



# Using Satellite Radar Imagery to Detect Leaks from Potable Water Pipes



# Today's Speaker



**John Stevens**

Sales Development Representative, North America

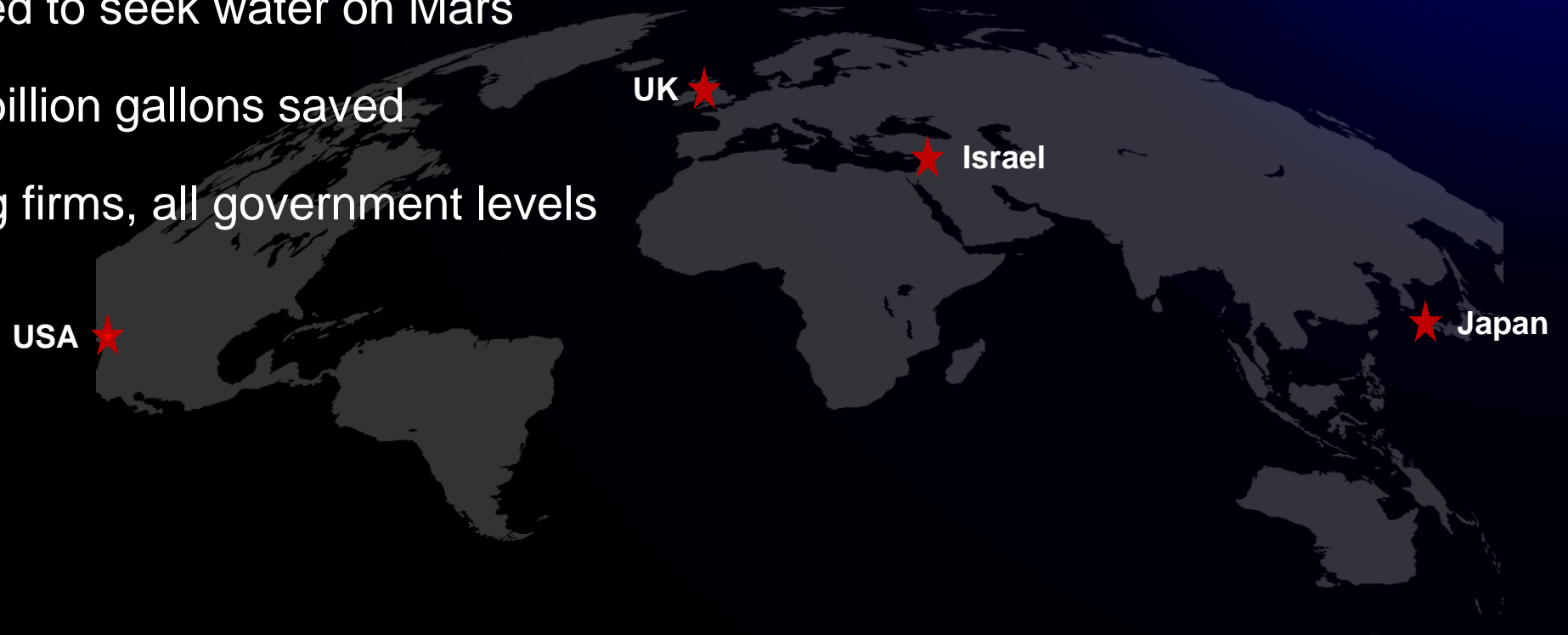
# Agenda

- **About ASTERRA**
- **Satellite Technology – Synthetic Aperture Radar**
- **Recover: Leak Detection & Analysis**

# About ASTERRA



- Founded in 2013
- Technology first used to seek water on Mars
- By 2023, over 276 billion gallons saved
- Utilities, engineering firms, all government levels



# ASTERRA's Impact by the Numbers

Service provided in over **62** countries



Carbon dioxide emissions reduced by **181,657 metric tons**

Equivalent to 151M lbs. of coal burned



**709,695 MWH** of energy saved



More than **77,133** leaks verified



**283, 838 M Gallons** Water Saved

Equivalent to the amount used by a city of 4 million people



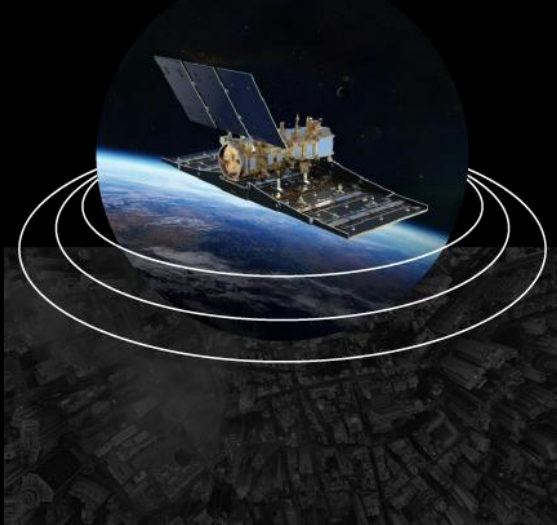
**3.5 leaks found per crew day**

VS. 1.3 found using traditional acoustic methods (on average)

Values used for the volume of a leak were taken from AWWA M36 manual for the typical water lost from a service main over 12 months. Values for electricity and CO2 vary based on volume of water estimated and the power usage plus the fuel source. The value used was from California Energy Commission report CEC-500-2021-036 for Duarte, CA USA.

