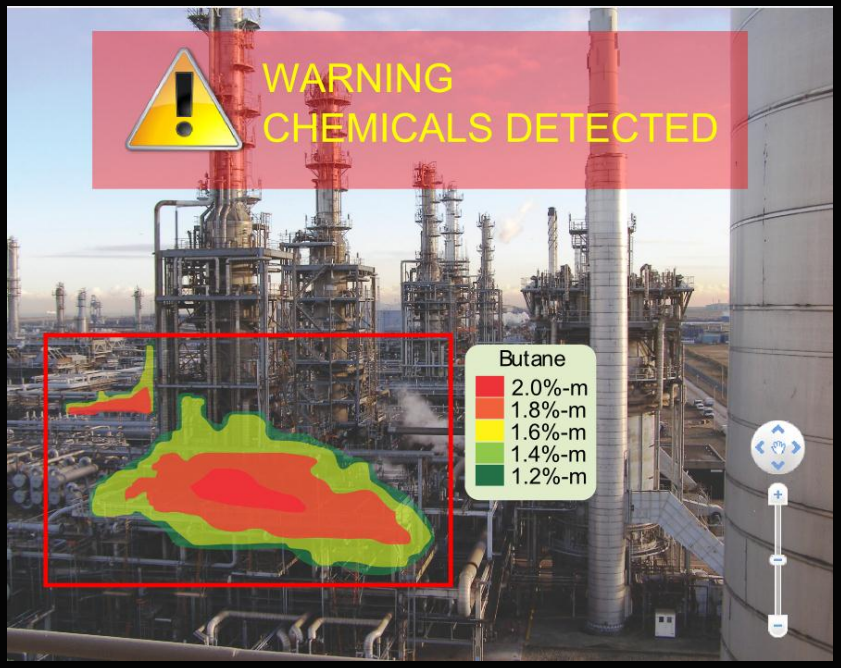

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Gas Cloud Imaging

Next Generation of Gas and Flame Detection

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Senior Sales Manager
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Company History

- Established in 2009
- Based in Houston, TX with offices in Denver, CO and Saudi Arabia
- Started with US Defense Contracts before moving into Oil & Gas in 2011
- Award-winning patented technology
- First GCI mounted in refinery since 2012

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Detection of hidden leaks

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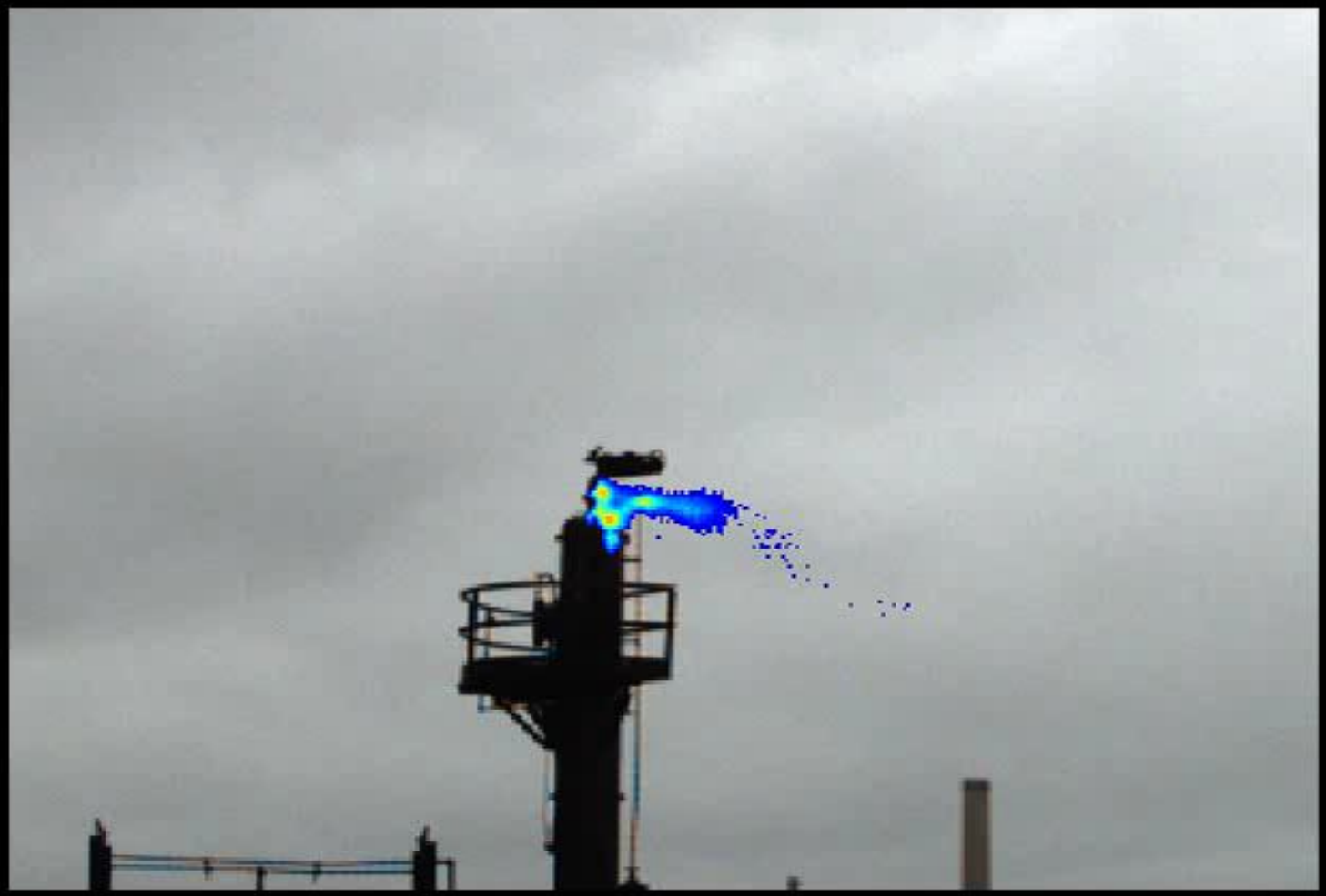
Detection at far distances 350 m (1,150 ft)

