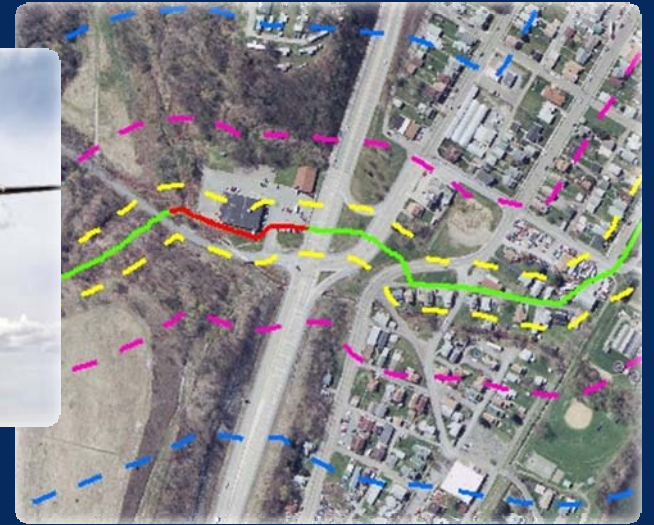




ITT



Airborne Leak Detection and Corridor Safety Monitoring

Engineered for life

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Agenda



I. Overview of Differential Absorption Lidar (DIAL) Technology

- Examples of airborne DIAL leak surveys

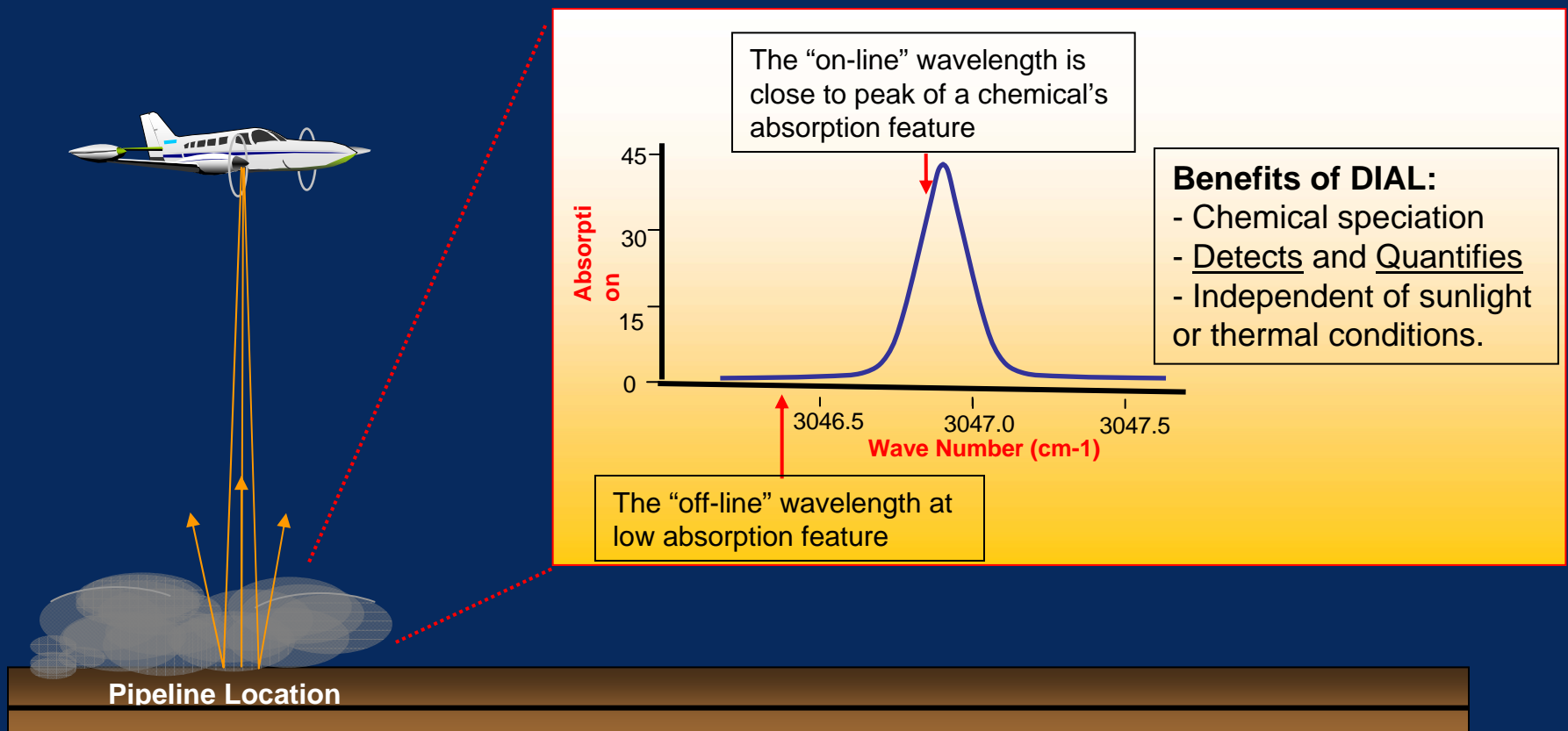
II. Overview of Aerial Mapping - Orthomosaic Imagery

- Examples of Corridor Monitoring: *Structure counting, Pipeline class analysis, and High-Consequence-Area (HCA) calculations.*

Differential Absorption Lidar (DIAL)

Gas Detection and Quantification Technology

DIAL is a pulsed laser technique that measures the difference in energy absorption between two specified wavelengths.