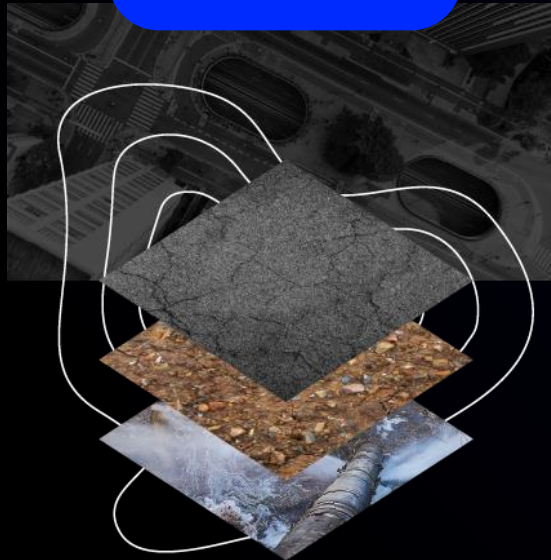
# The Underlying Technology: Remote Sensing

VIEW



Satellite-based for  
wide-area view

SENSOR



Synthetic Aperture Radar (L band)  
for depth of penetration

ANALYSIS



Algorithmic analysis for  
actionable intelligence

VIEW

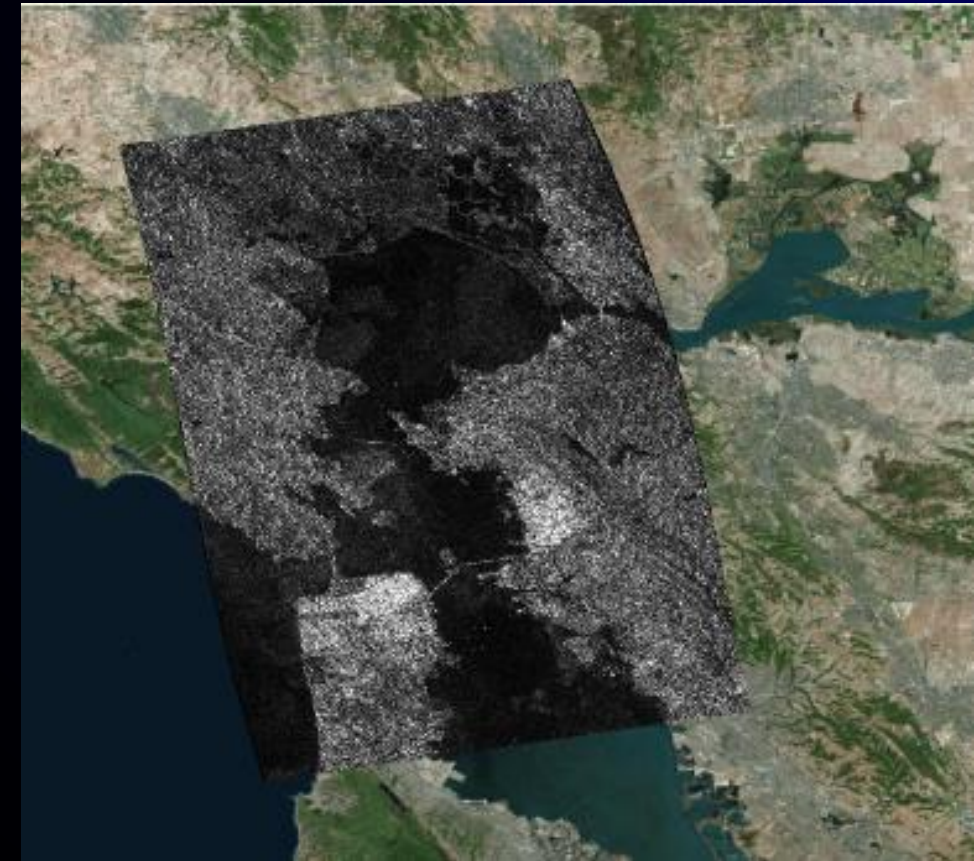
# Satellite-Based

Sensors carried in continuous orbit, **390-mile altitude**

Allows for **up to 1400 sq miles** coverage

**Affordable** data, large-area at once

**7 to 14-day revisit cycle** with precise recurrent positioning



SENSOR

