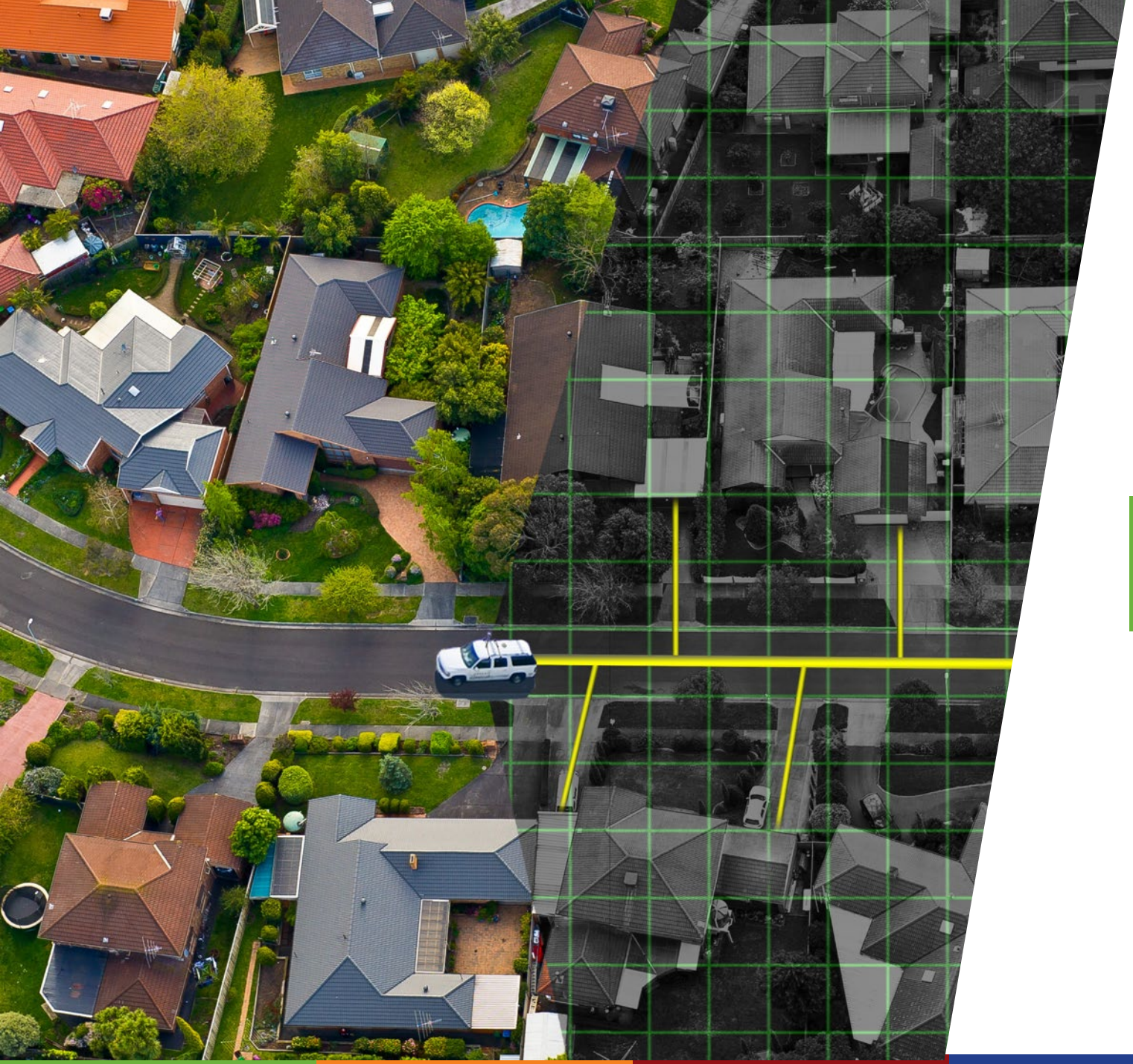

PICARRO

Global Leader in Emissions Measurement,
Emissions Reduction,
Pipe Replacement, and Advanced Leak Survey