Rebellion Photonics' GCI,



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Gas Cloud Imaging Camera (GCI)

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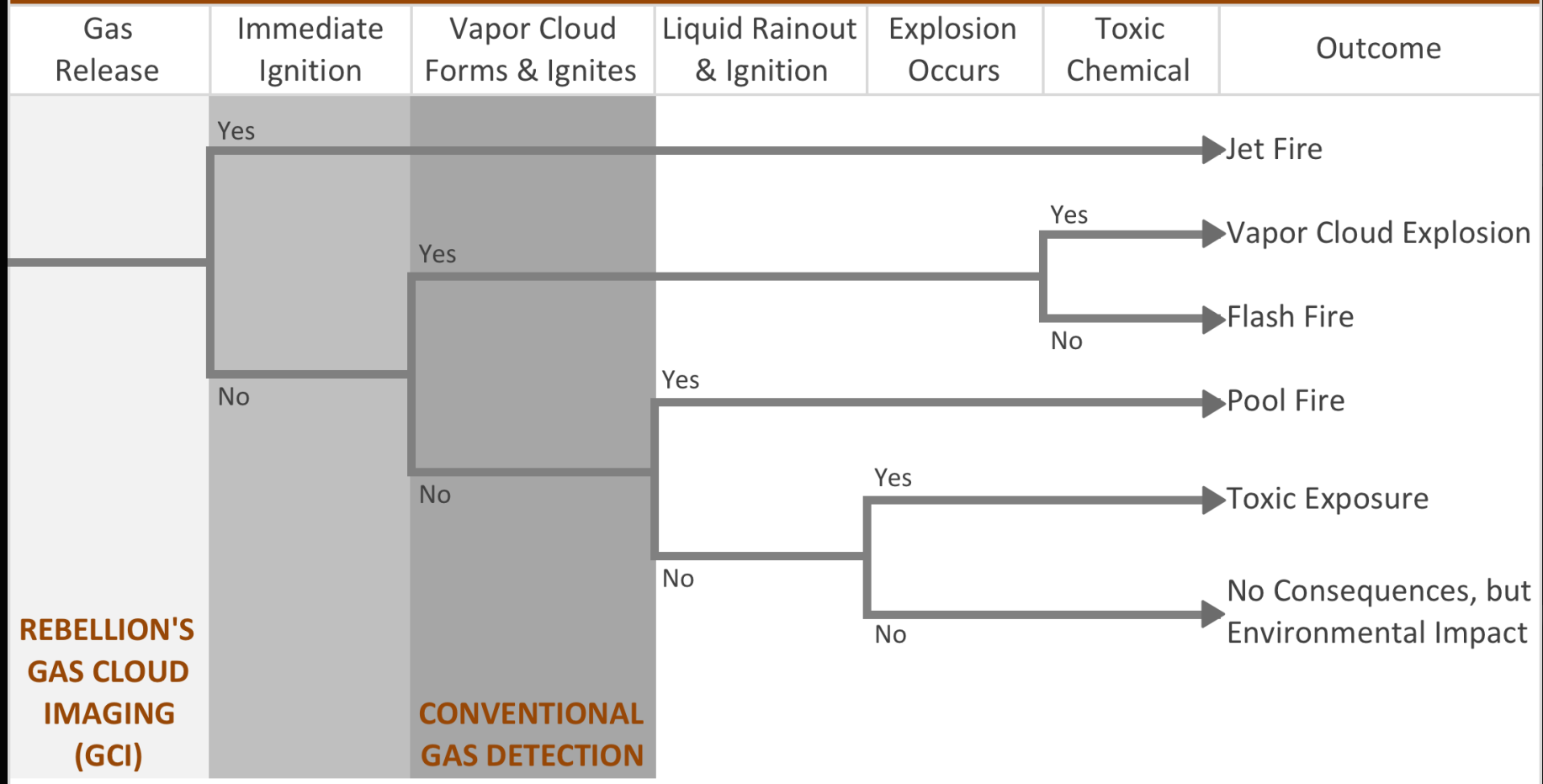
Early Detection at the Source