# Synthetic Aperture Radar

Uses L band for up to **10'** penetration

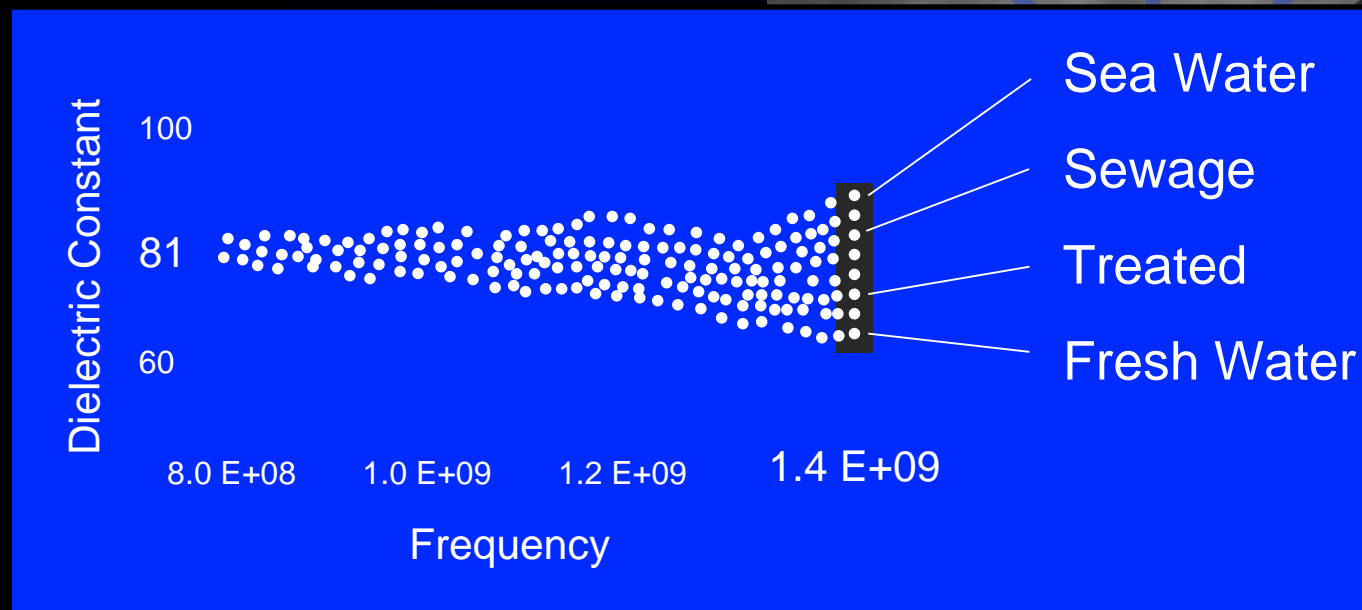
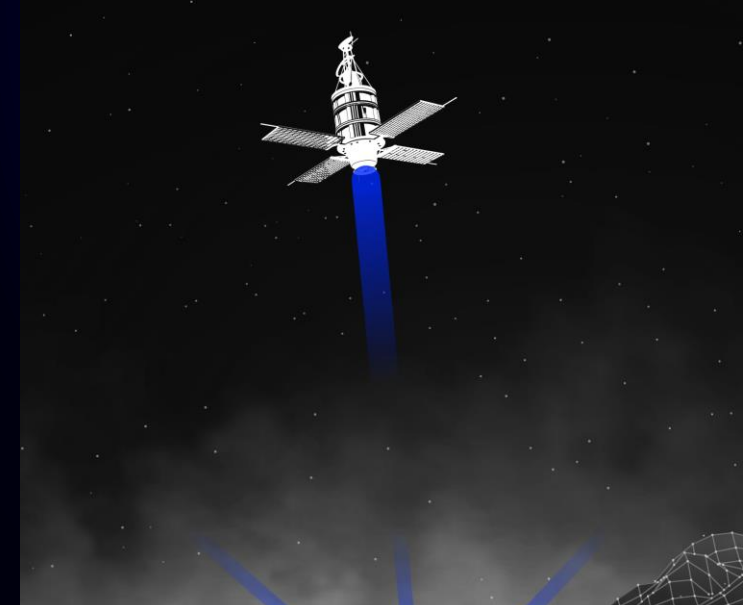
**All weather** conditions

**Day and night** operation

Pierces forest, pavement,  
asphalt, concrete

Dielectric sensitivity

Sees the actual soil moisture





Case Studies Worth Studying

# Another Secret Leak Revealed: Hilton Head Island, SC

A 12" main beneath a marsh

Losing 700-1000 gallons per minute

\$1,500,000 lost over 3 years

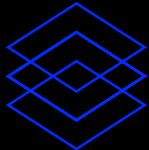
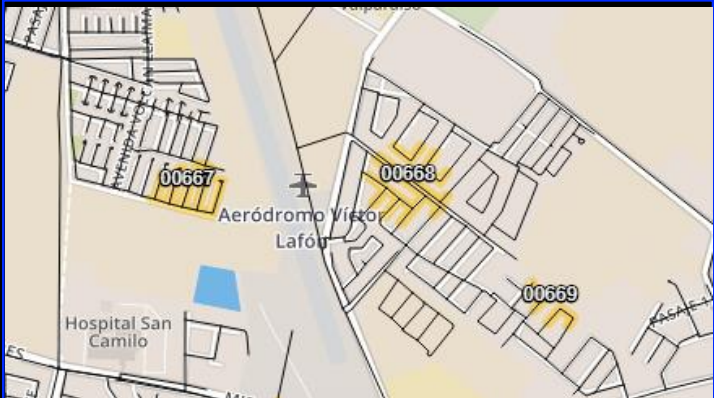
Until ASTERRA found it