Airborne Leak Surveys



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Aircraft and Sensor Suite



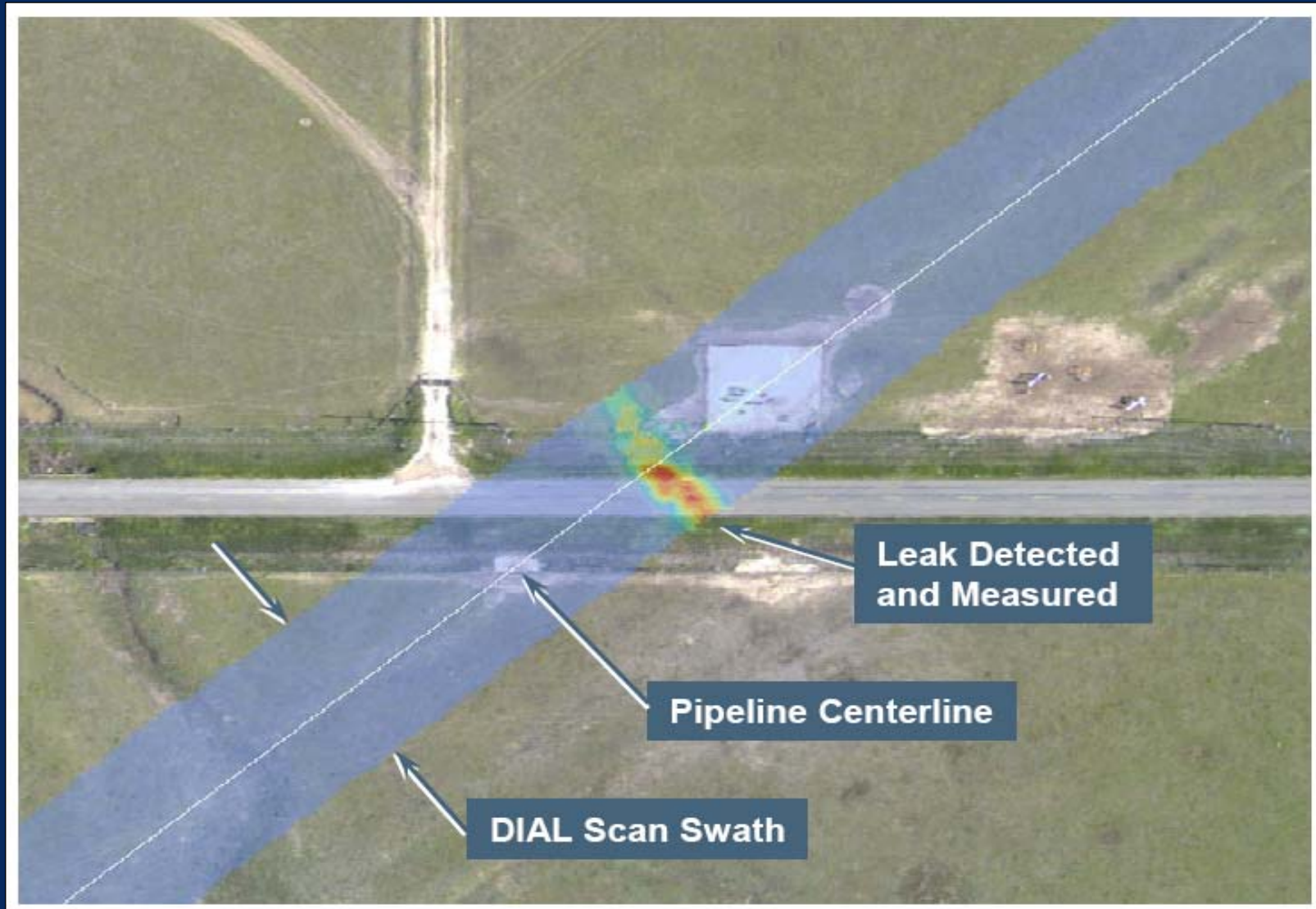
DIAL
Sensor

Digital
Video
Camera

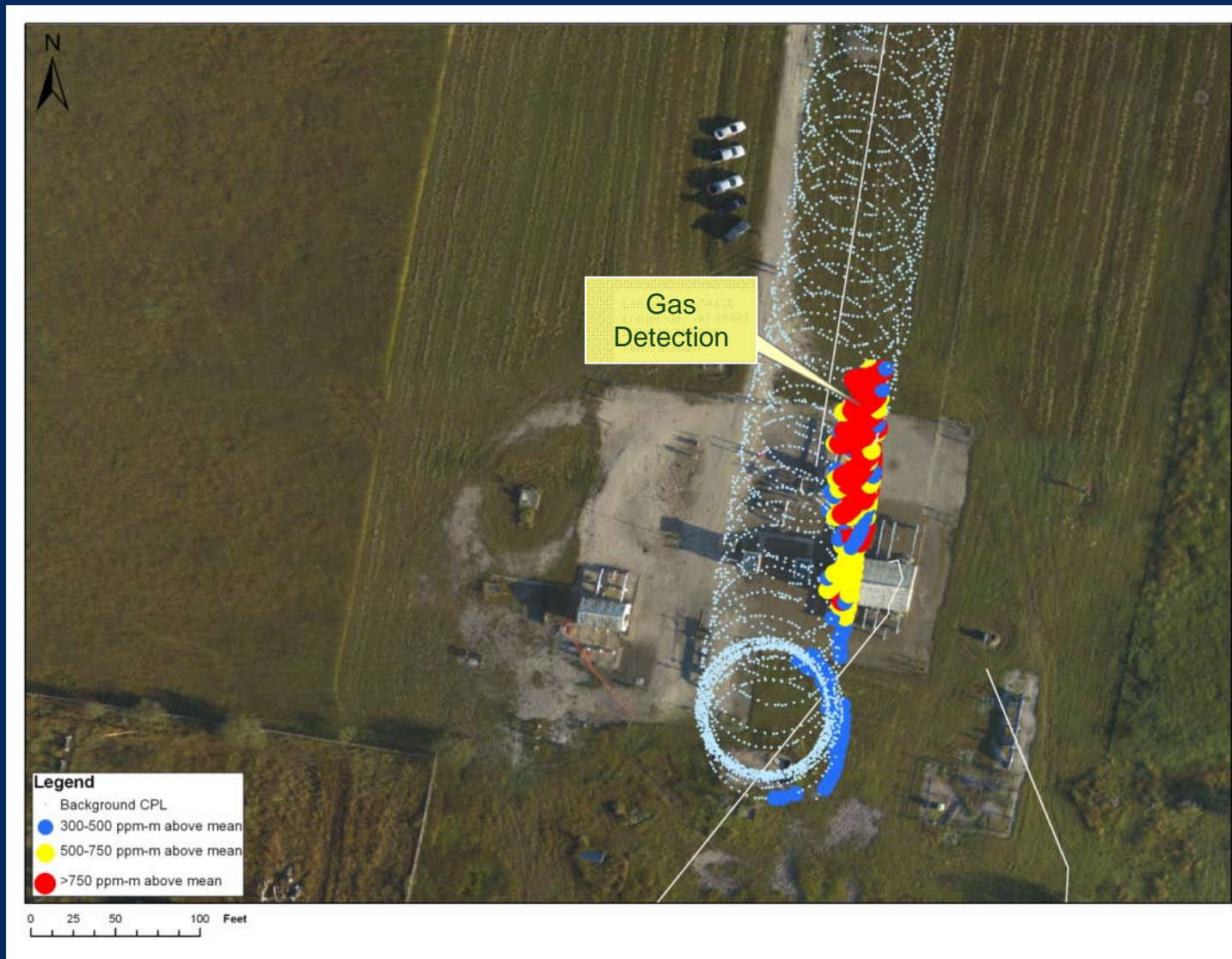


