

# PICARRO



PICARRO  
Surveyor™

for Natural Gas Leaks

# Picarro Surveyor for Natural Gas Leaks

## Survey at the Speed of Traffic

The Picarro Surveyor is the industry's only leak detection solution that surveys mains and services at driving speeds



### Mobile Form Factor:

System hardware designed to be easily vehicle-mounted and mobile, including mobile wireless connectivity, vehicle electrical power.

### CRDS Technology:

World's most sensitive and stable technique for measuring methane and carbon isotopes in methane for gas source identification.



### P-Cubed™ (Picarro Processing Platform):

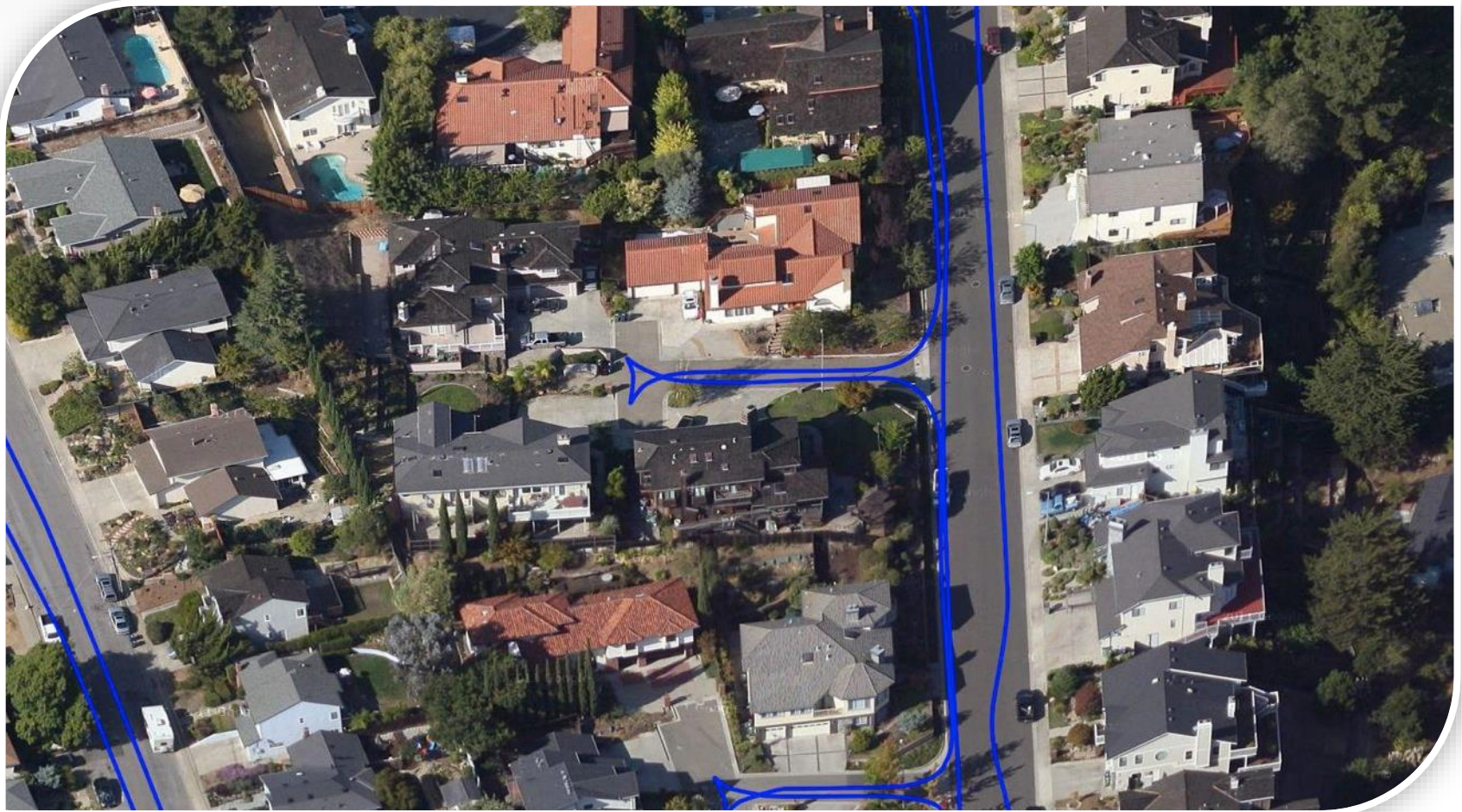
Web-based repository and algorithmic engine for collecting, cataloguing, processing and displaying visually-rich geospatial survey data from multiple Picarro Surveyors.



# Picarro Surveyor in Action

## Survey Path Indication

Survey path (vehicle breadcrumb trail) indicated as vehicle drives.