**Saving Hilton Head \$500,000 a year**



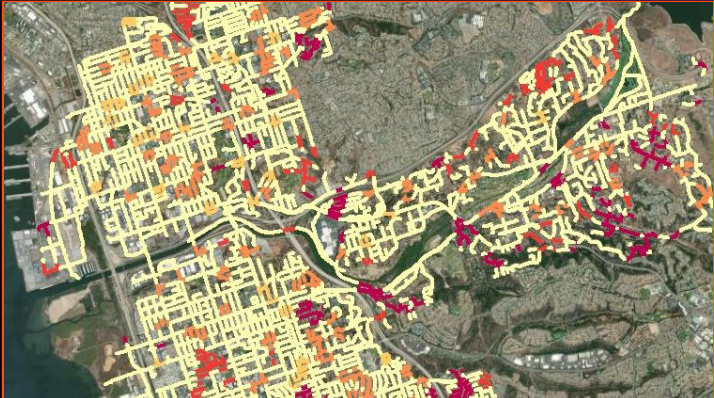
“Without this project, it would probably still be leaking.”

# Solutions Based on ASTERRA Technology



## Recover

Underground leak detection, efficient monitoring of your entire water or sewer system



## MasterPlan

Pipe deficiency assessment for replacement planning models

The background image shows a trench with several large, dark pipes running parallel to each other. The pipes are supported by metal bars. The trench walls are made of earth and gravel. A blue overlay covers the left side of the image, containing the text.

# ASTERRA Recover

Leak Detection & Analysis for  
Potable/Wastewater Systems

Recover Meets Today's Challenges

# The Reactive Approach isn't Working

Reactive leak detection is the most common method

Relies on leaks being seen, reported

Non-surfacing leaks are missed entirely:

- $\cong$  50% of real water loss
- Much higher in many localities

These leaks can persist for years



Reactive detection only finds leaks that surface. Most don't.



Traditional Proactive Approach:

**“Let’s walk the city and listen for leaks!”**

Technicians lug acoustic devices  
hundreds of miles

Inefficient, impractical, often unaffordable

Assessments are out of date before  
they’re finished

Many leaks just get missed

Most utilities can’t and don’t



ASTERRA Recover Proactive Approach

# Now, Search Teams Are Guided by Intel

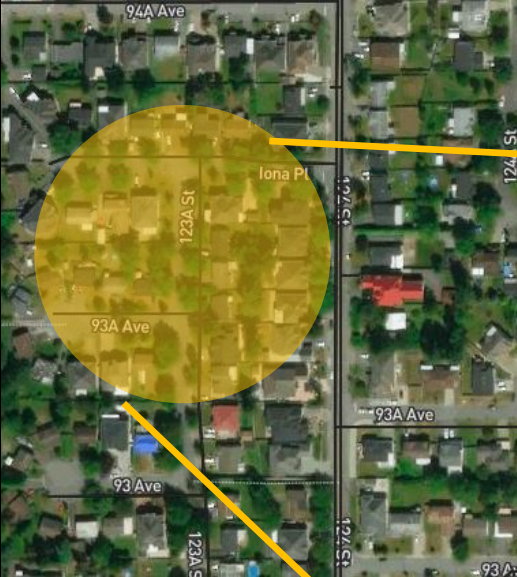
Satellite-based leak intelligence subscription covers an entire system

Ground crews now are provided ongoing likely leak locations to target, resulting in far greater efficiency

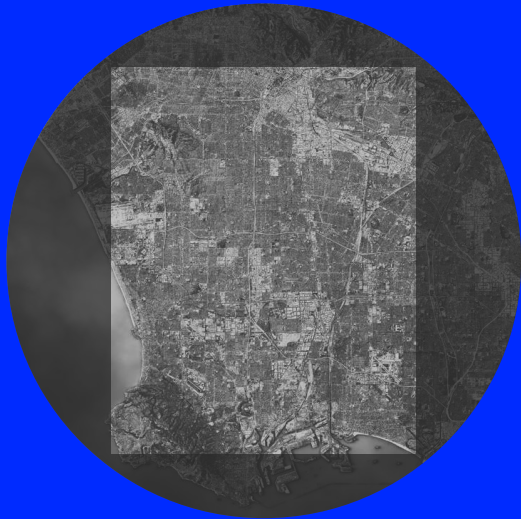
Many subterranean leaks that a search team would NEVER have found are often revealed