Australian Pipelines & Gas Association
2022 Annual Convention & Exhibition

September 26, 2022

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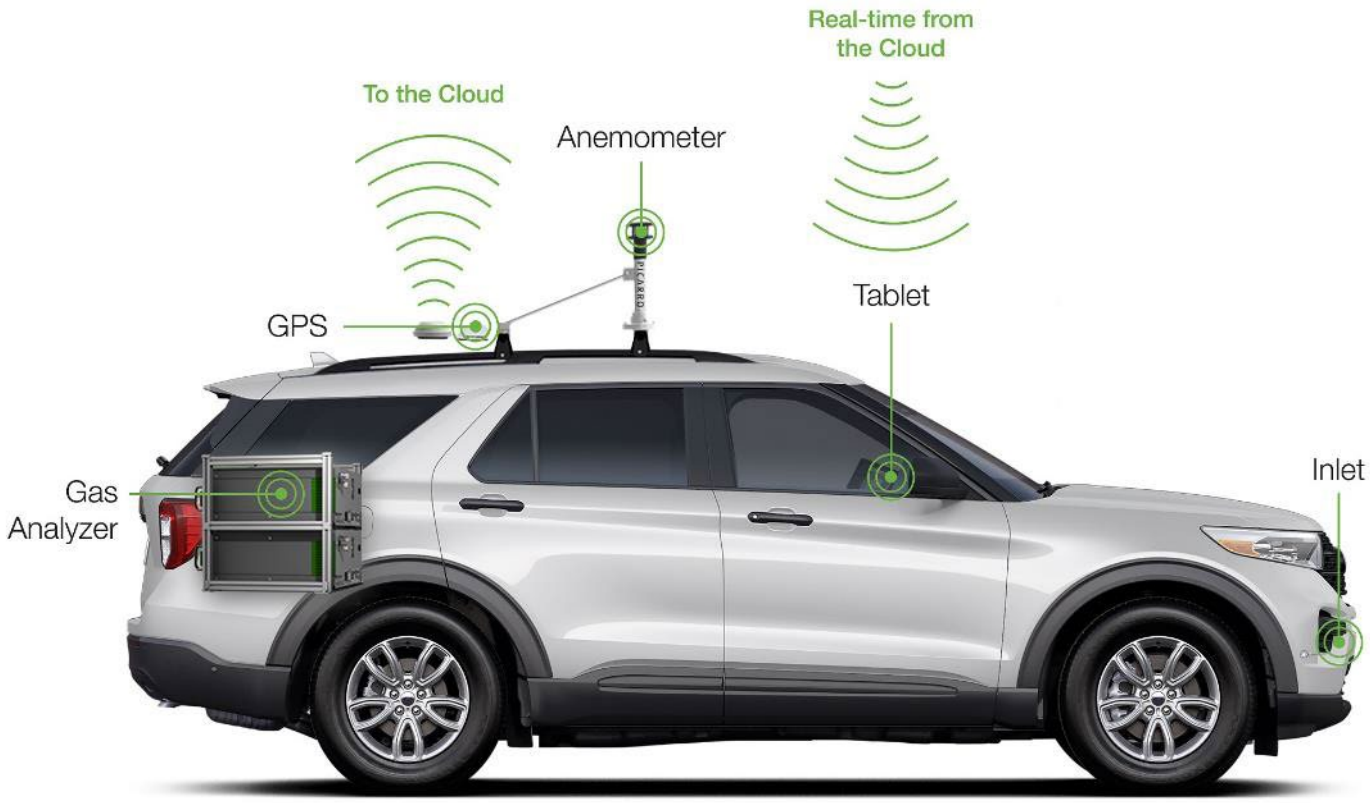
Picarro Proprietary Hardware, Software & Analytics



Hardware

- All Weather gas inlet system
- PPB methane/ethane sensor
- Anemometer – wind-speed / direction
- iGPS
- Cloud connected
- Driver UI tablet

Software & Analytics

- Multi-pass data collection protocols
- Atmospheric and methane plume modeling
- Source discrimination to avoid false positives
- Risk assessment and flow rate quantification