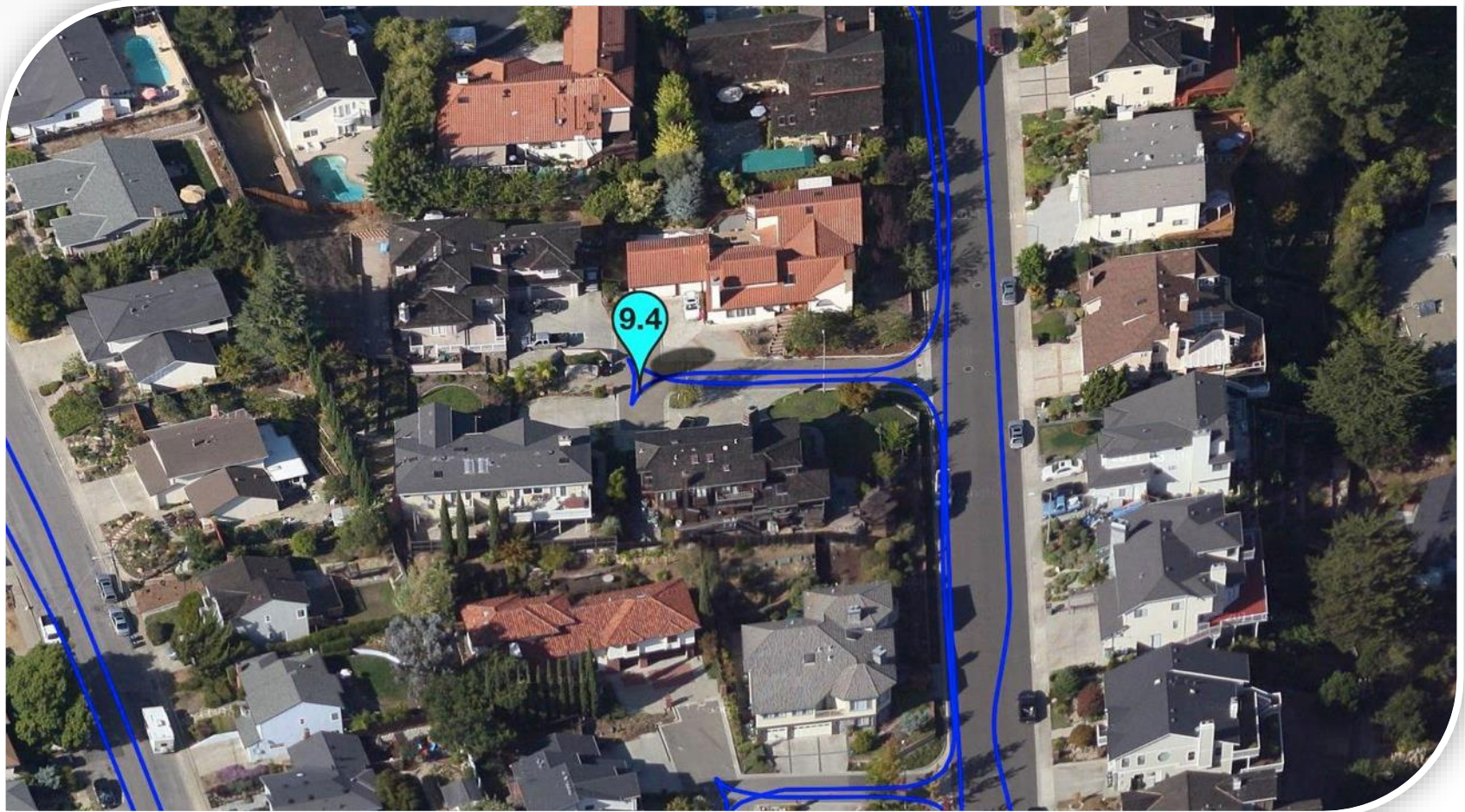




# Picarro Surveyor in Action

## Leak Indication Display

Peak bubbles appear as Picarro algorithm detects likely natural gas leaks.