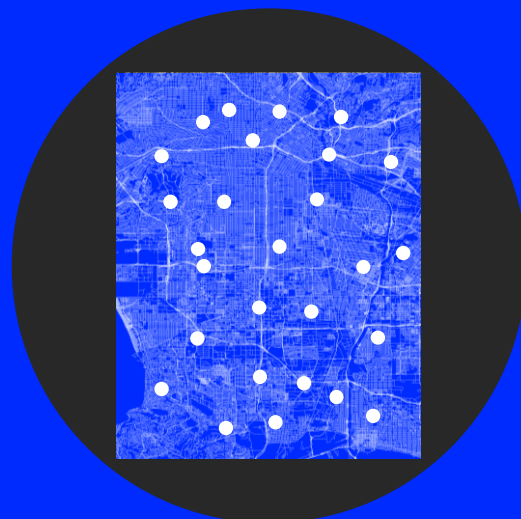
# ASTERRA POI – POINT OF INTEREST



# ASTERRA Recover at Work



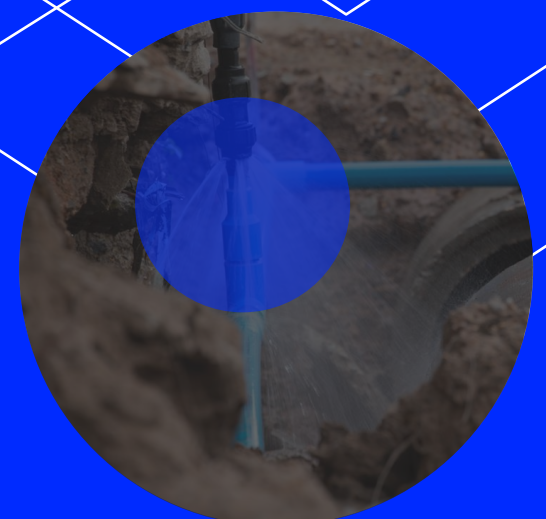
The survey area boundaries are defined for image acquisition



The image is analyzed; POIs are overlaid on a GIS pipe system map



A trained team efficiently pinpoints the leak(s) within each POI



Confirmed leaks are triaged for attention from repair crews





# EO Discover



## All Your Insights in a Single Platform

**EO Discover**

SEARCH

- HOME
- U-COLLECT DASHBOARD
- MY ACCOUNT

**Recover**

Overall Performance ⓘ

Total Leaks Found <b>80</b>	Non-Surfacing Leaks <b>73/80</b> 91%	Leaks per mile <b>1.9</b>	Greenhouse Gas Reduction <b>165,150,596</b> lbs CO <sub>2</sub>
Water Saved <b>236,046,913</b> Gallons	Water Cost Savings <b>\$354,109</b>	Energy Saved <b>536,121</b> kw per year	Energy Cost Savings <b>\$75,057</b>

Projects Sort ▾

Anytown  
February 2023

100% U-COLLECT DASHBOARD →

U-VIEW MAP GIS FILES WMS LEAKSHEETS & DATAFORM

MASTER DASHBOARD (0)

**Edit Performance Inputs**

Water Cost  
0.00155 \$ PER LITER [Reset to Default](#)

Power Cost  
0.0006 \$ PER KW [Reset to Default](#)

Treatment Cost  
0 \$ PER ML [Reset to Default](#)

Greenhouse gas emissions  
0.25 KG [Reset to Default](#)

Your additional comments and remarks

SAVE

The intelligence to set priorities, make decisions, see results and plan improvements