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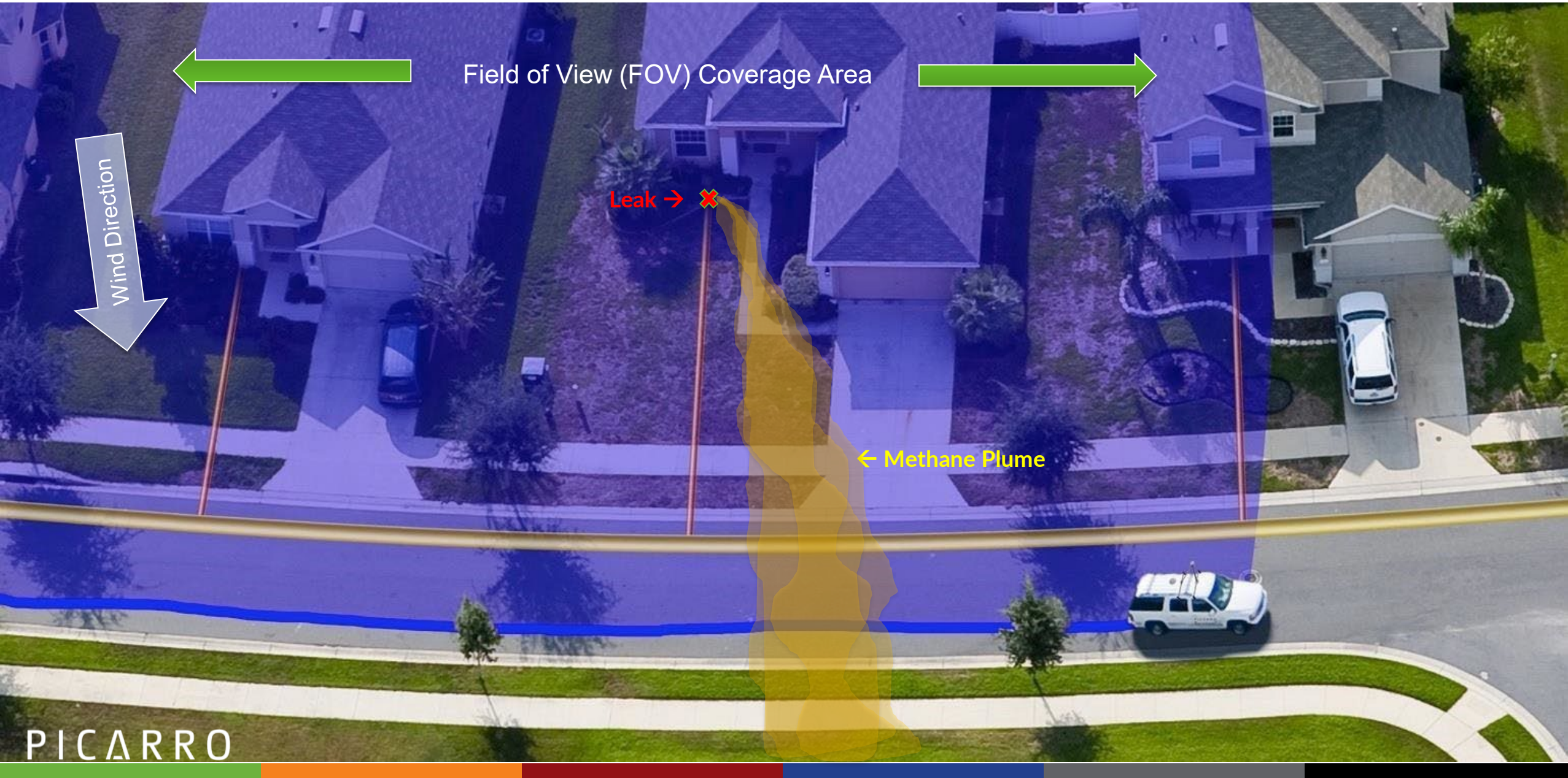
Advanced Leak Detection and Emissions Quantification



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Picarro Advanced Leak Detection Algorithm

ALD 1.0 2012 → ALD 2.0 2015 → ALD 3.0 2017 → ALD 4.0 2022

1st Generation

- Concept of LISA, gap
- Field of View
- Methane plume modeling

2nd Generation

- Spatial/temporal aggregation
- False positive removal with ethane sensitivity

3rd Generation

- Risk Ranking Analytics
- Next Gen FOV3
- Link leak indication to GIS assets

4th Generation

- Priority Ranking 2.0
- Customized to network properties and operator priorities

