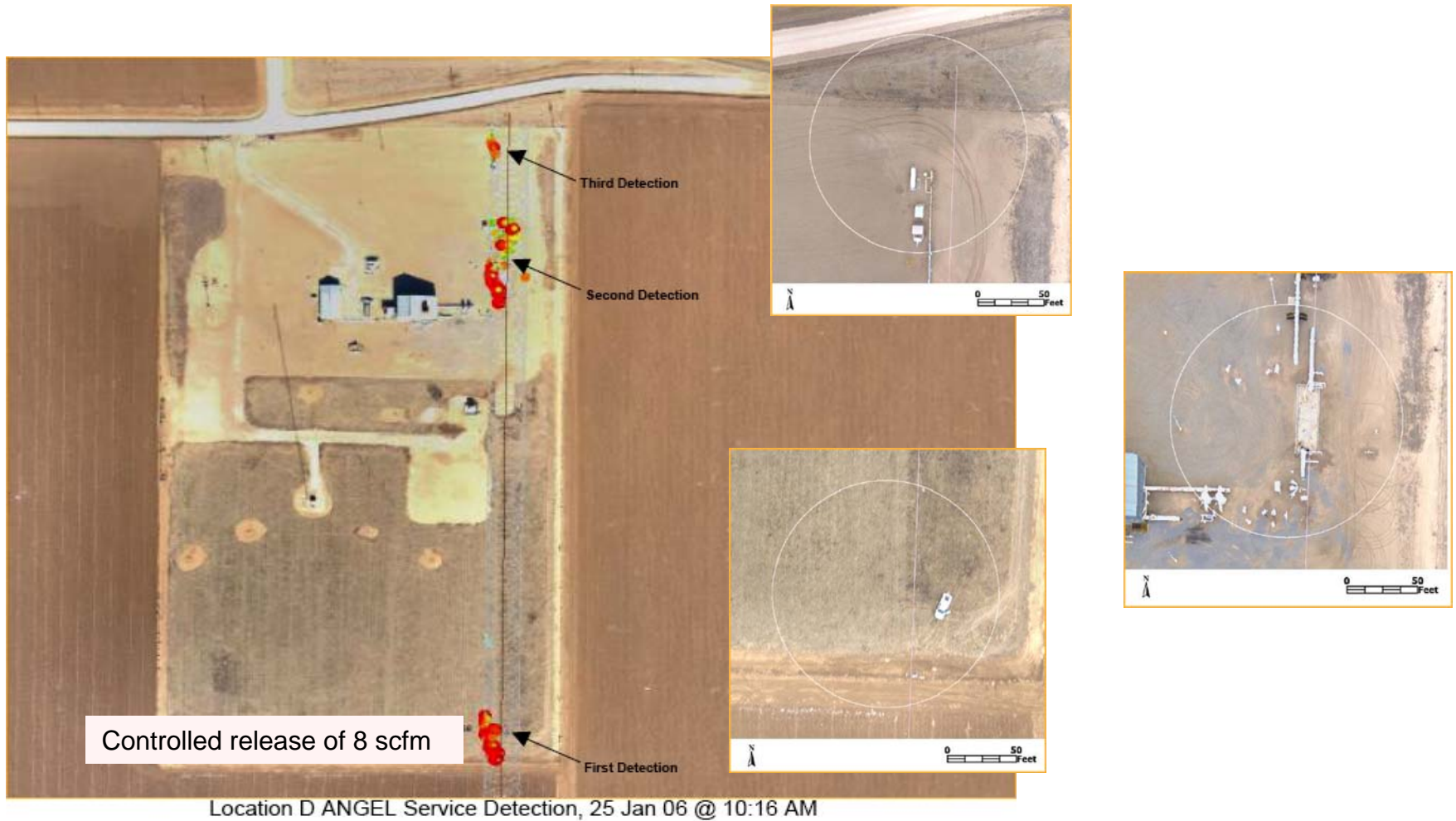


Detected using DIAL Technology from Aircraft