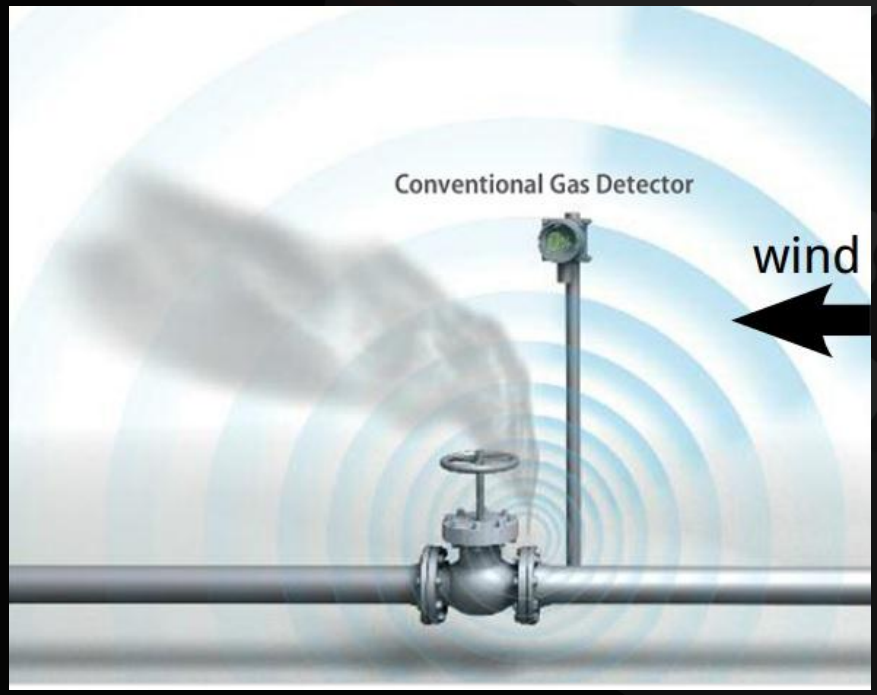
EVENT TREE FOR GAS RELEASE



The gas release event tree illustrates the sequence of events that may take place in the event of a gas release. Rebellion Photonic's Gas Cloud Imaging system (GCI) responds at gas leak initiation whereas conventional detectors only respond when the gas has accumulated, formed a vapor cloud, and come in contact with the sensor.

Point Detectors

The status quo for gas sensing is to populate a facility with single-point gas sensors to sparsely sample the surrounding air.