P-CUBED®

Rev 6.4

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Picarro Emissions Quantification Algorithm

EQ 1.0 2014 → EQ 2.0 2017 → EQ 3.0 2022

1st Generation

- Flow rate estimate of single leak
- Methane plume modeling

2nd Generation

- Spatial/temporal aggregation
- Accuracy validated with controlled release experiments

3rd Generation

- Measurement based emissions factors
- Network emissions reporting
- OGMP 2.0 – One Future - Veritas

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Picarro Applications

Emissions Measurement (Network)

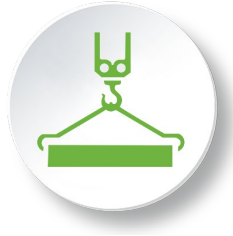
- Quantify methane leaks at scale, report on total network emissions
- Supports OGMP2.0 gold standard and other upcoming regulations

Emissions Reduction

- Super Emitter Program
- Find top 10% of highest emitting leaks, reduce network emissions by up to 50%

Pipeline Replacement (Optimization)

- Identify high priority network areas and pipe assets for accelerated replacement
- Combine methane data with your own infrastructure pipeline integrity variables
- Optimize your capital investment and reduce your operational repair budget



Advanced Leak Survey

- Advanced Leak Detection (ALD) for leaks measurement at speed and scale
- Prioritizing leak indications to increase network safety, reduce odor calls, reduce emissions

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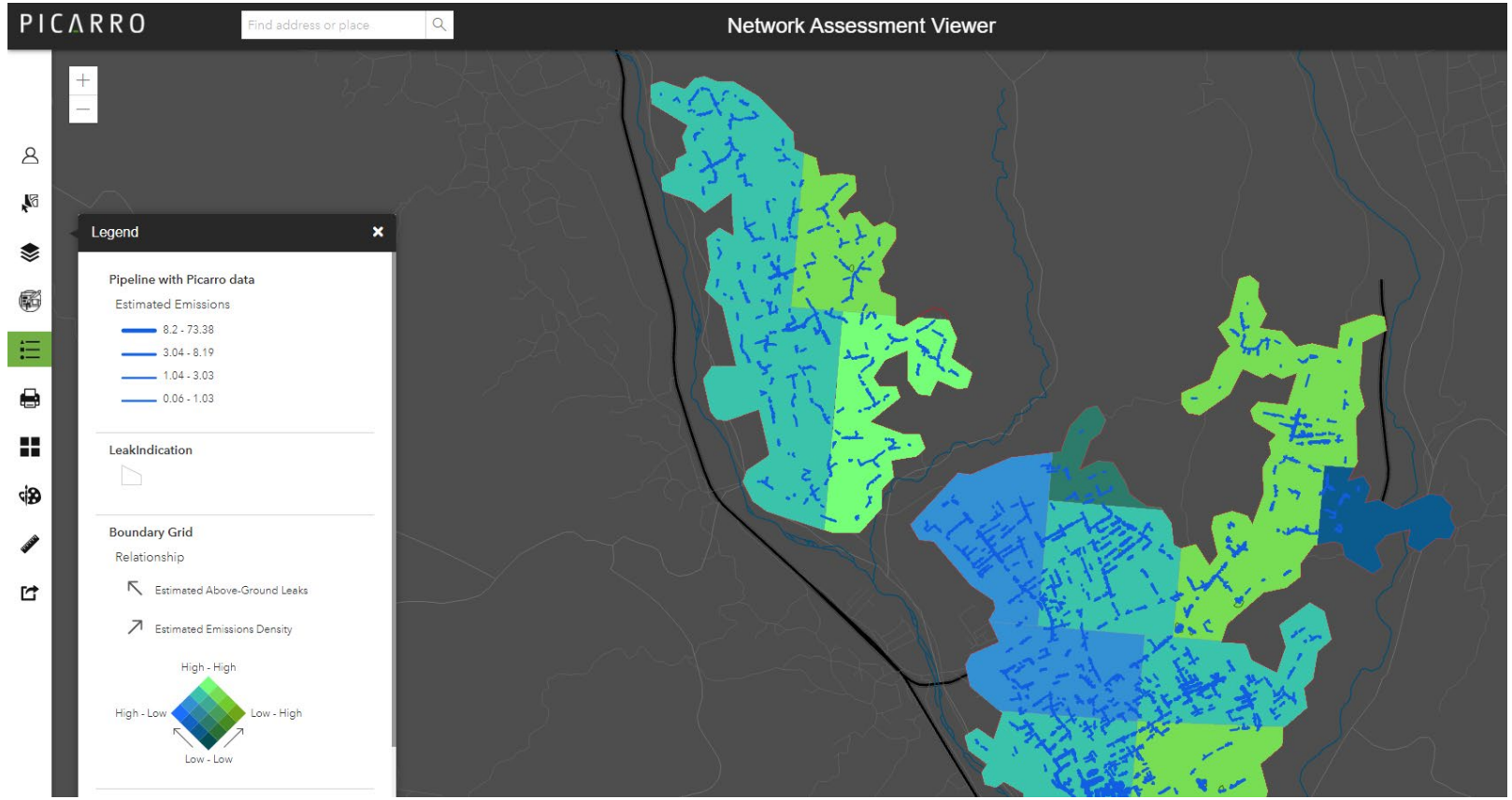
Network Emissions Measurement