# EO Discover



## All Your Insights in a Single Platform

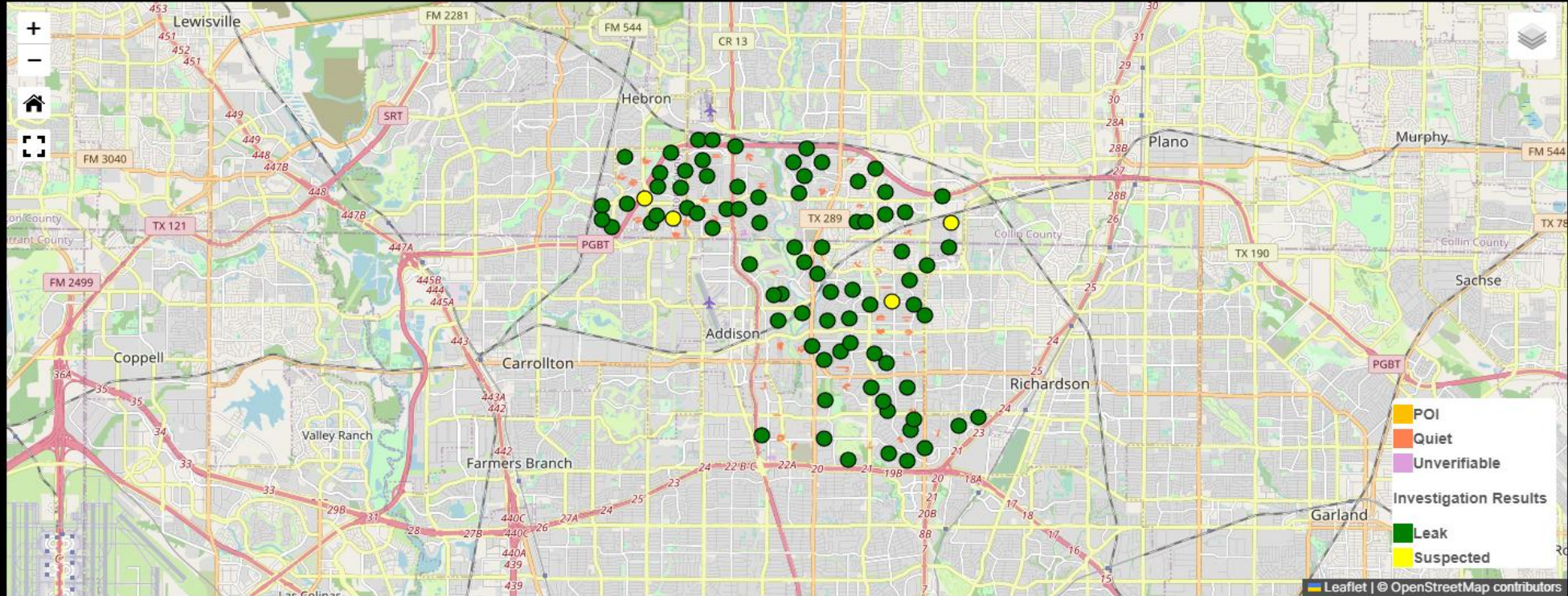
EO Discover

SEARCH

HOME

U-COLLECT DASHBOARD

MY ACCOUNT



### Field Results

SEARCH

ID	Investigation Results	Leak Type	Visible	Address	Date	Comments	Reference	Photo
10088	Leak	Service	No	15929, North Coit Ro <a href="#">READ MORE</a>	2023-01-05 09:09	Medium size leak	456635.0	
10027	Leak	Service	Yes	18040, Midway Road, <a href="#">READ MORE</a>	2023-01-09 04:00	Large leak	456617.0	
10001	Leak	Main	No	2559, Sunscape Lane, <a href="#">READ MORE</a>	2023-01-09 05:11	Leak size 0.5 Gallon	456415.0	

The intelligence to set priorities, make decisions, see results and plan improvements