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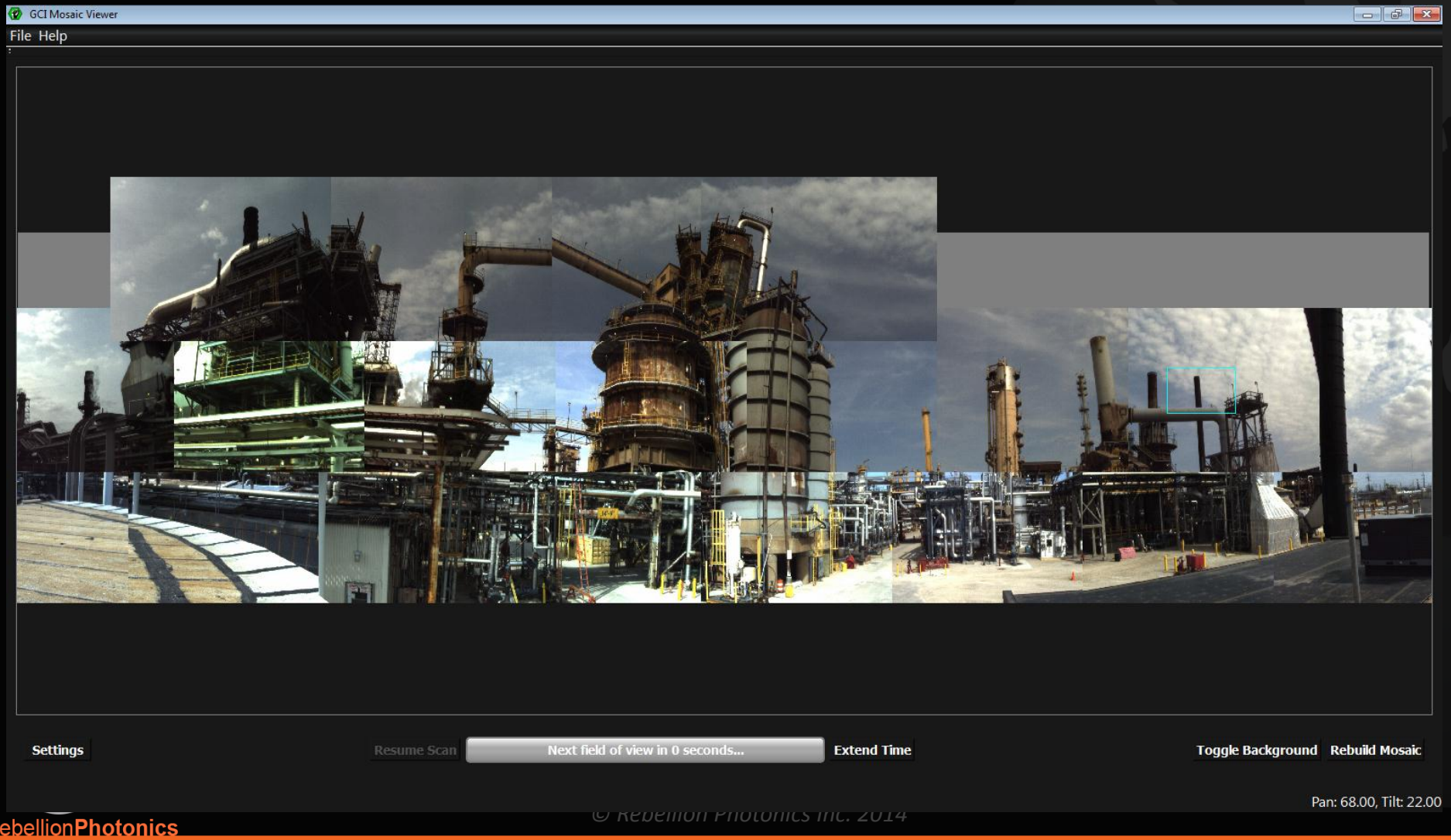
1 GCI = 4 Million Line Detectors



Next Generation of Safety

- Reduce downtime & labor by identifying false alarms
- Reduce Risk of Catastrophic events

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2 Options – Fixed or Truck Mount

Fixed Continuous Monitoring solution

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GCI Hardware Includes:

Camera

Server

Work Station

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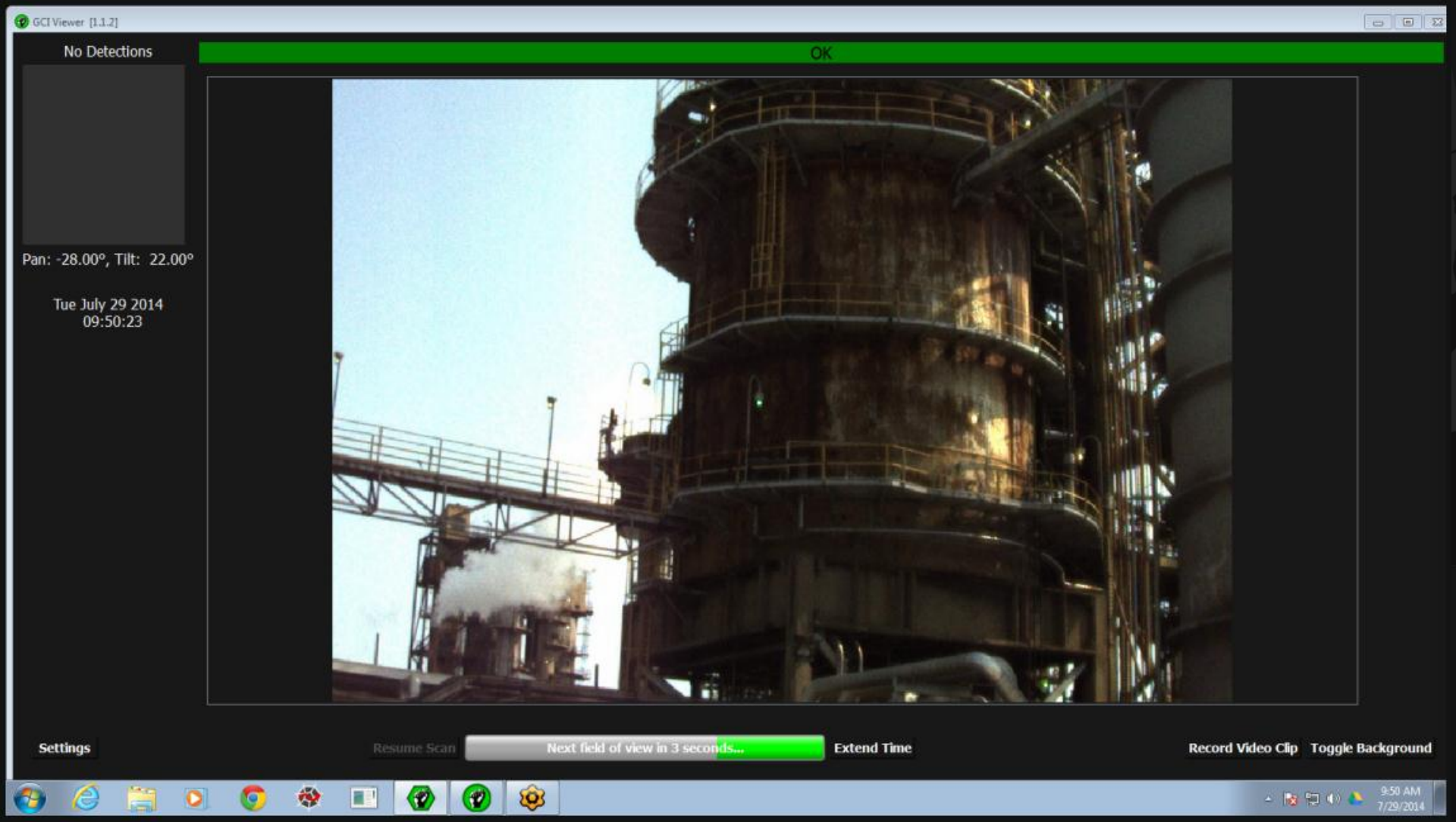
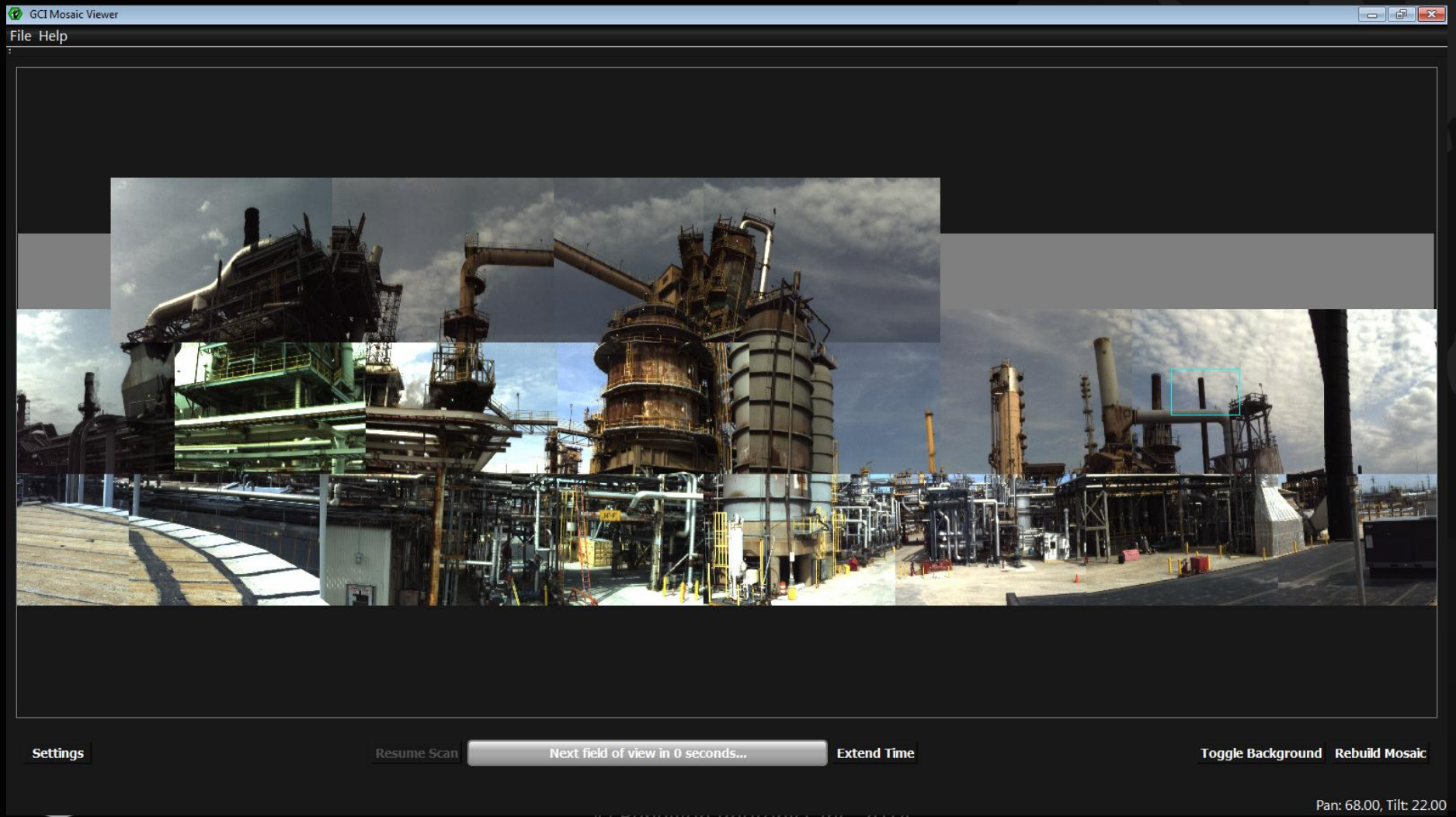
User Interface