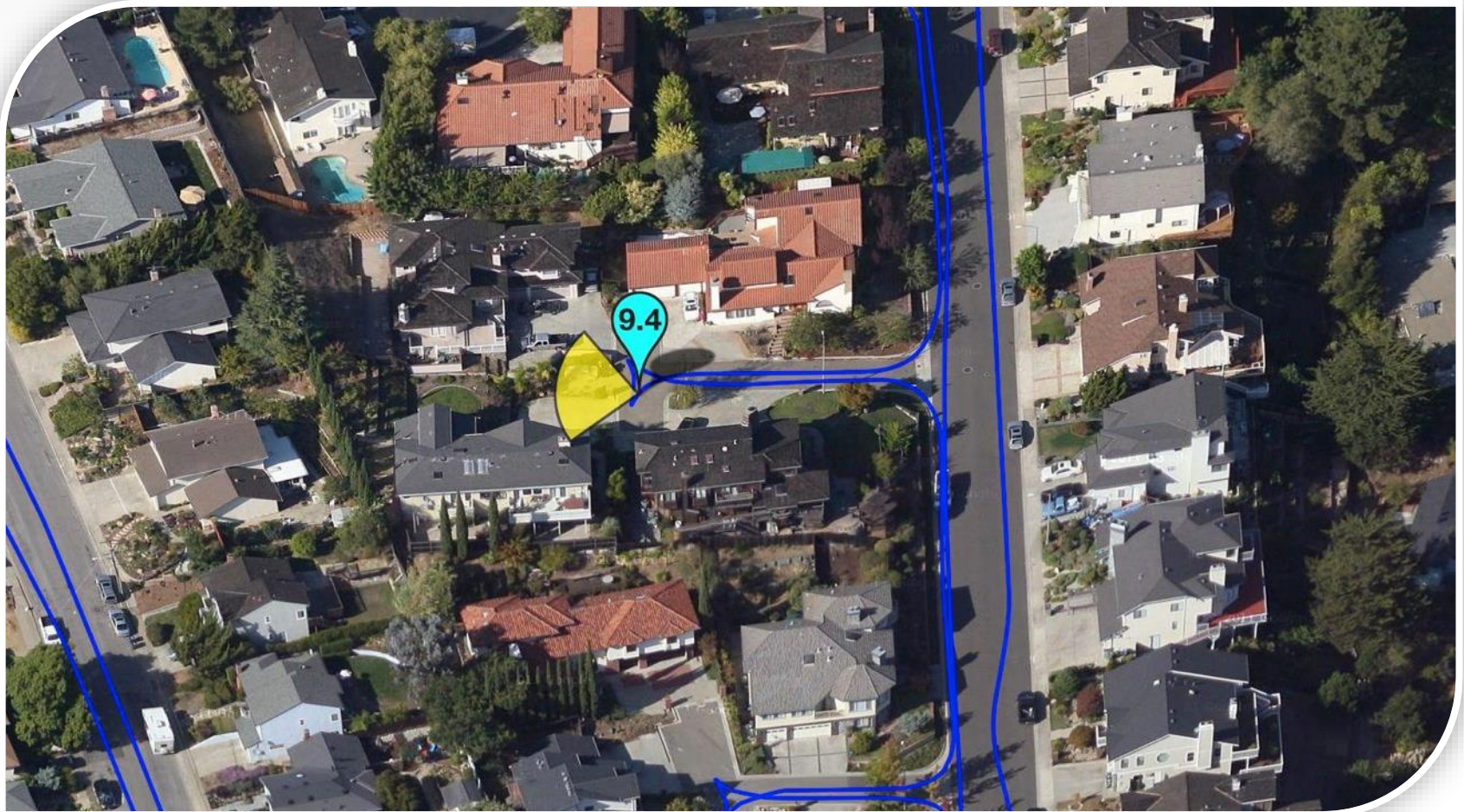




# Picarro Surveyor in Action

## Leak Indication Search Areas

Wind information used to compute Leak Indication Search Areas (LISAs).