- Network Asset Viewer (NAV) - Intuitive and interactive representation of ***measured*** methane leaks and associated emissions in network
- Compute leak and emission density and total for pipe assets, aggregate data to local, regional or total network level
- NAV powers multiple applications, including emissions reporting and Integrity management



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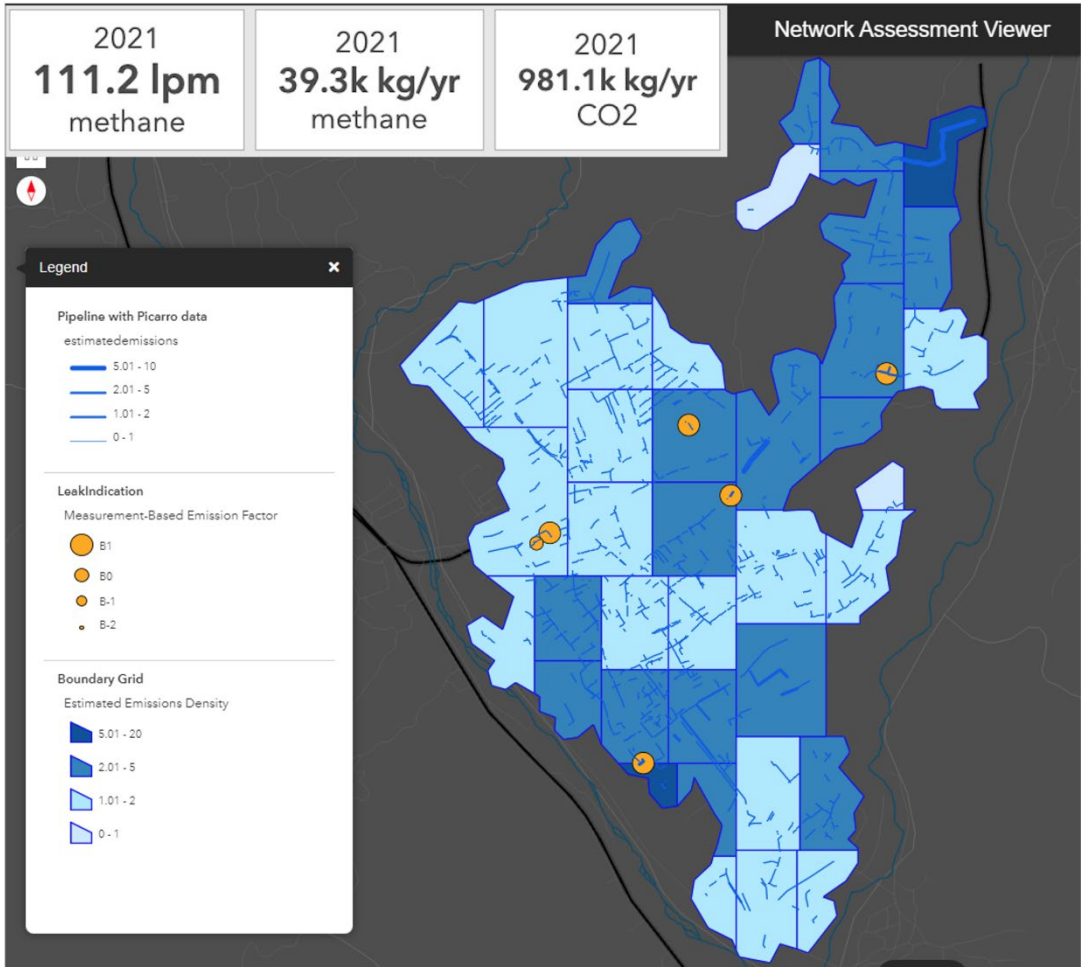
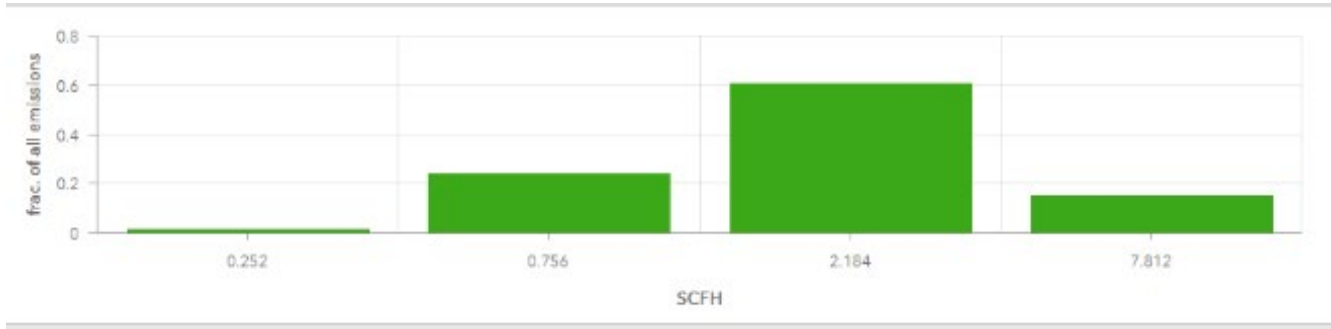
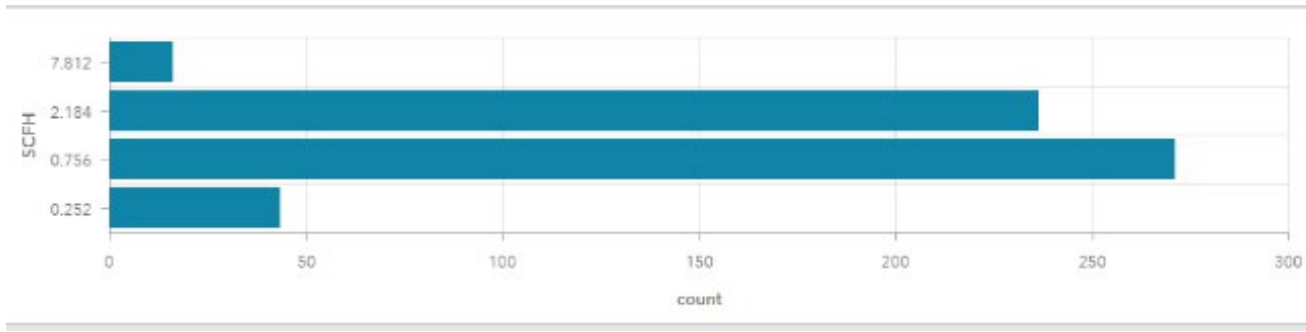
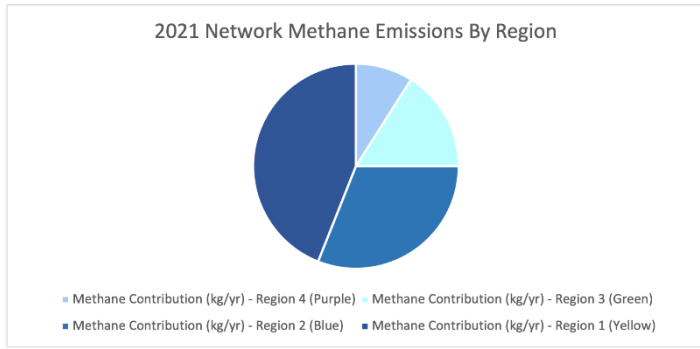
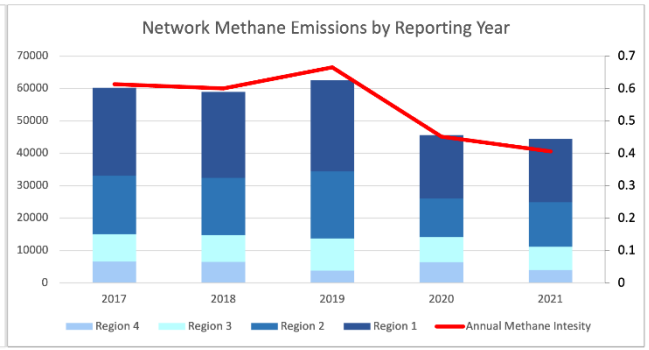
Network Emissions Measurement