High
Resolution
Mapping
Camera

Airborne DIAL Leak Survey Results



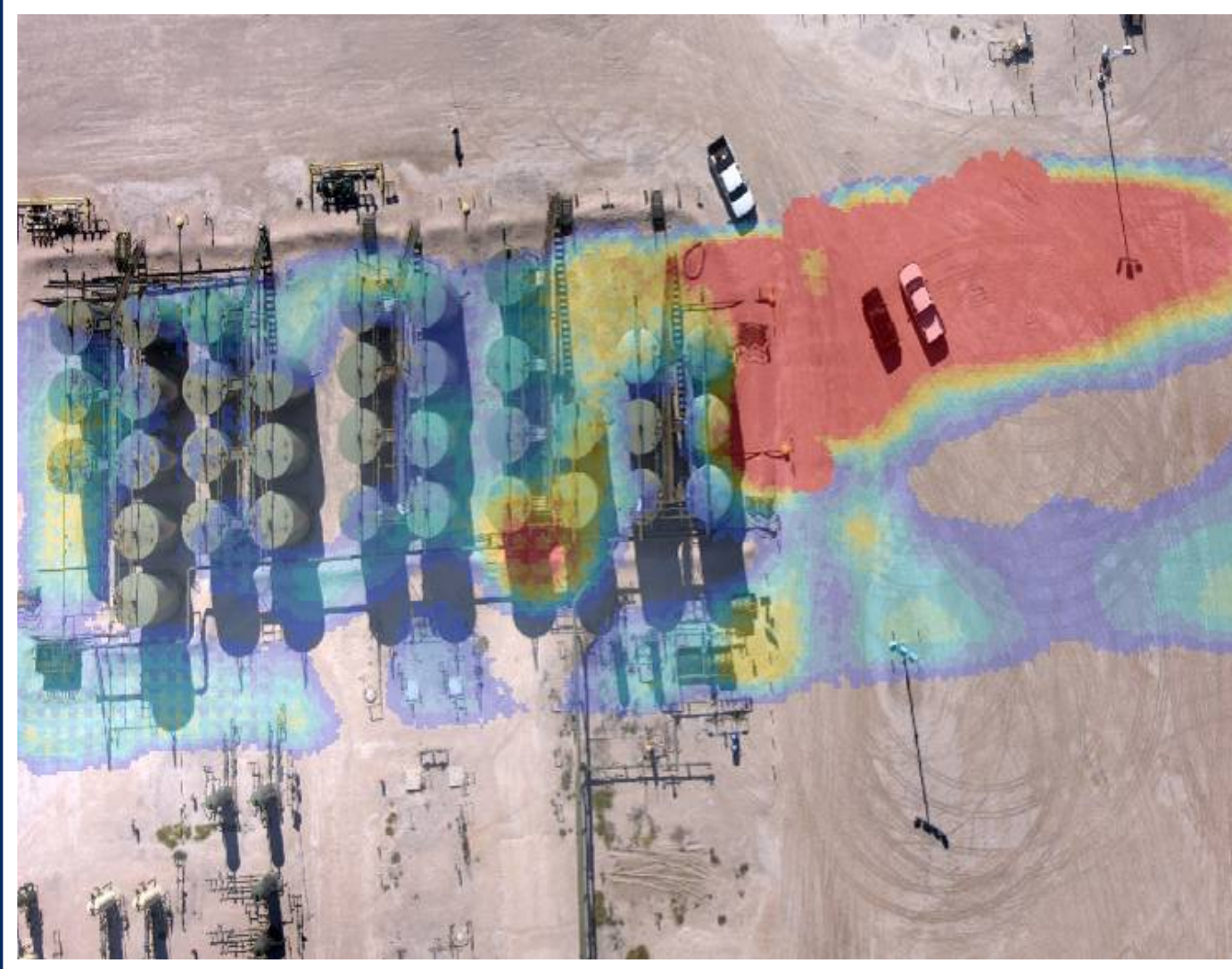
Airborne DIAL Leak Survey Results



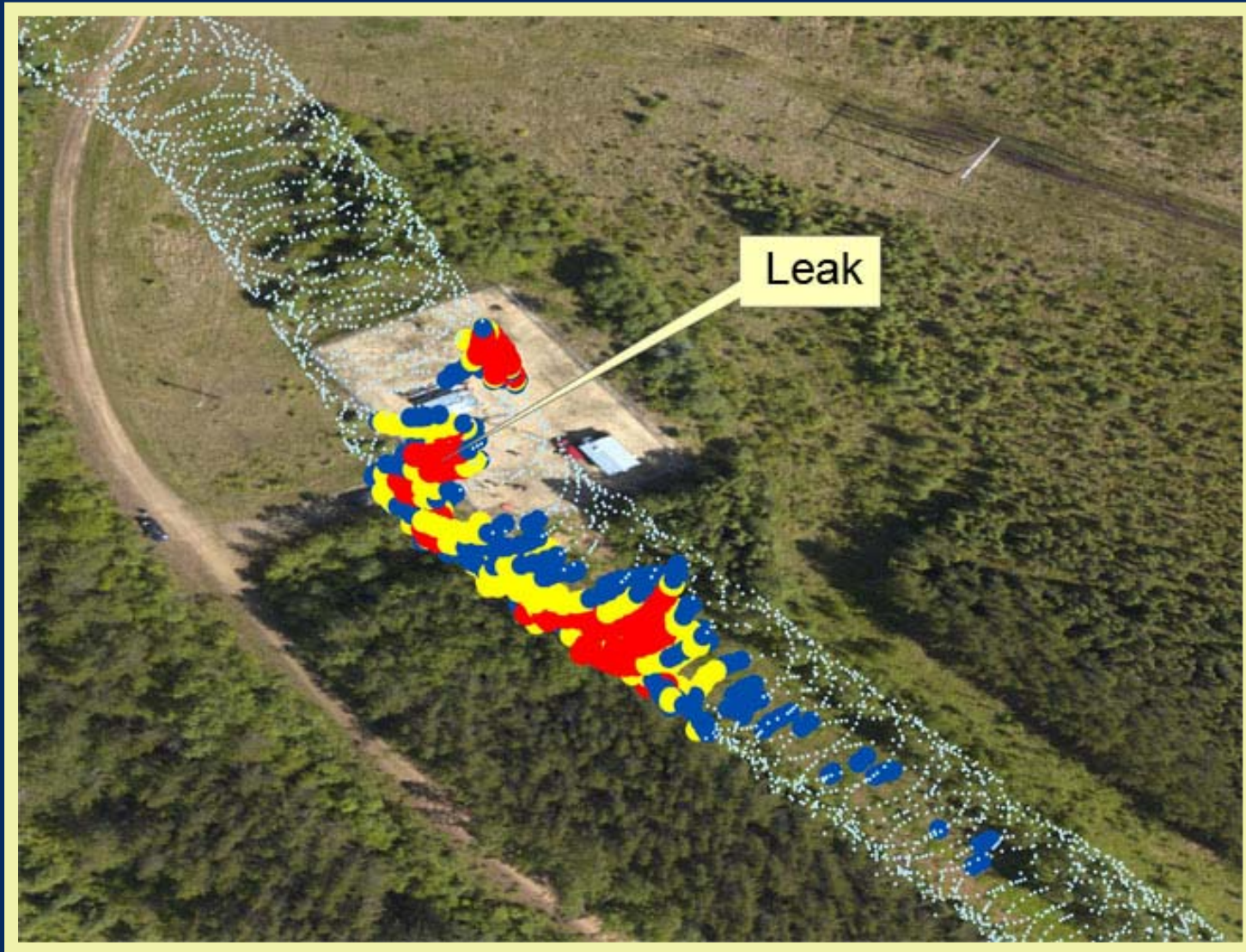
Airborne DIAL Leak Survey Results