Mosaic Viewer



Service Includes:

- Real-time, continuous video
- Portal to view past events
- Calibration
- Automated video email/text escalation alarms
- Installation and Camera Placement Planning
- Software Upgrades
- Daily "Health Monitoring" of camera
- Set-up and Monitoring of Data Storage
- Hardware Maintenance, Upgrades, & Liability

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Why 'Service Model' for fixed installs?

- If
  - Safety Equipment should always be the BEST.
  - The GCI is an IT Service, first and foremost.
  - IT systems become obsolete quickly if not continuously updated.
- Then
  - The GCI is offered as a monthly service contract in order to provide the highest level of safety.

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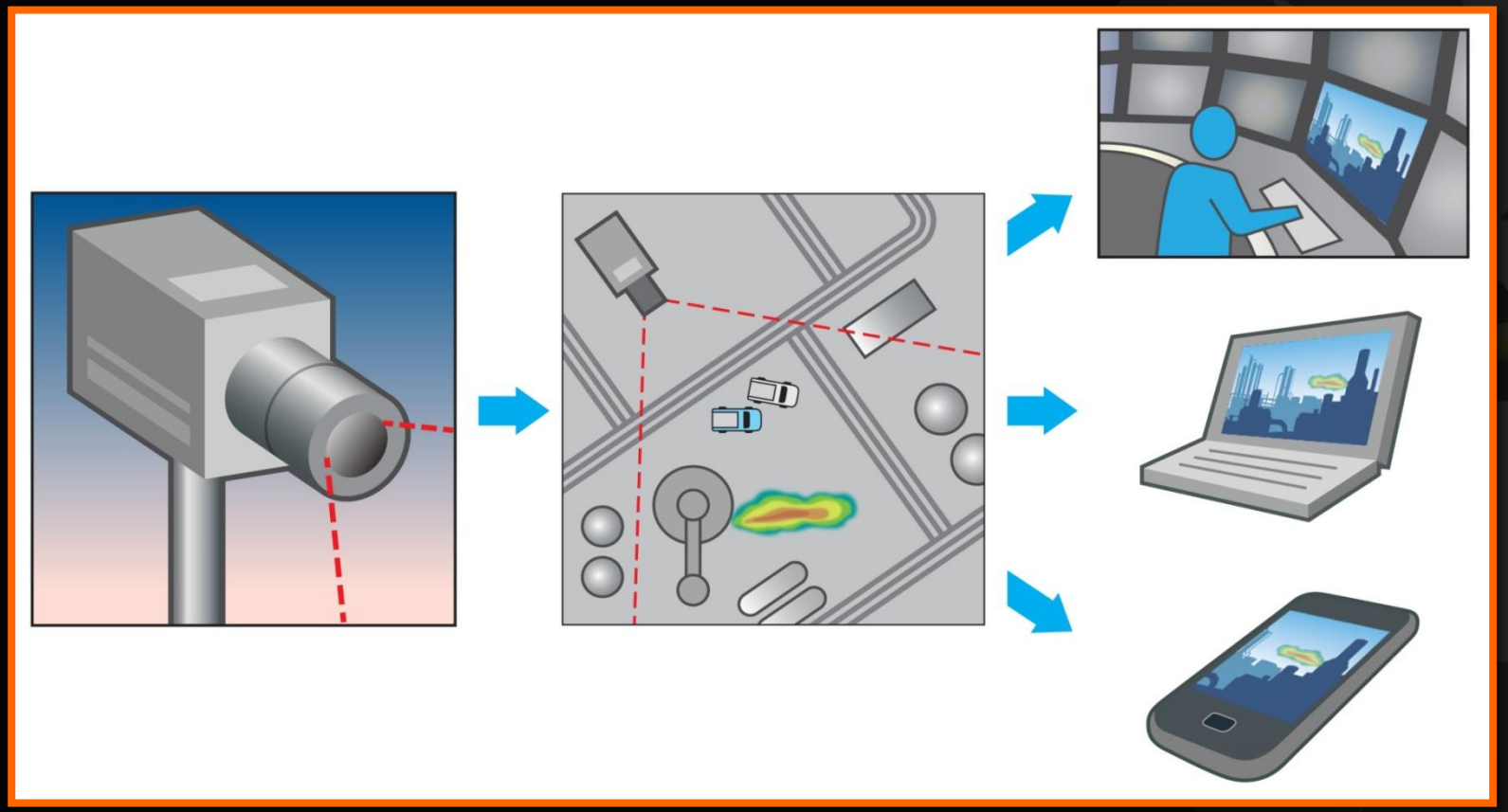
GCI System Diagram