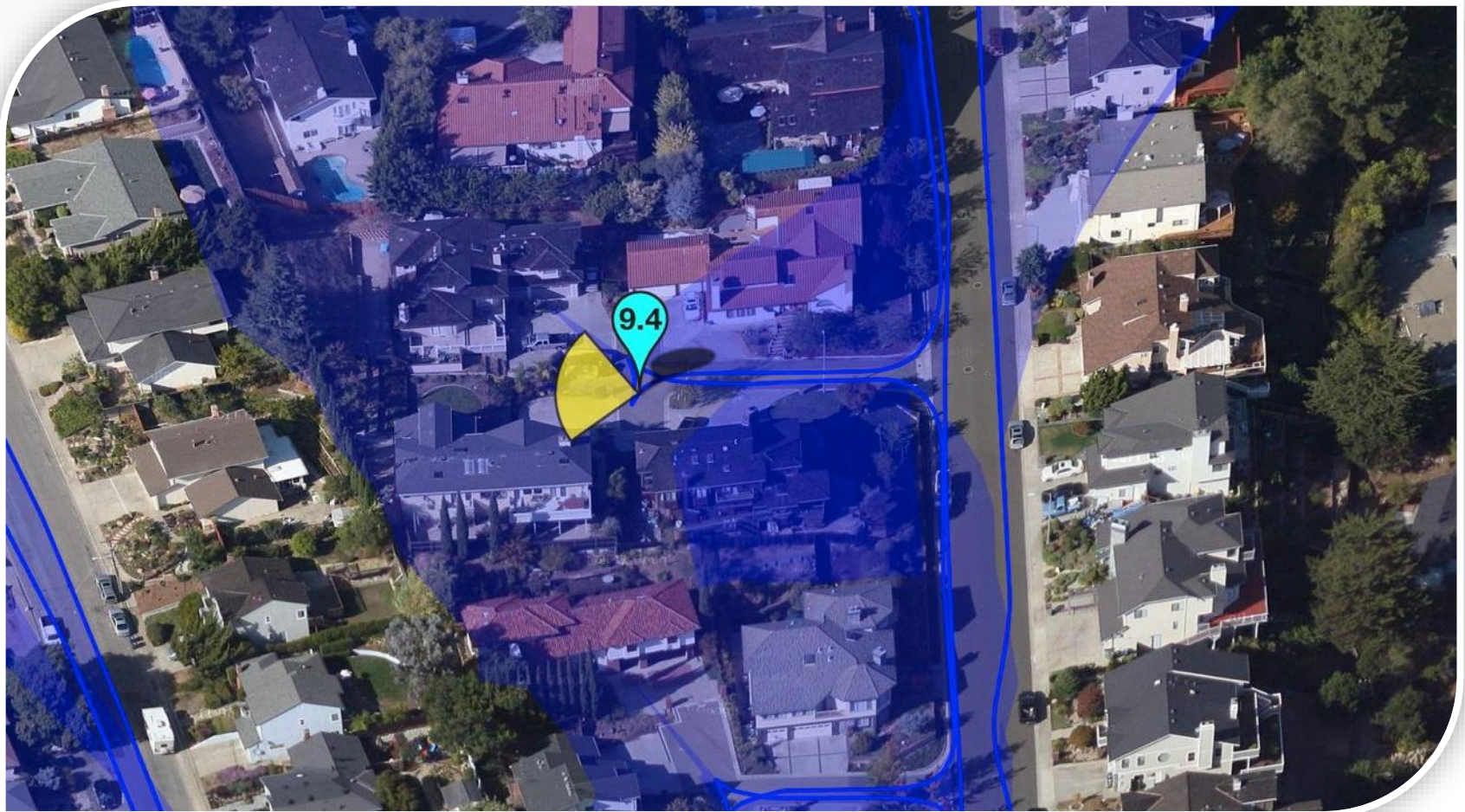




# Picarro Surveyor in Action

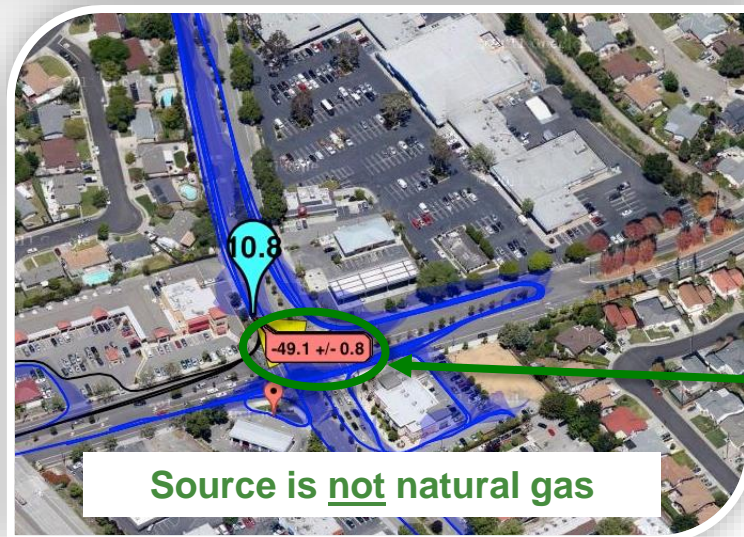
## Field of View

Wind information used to calculate Field of View (FOV) showing area covered by survey.

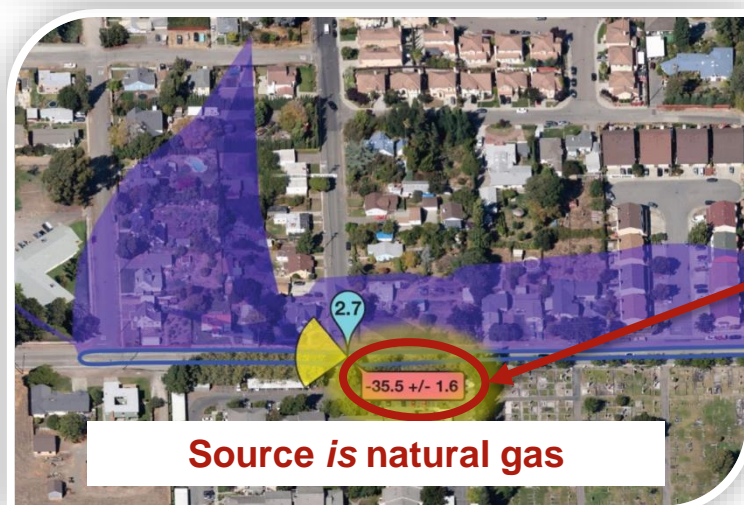
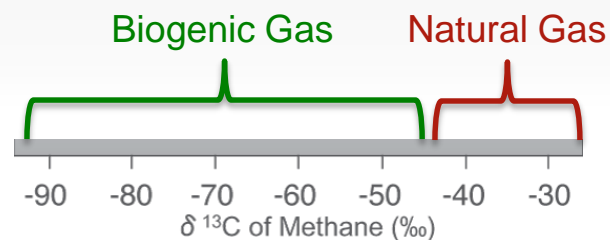


# Picarro Surveyor in Action

## Isotopic Analysis: Is Leak Source Natural Gas?



Range of stable carbon-13 isotope values in methane



# Picarro Surveyor 2.0

- Seamless integration of Utilities GIS assets
- Minimizes the number of false positives
- User- friendly interface and powerful and flexible reporting capabilities
- Standard settings optimized for your system
- Multiple “use case” modes
- Robust hardware - rack mounted system, inlet bumper line system