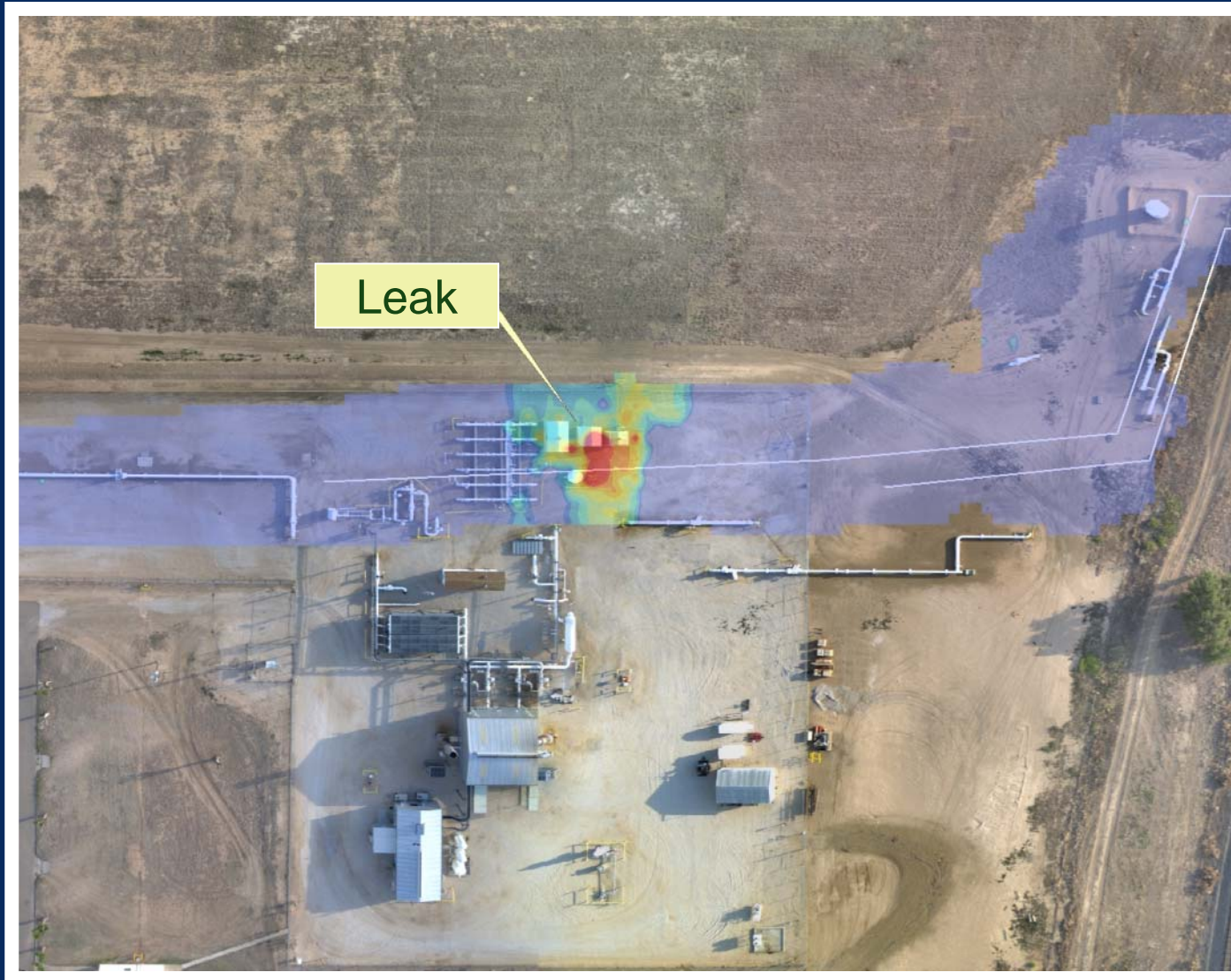
Airborne DIAL Leak Survey Results



Airborne DIAL Leak Survey Results

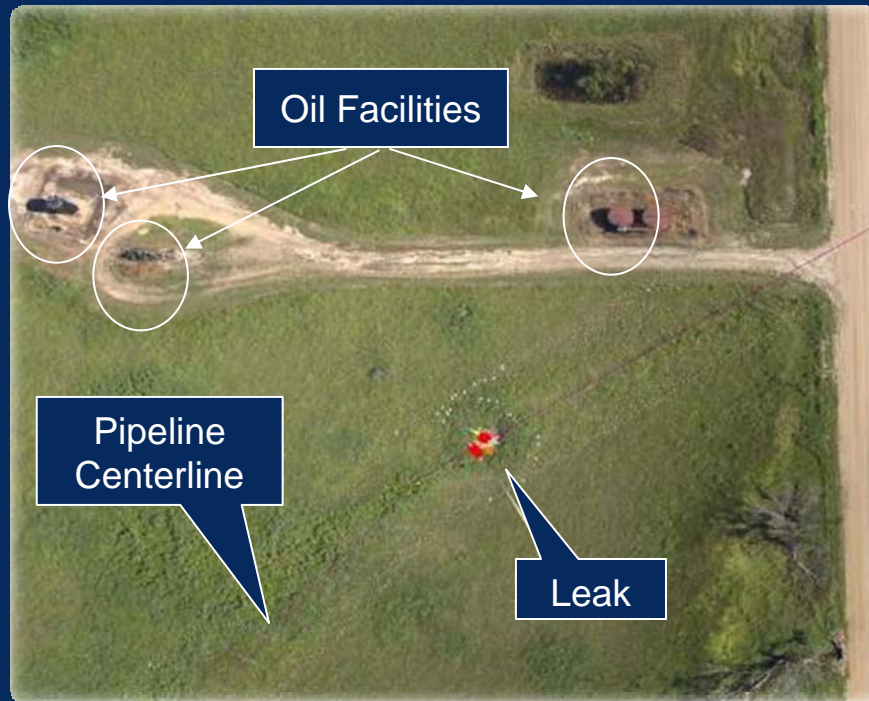


Airborne DIAL Leak Survey Results

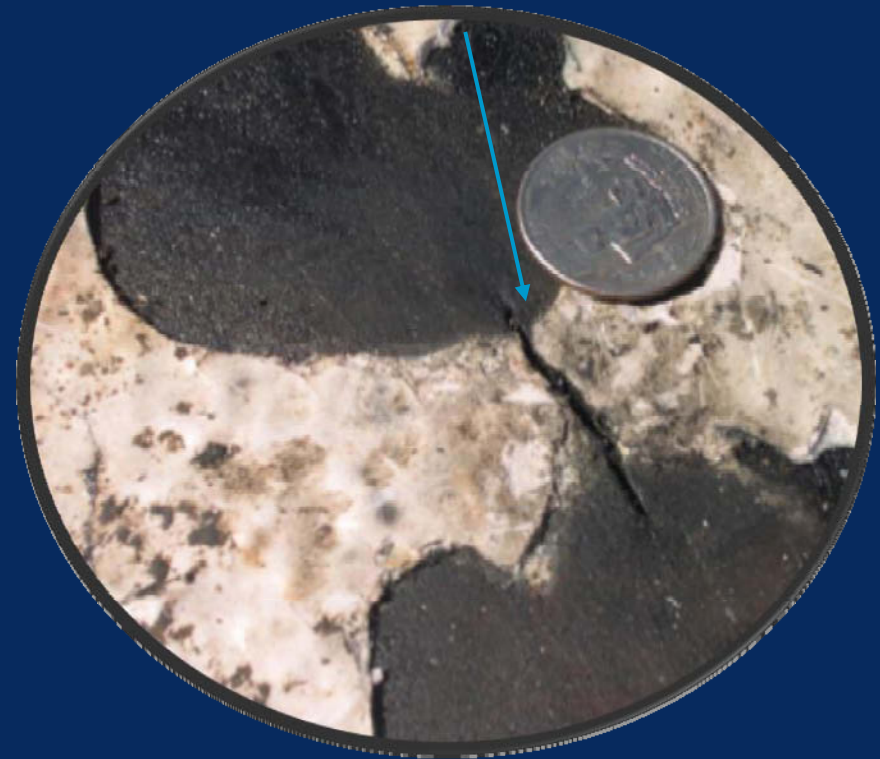


Example: ANGEL Services Detection of an Underground Pipeline Leak

Transmission Pipeline Operating at 700psi



Pipeline Crack



DIAL finds potentially catastrophic leak that current best practices missed.