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Truck-mounted GCI

Mobile Emissions monitoring solution

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Truck-mounted GCI

- Periodic site visits for emissions monitoring and reporting
- Operational tool for verifying that operators are properly sizing equipment and not losing product
- Reduce risk of catastrophic events
- Safety in emergency response

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Additional Specs

- Temp. Range -40 C (-40 F) to 55 C (131 F)
- 24/7 Operation
- Self-calibrating
- All Weather tested

  (snow, rain, ice, sunny heat)

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Very High Sensitivity
(Detection of 1 cu ft gas release at 150 m)

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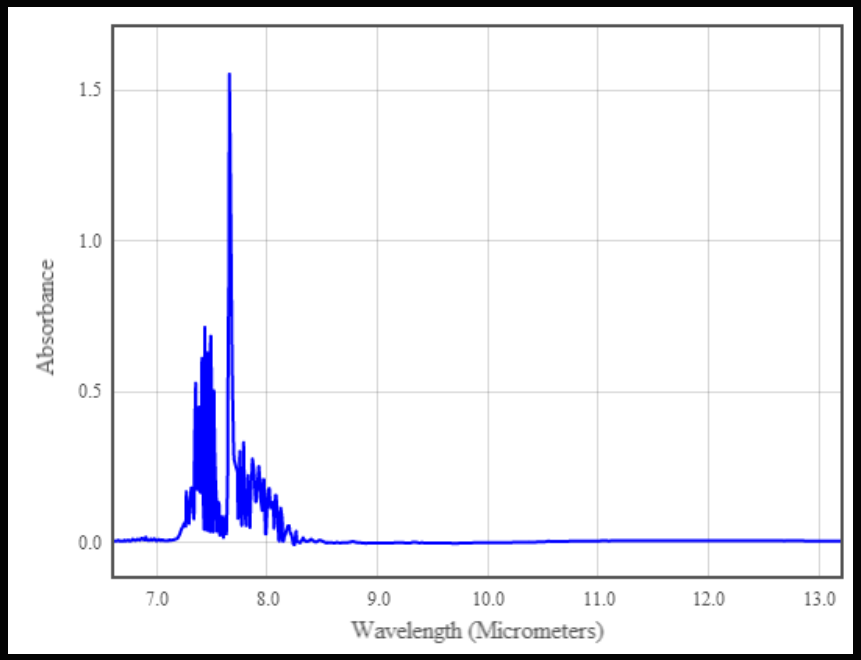
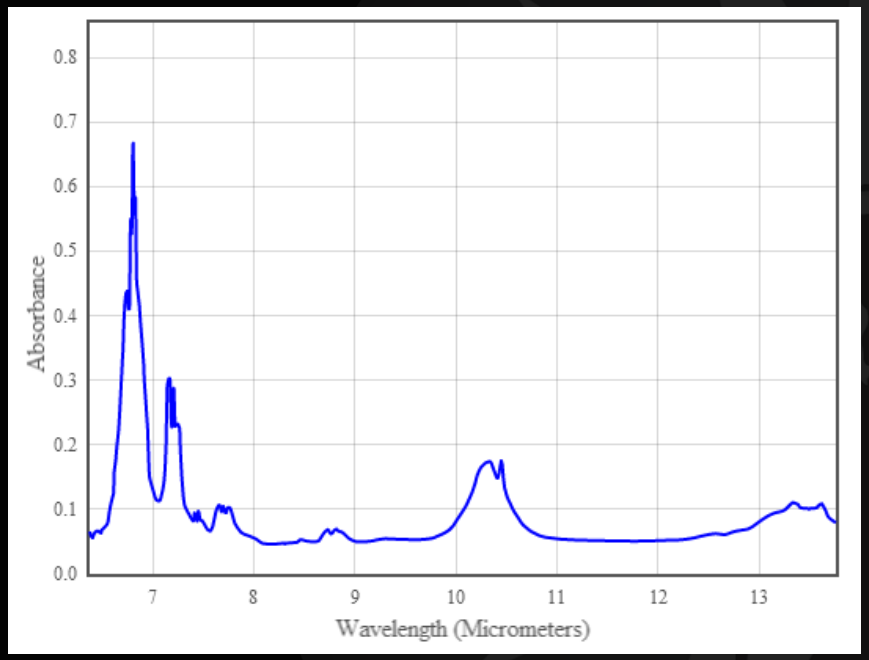
How does it work?