# Surveyor with GIS Pipeline Assets – Mains & Services

The screenshot displays a GIS application interface for a survey project. The top control bar contains the following information:

- Tag: San Rafael Test
- Mode: Operator
- Driver: rcbc@pge.com
- Stability Class: E
- Analyzer: FEDS2045-1
- Surveyor: PG&E 1 - B27364 - 20
- Start Time: 2/18/2015 7:31:25 PM PST
- End Time: 2/18/2015 7:57:45 PM PST

The main map area shows a residential neighborhood with a grid of streets. A prominent yellow line, representing a pipeline asset, runs diagonally across the map from the top-left towards the bottom-right. Other features include a grid of orange lines, various street names (e.g., Woodside Rd, Camino Real, Woodside Central), and several labeled points of interest such as schools (Hawes Elementary School, Forest Public High School), a cemetery (Union Cemetery), and various businesses (Starbucks, Days Inn Redwood City, Chavez Supermarket).

The bottom toolbar contains four icons with labels: Display, Map, GIS, and Curtain. The PICARRO logo is visible in the bottom right corner of the interface.

# P-Cubed Web Interface Dashboard

PICARRO Surveyor™ Pacific Time (US and Canada) avp@pge.com

**Dashboard**

- Dashboard
- Driving Surveys
- Surveyors
- Fleet Map
- Reports
- Administration
- Send Feedback

### Active Surveyors

Surveyor	Analyzer	Status
PG&E 1 - B27364 - 2013 Ford Escape - FEDS2045-1	FEDS2045-1	Offline
PG&E 2 - B28499 - 2013 Ford Escape - FEDS2042	FEDS2042	Offline

[View All Surveyors](#)

### Recent Driving Surveys

Tag	Surveyor	Analyzer	Started	Status
2527-J5 Day 2	PG&E 1 - B27364 - 2013 Ford Escape - FEDS2045-1	FEDS2045-1	5/19/2015 2:43 AM	Completed
2527-J5 Day 2	PG&E 1 - B27364 - 2013 Ford Escape - FEDS2045-1	FEDS2045-1	5/19/2015 2:07 AM	Completed
2527-H5 day 2	PG&E 1 - B27364 - 2013 Ford Escape - FEDS2045-1	FEDS2045-1	5/19/2015 12:28 AM	Completed
2527-J5	PG&E 2 - B28499 - 2013 Ford Escape - FEDS2042	FEDS2042	5/18/2015 4:38 AM	Completed
2527-J5	PG&E 2 - B28499 - 2013 Ford Escape - FEDS2042	FEDS2042	5/18/2015 4:21 AM	Completed
2527-J5	PG&E 2 - B28499 - 2013 Ford Escape - FEDS2042	FEDS2042	5/18/2015 3:42 AM	Completed
2527-H5H6	PG&E 2 - B28499 - 2013 Ford Escape - FEDS2042	FEDS2042	5/18/2015 2:34 AM	Completed



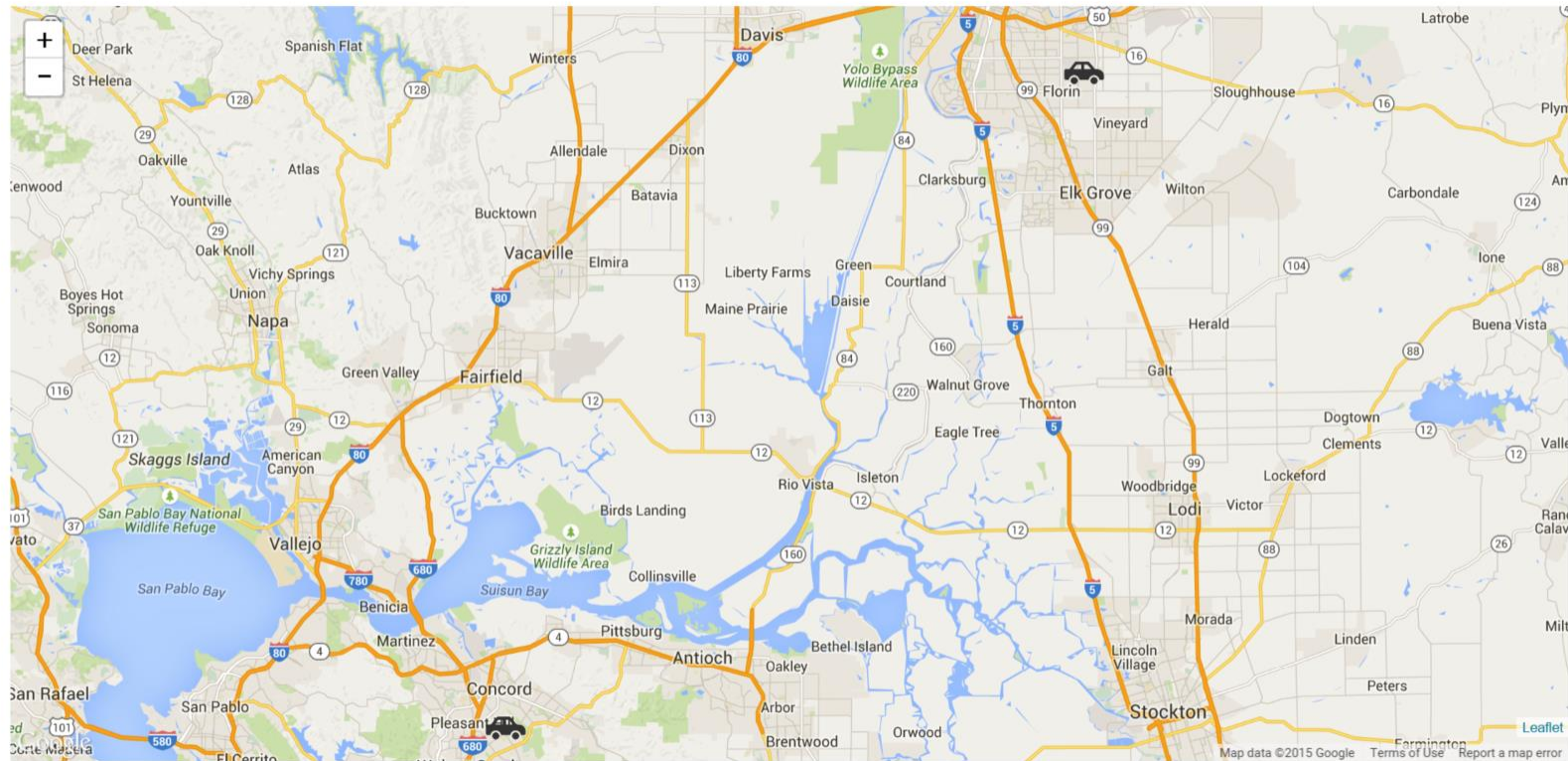
# Real-time Status and Locations of Each Vehicle in Surveyor Fleet