# EO Discover



## All Your Insights in a Single Platform

**EO Discover**

SEARCH

HOME

U-COLLECT DASHBOARD

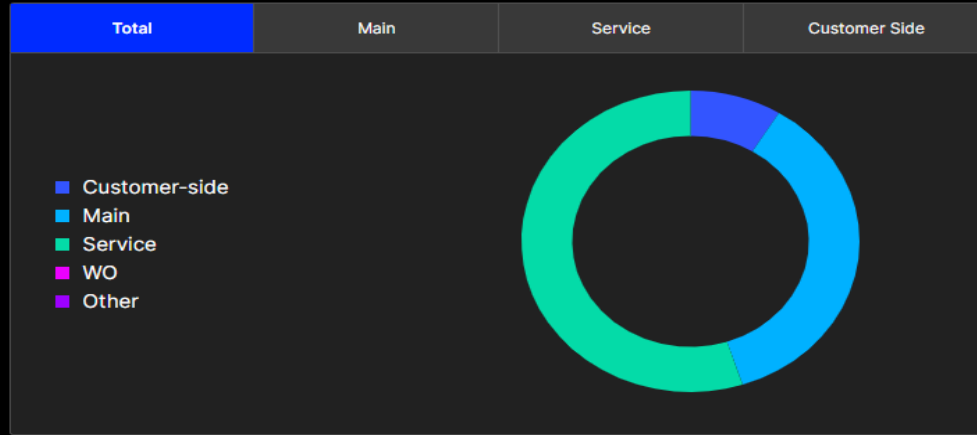
Anytown  
February 2023

+ New Project

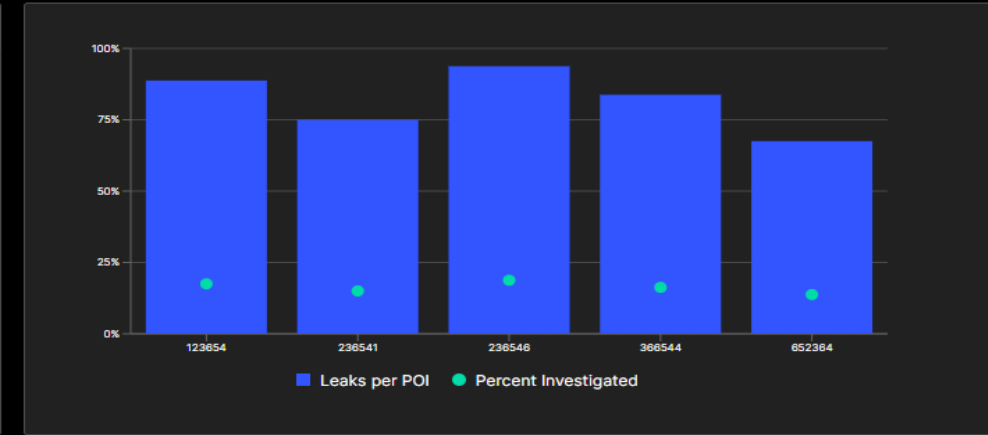
MY ACCOUNT

HELP

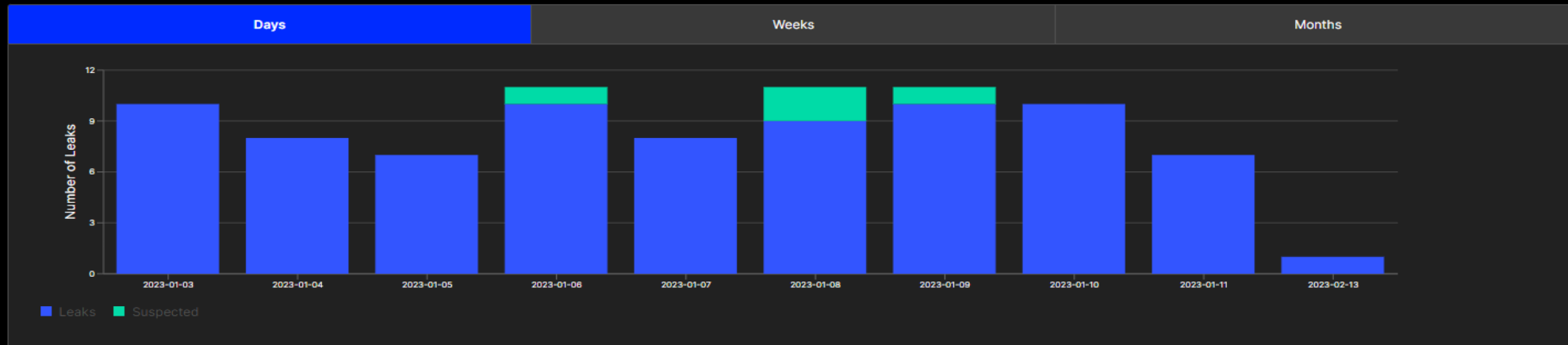
### Leak Type



### Leaks/POI per license



### Results by Date



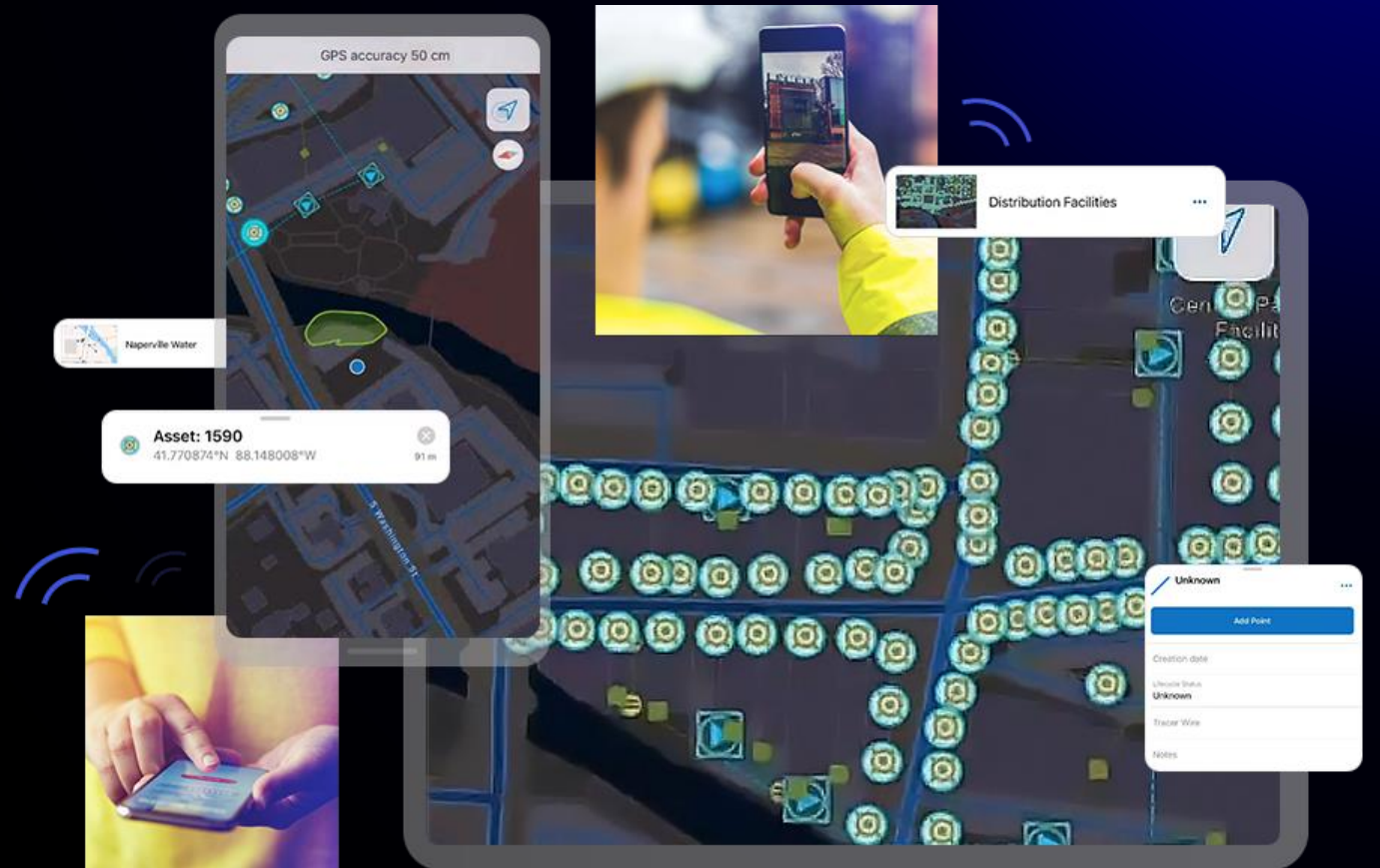
The intelligence to set priorities, make decisions, see results and plan improvements