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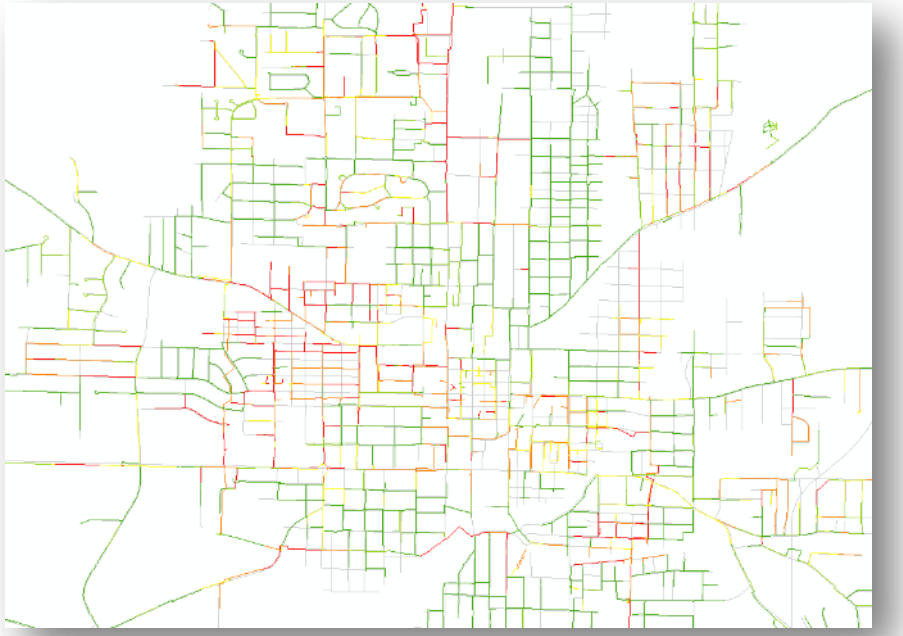
Pipe Replacement Challenges

How to optimize pipe replacement programs to

- ✓ Maximize removal of risk across all threat types
- ✓ Maximize leak removal using capital $
- ✓ Stay within budget & planned mileage
- ✓ Boost capital efficiency

Static DIMP risk modeling



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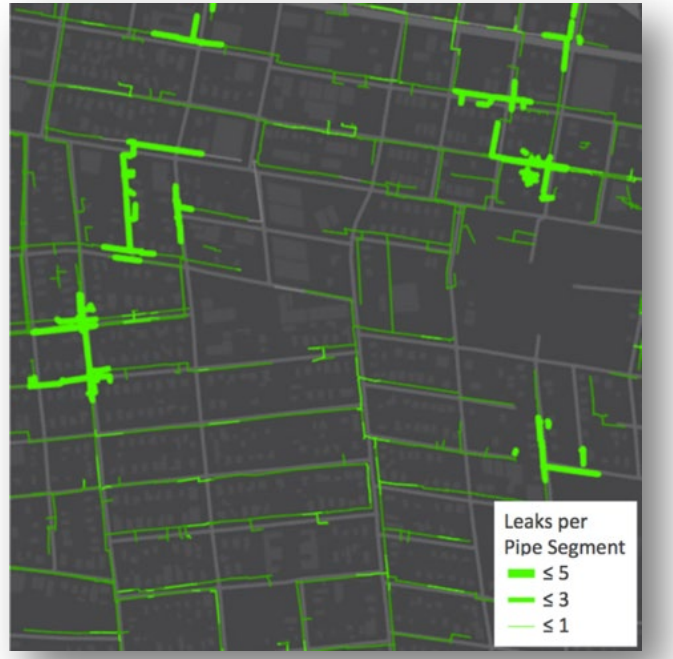
Live methane Data collected with Picarro