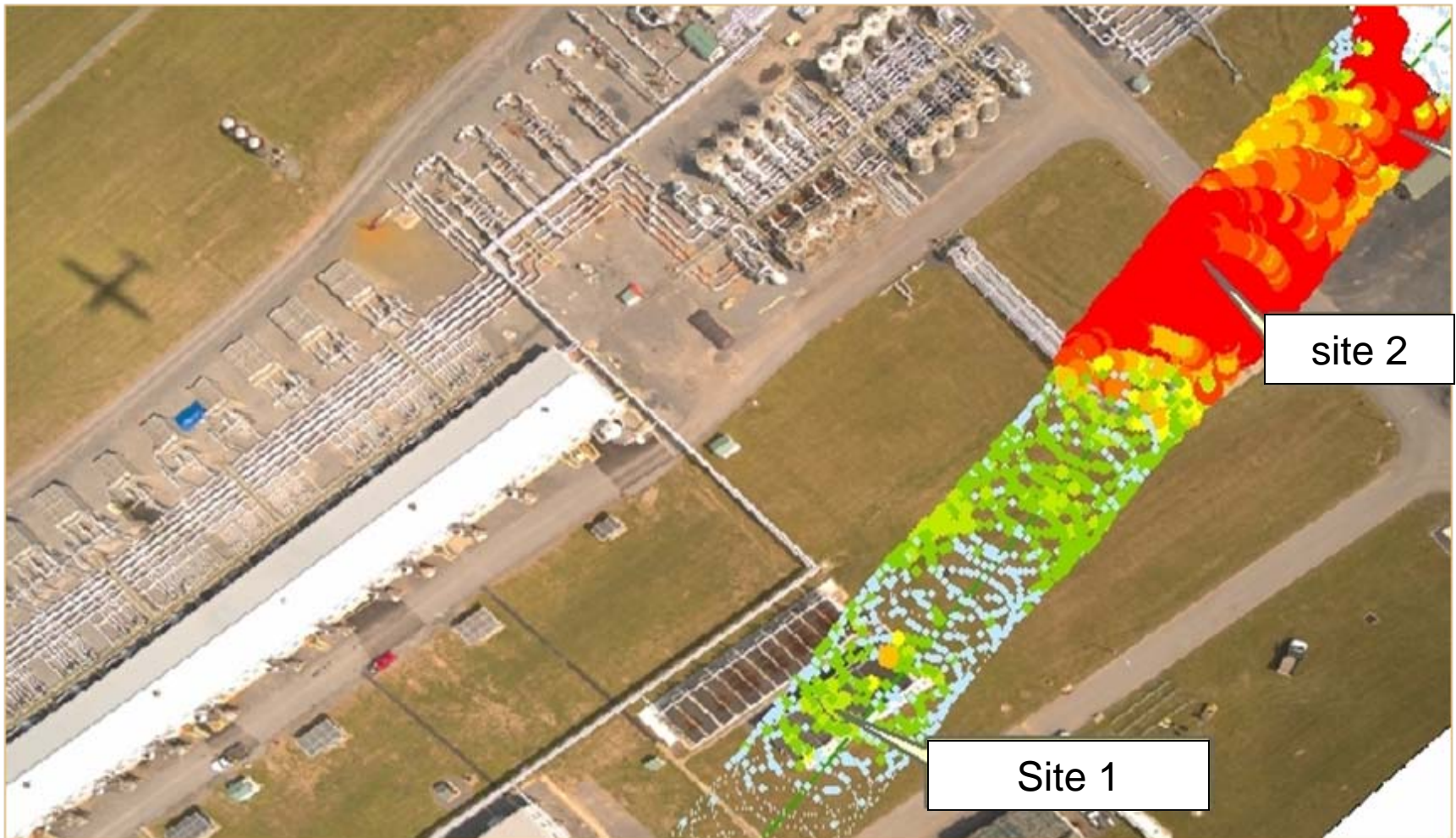
Example 1: Natural Gas Transmission Pipeline Route