PICARRO Surveyor™

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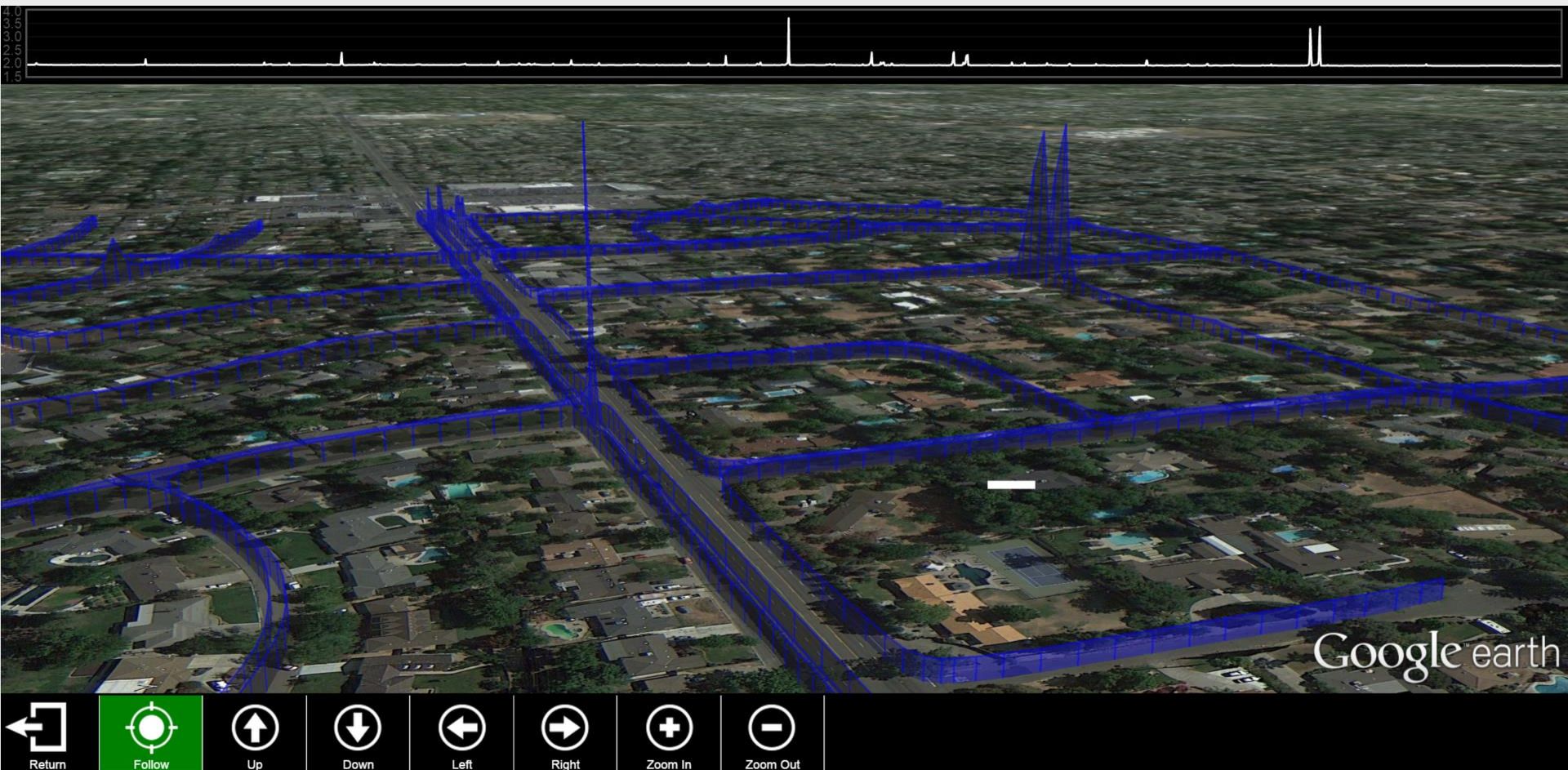
- Dashboard
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## Fleet Map