Aerial Mapping Orthomosaic Imagery



ITT Aircraft and Sensor Suite



DIAL
Sensor

Digital
Video
Camera



High
Resolution
Mapping
Camera

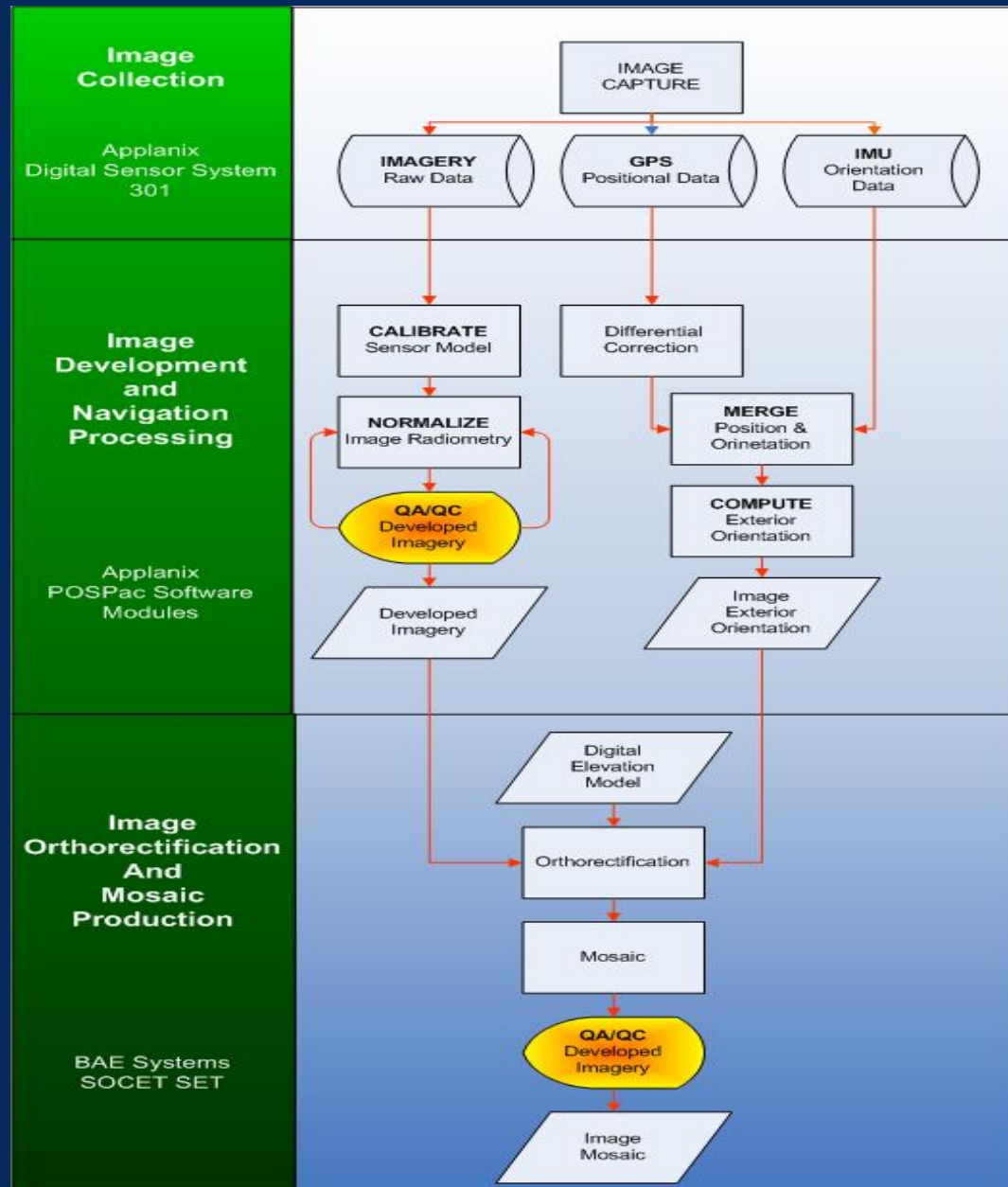
Image Collection



The Applanix DSS medium format digital mapping system offers the following benefits:

- Mapping grade system meeting USGS and NASA image geometry and standards for mapping applications
- Full radiometric image calibration, providing high quality and consistent digital imagery