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Optimized pipe selection

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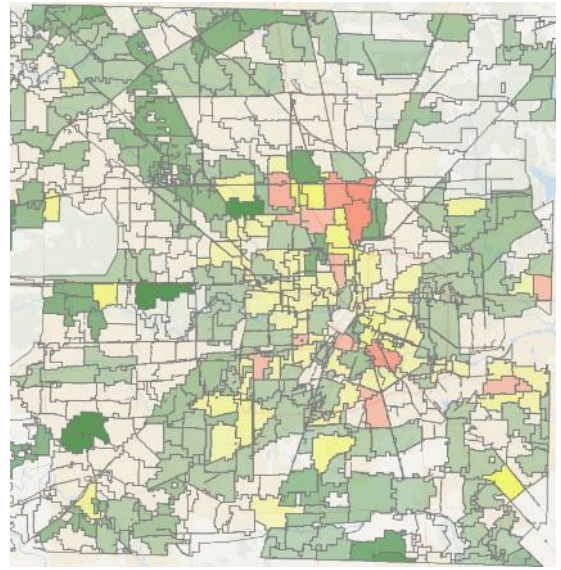
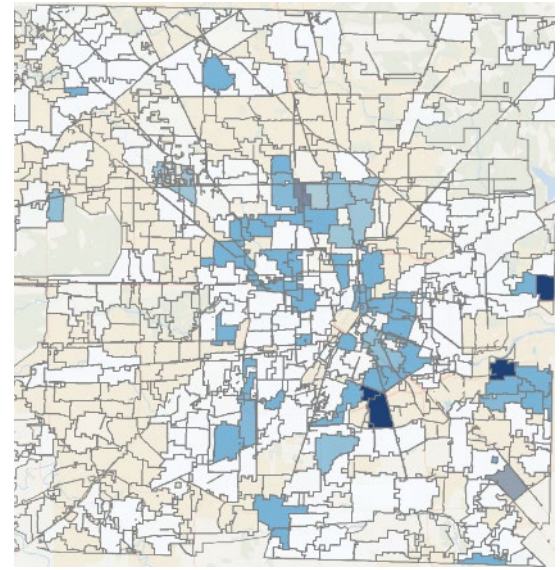
Data-Informed Pipe Replacement

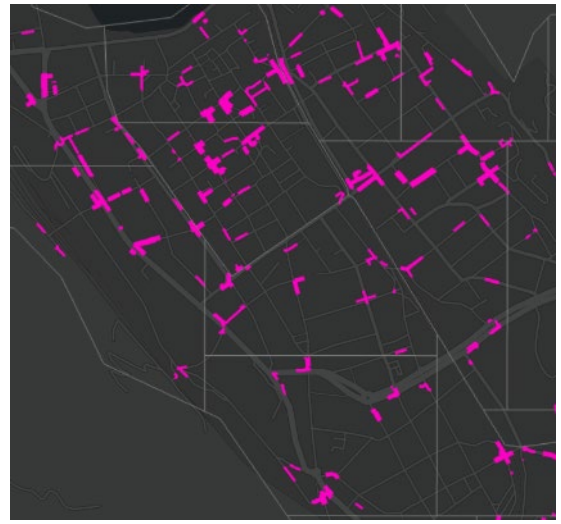
- Drive areas of interest with Picarro
- Picarro's analytics measure and attribute methane emissions to specific areas and main pipe segments
- Identify leakiest network areas & pipe segments
- Prioritize replacement of pipes based on actual asset condition
- Find and eliminate 2x times more leaks than traditional replacement strategy



Leak density by areas (# leaks/mile)



Emission density by area (# SCFH/mile)



Rank main pipes by leak density (# leaks/mile)

Rank main pipes by emission density (# SCFH/mile)

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Thank You!

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