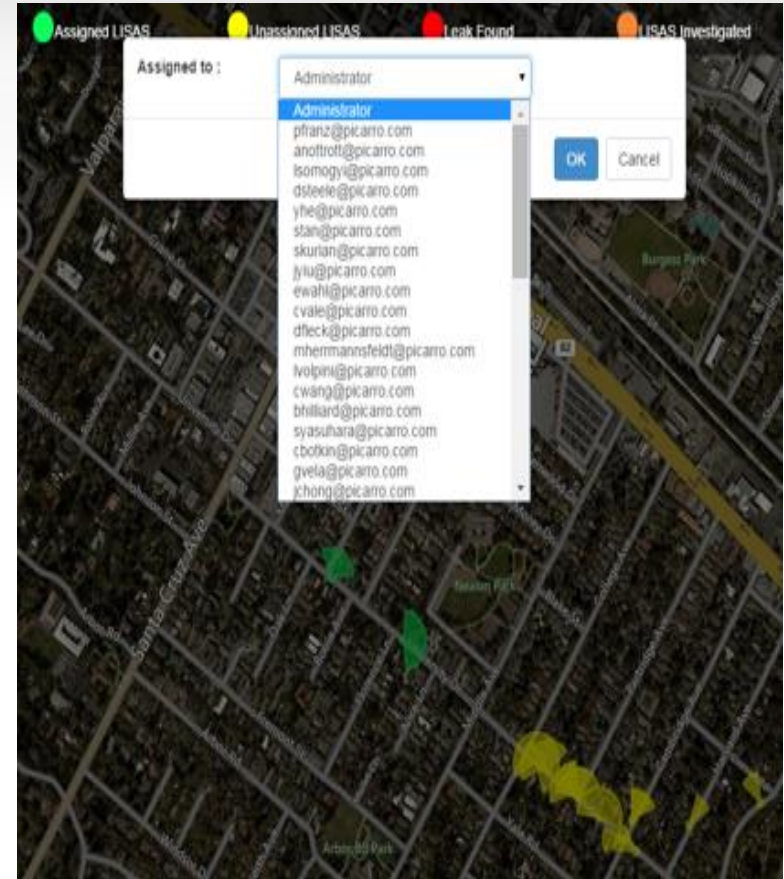
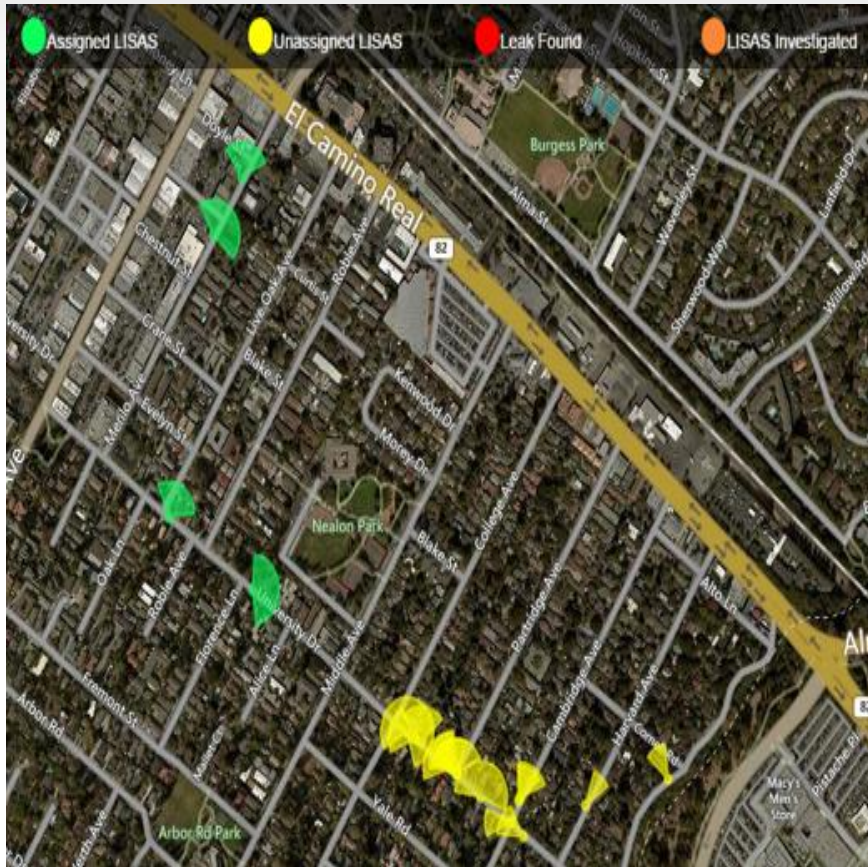
© 2015 Picarro Inc. Build: 2.1.3b0f7ae