- Integrated direct georeferencing and sensor calibration
- Quick data turnaround with end-to-end digital processing and direct data import into photogrammetric and GIS systems

Orthomosaic Workflow



Orthomosaic Imagery



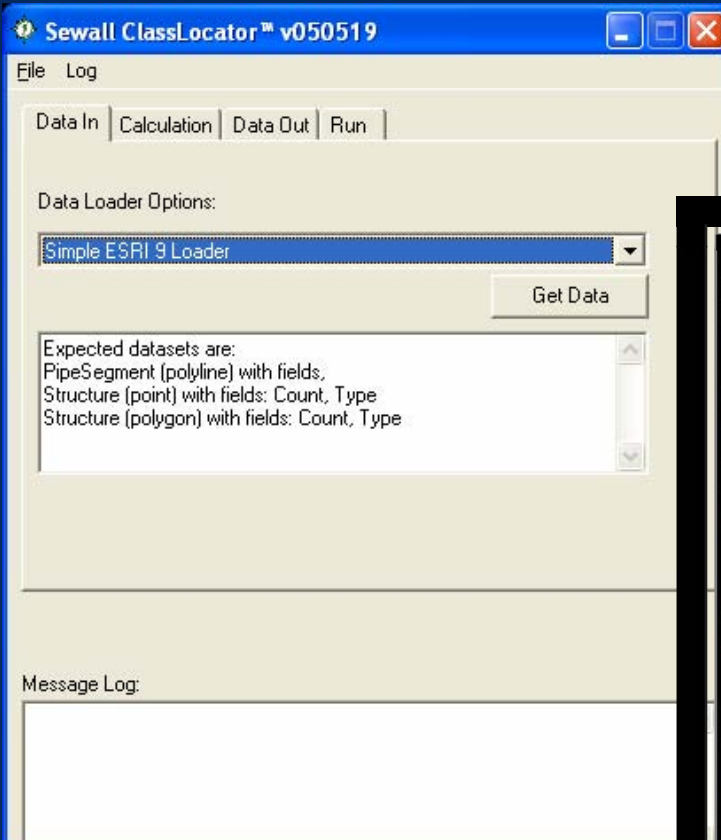
Orthomosaic Imagery – High Details



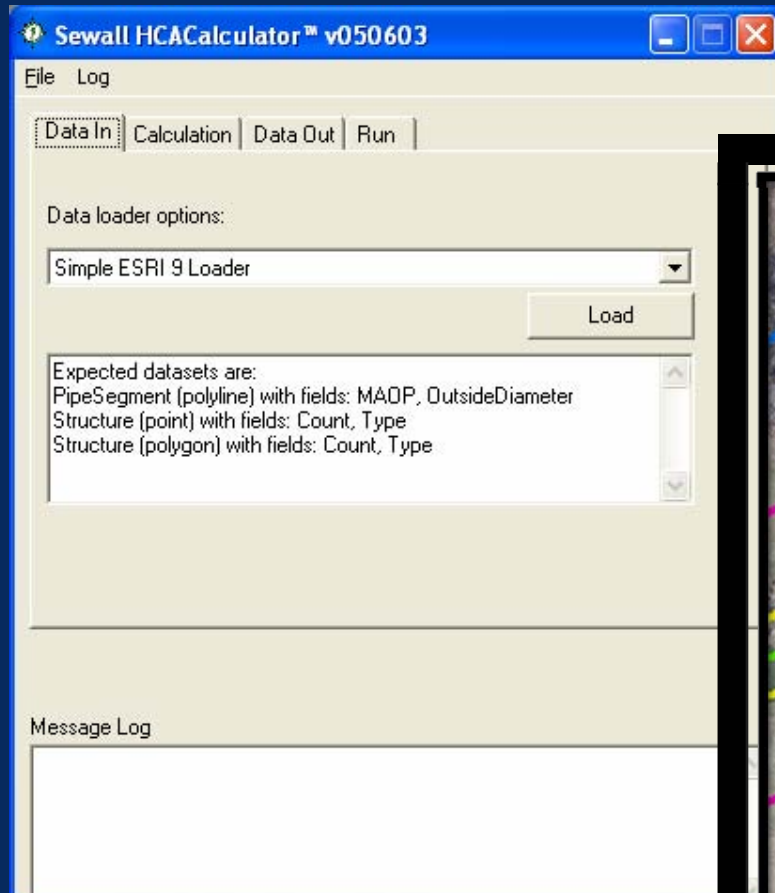
Structure Updates, Pipeline Class Location Analysis, and HCA Calculation