Example 2: Natural Gas Compressor Station



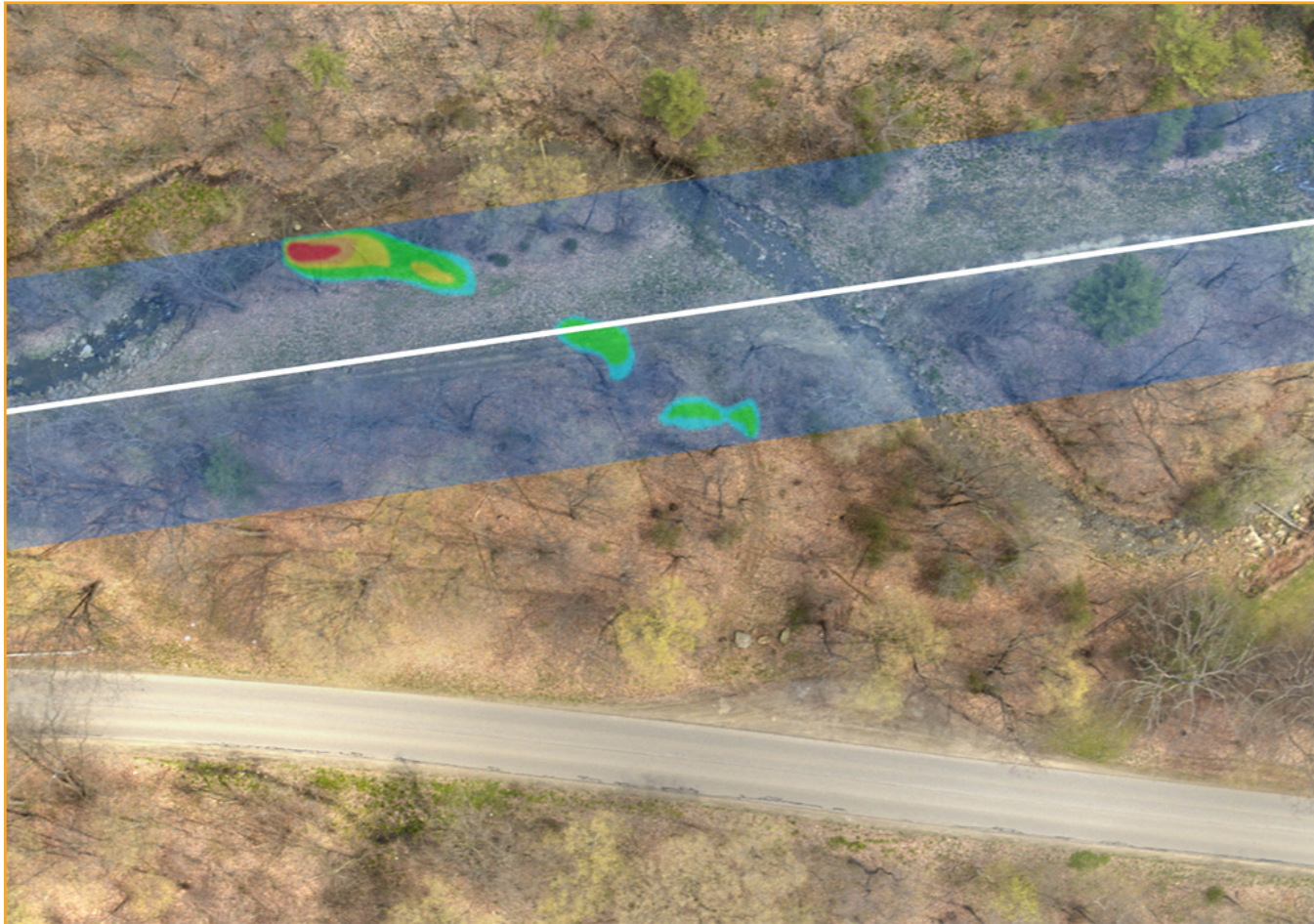
Example 3: Processing Plant



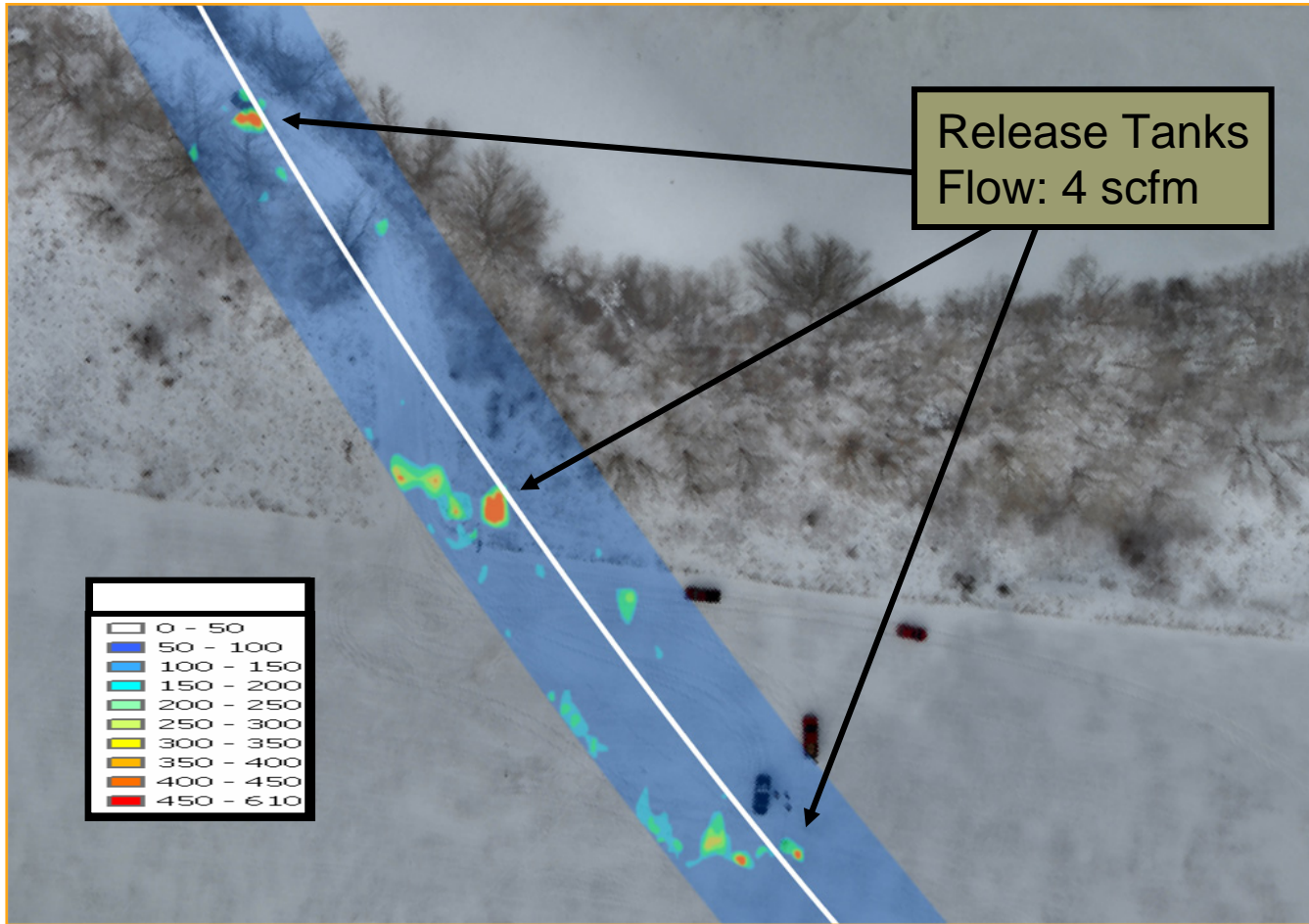
Example: Facility Leaks



Example: Underground Pipeline Leak



Example: Snow Covered Right-Of-Way— Controlled Release



ANGEL Service is Fully Operational and Commercially Available

- Completed field validations with numerous pipeline owners/operators.
- Successfully completed contracts with both U.S. Department of Energy and U.S. Department of Transportation office of pipeline safety
- Actively involved in Environmental Protection Agency's Natural Gas STAR Program
- Supporting member of Methane to Markets partnership

For more information contact:

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