# “Curtain View” Visualization of Methane Concentrations

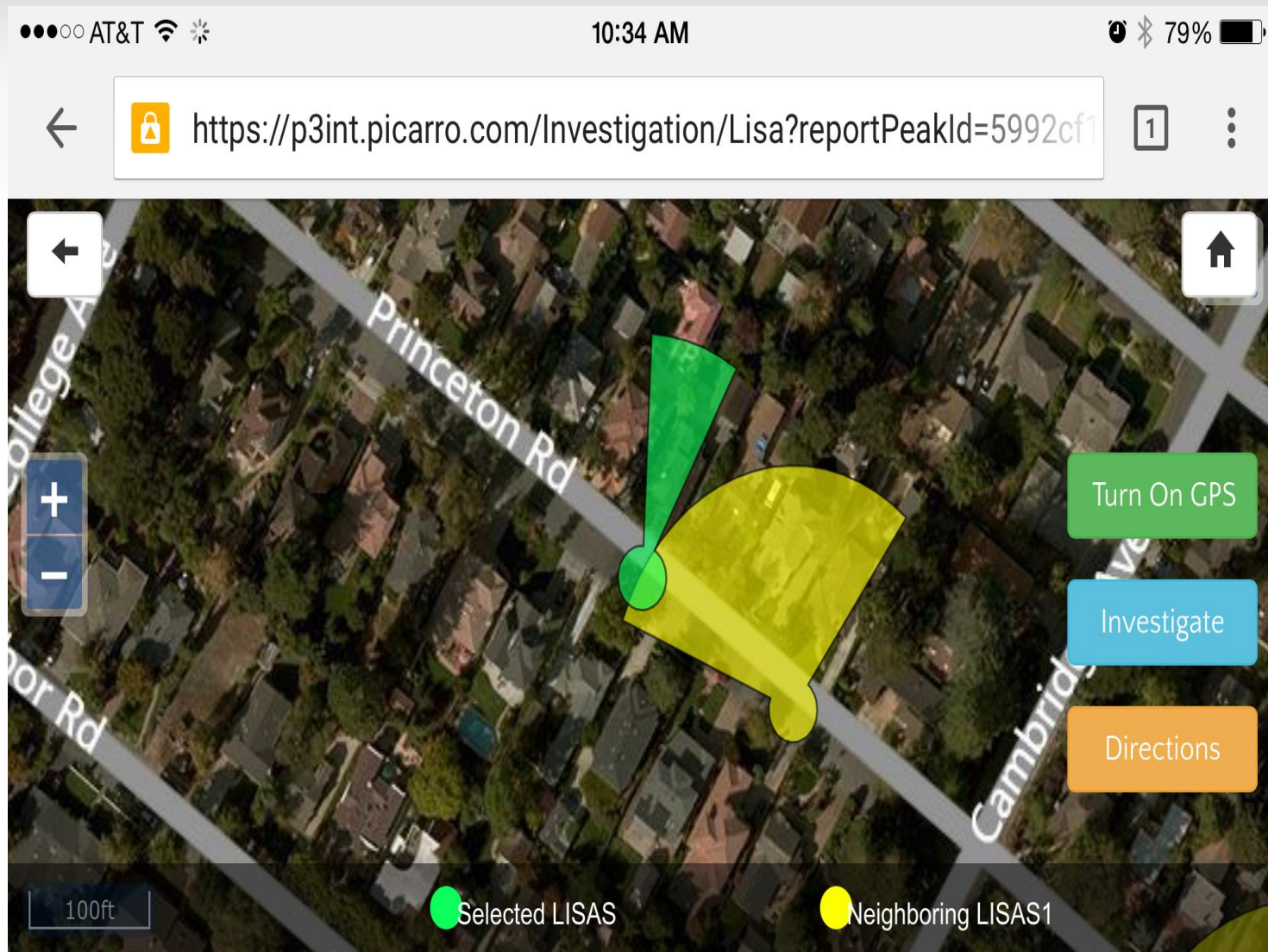




# LISA Assignment – Map Based



# Mobile View of LISA





# The results of 14 Customer Field Trials

- 3x more hazardous leaks found: Picarro (93%) Traditional (31%)
- 3x more gradeable leaks founds: Picarro (90%) Traditional (31%)
- Geographic FOV coverage: 92% for mains and 87% for services

# Customer Applications

- compliance leak survey
- Investigation of odor complains
- locate hard-to-find leaks
- Rapid survey of high-risk pipe
- Rapid survey of newer infrastructure
- Post construction survey
- Post-disaster survey
- Prioritize main and service replacement
- Frost survey
- AND GROWING.....