# Integration with GIS Software

Recover easily integrates with most GIS platforms



ArcGIS® Field Maps



# ASTERRA: The New Indispensable Technology

Entire cities continually monitored

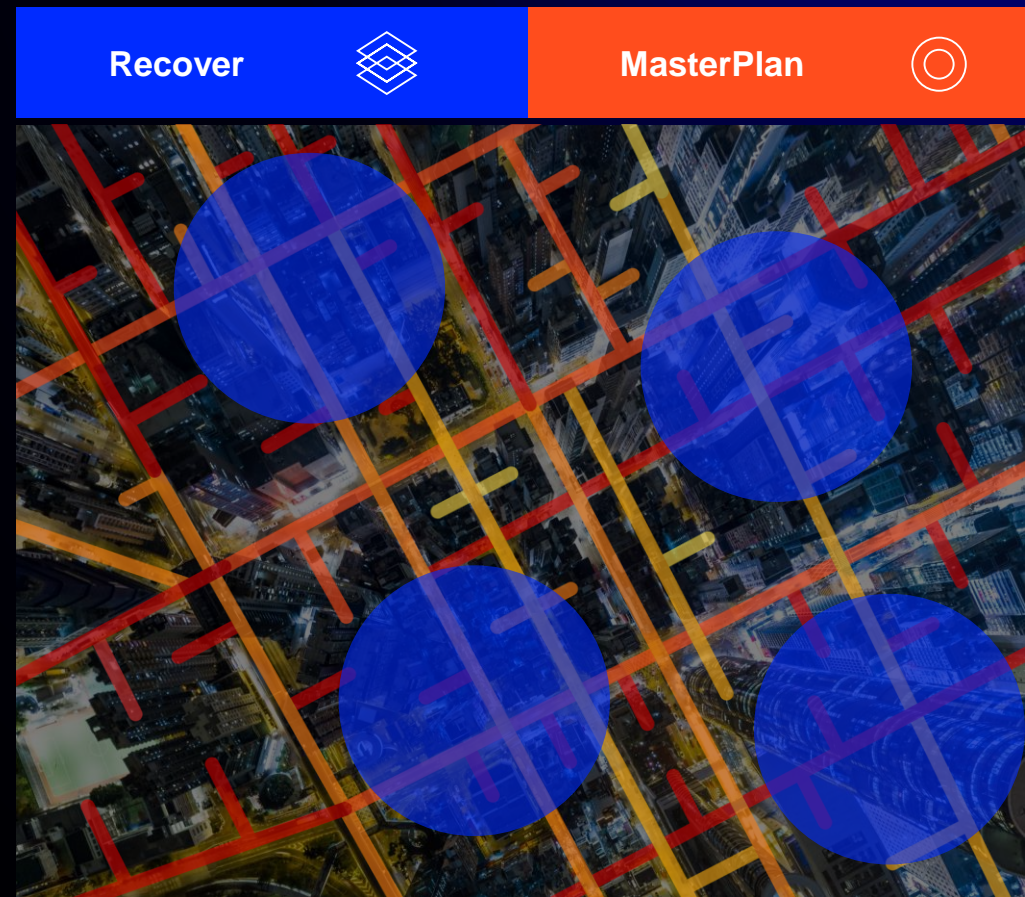
Non-invasive, no equipment required

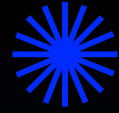
Data for:

- Pipe replacement and condition assessment
- Fast, efficient potable and wastewater leak location for repair

Saves money, resources, the environment, lives

Supports regulatory compliance





# Thank You

John Stevens



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