Pipeline Class Locator



Pipeline HCA Calculator



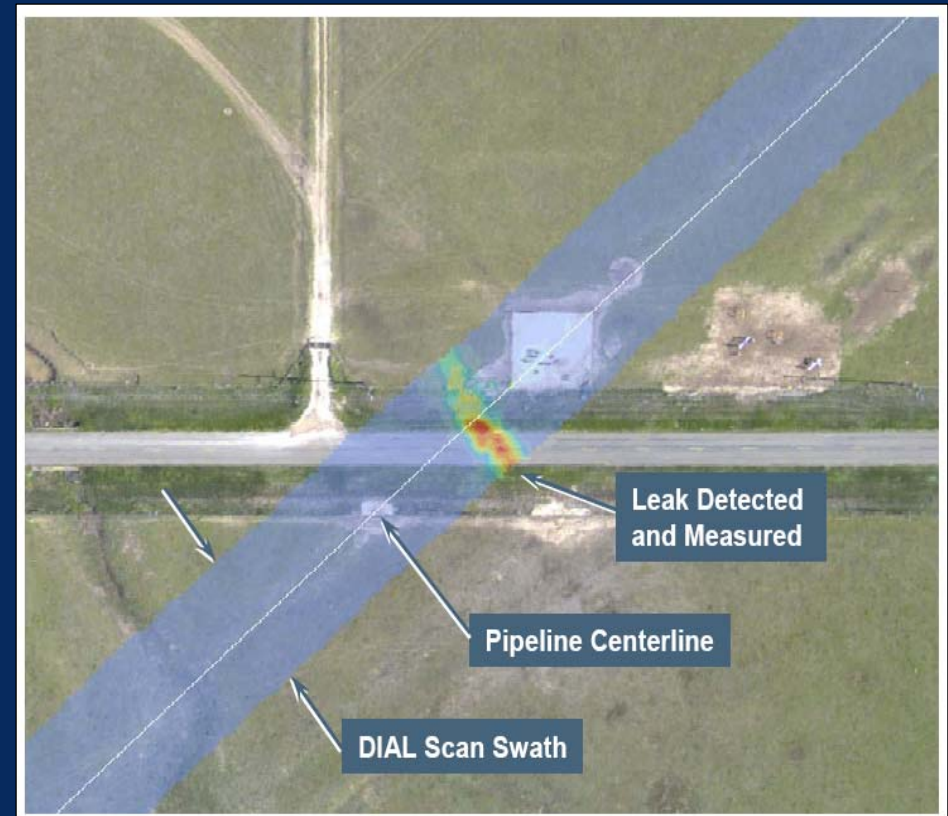
Summary



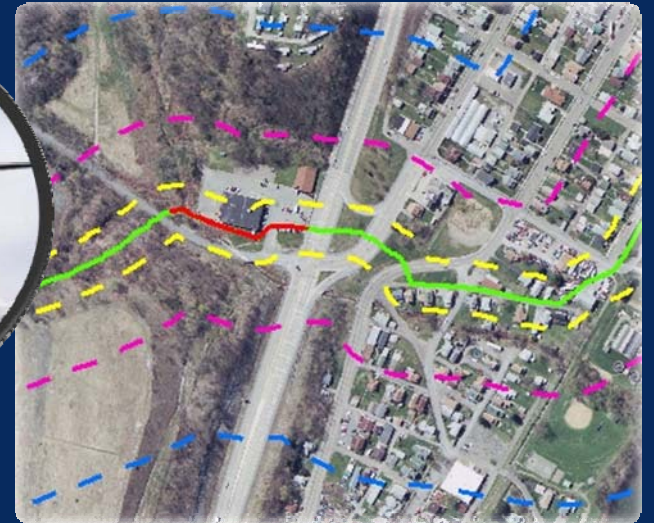
ITT ANGEL Services

The new "best practice" in leak surveys and corridor monitoring

- *Differential Absorption LIDAR (DIAL)* laser technology provides accurate gas detection and quantification.
- Finds leaks and emissions that current best practices are missing
- Maps corridors and surrounding areas for multiple safety applications
- Guaranteed performance levels
- Operator qualified (OQ) personnel
- Comprehensive GIS deliverables and record keeping



Thank You!



ANGEL Services
ITT Corporation

(585) 269-5121

www.ssd.itt.com/angel



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