Methane



Butane

Rebellion's GCI "sees" Barcodes at Every Pixel

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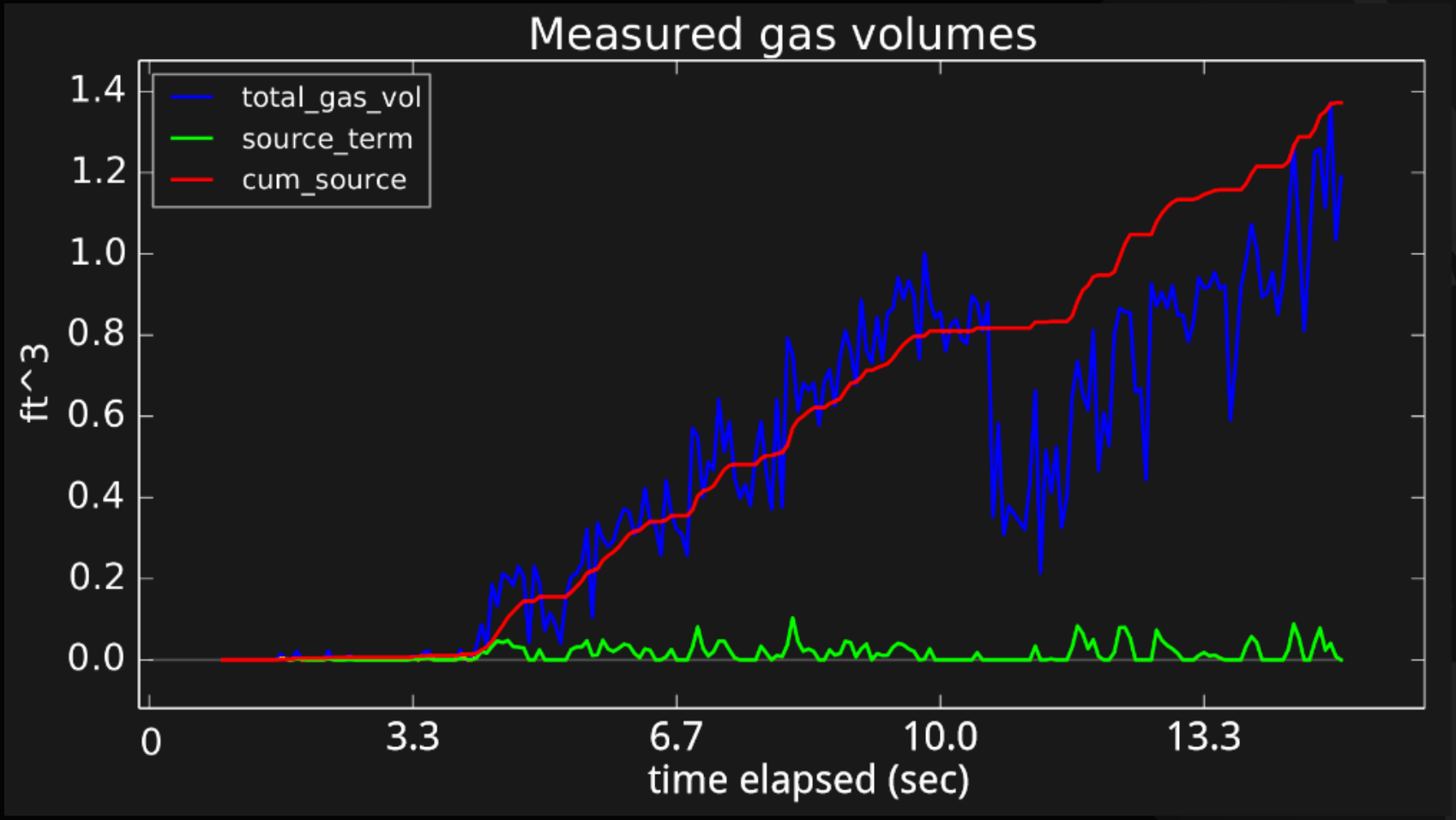
Example of Calculating Emission Rate



For measuring leaks, common units are ft^3/min, kg/hr, or g/min.

[Data: pressure-regulated methane hose release]

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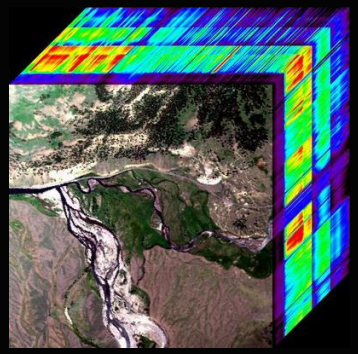
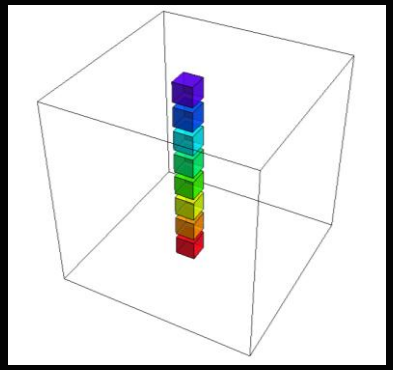


3 Dimensions of data required

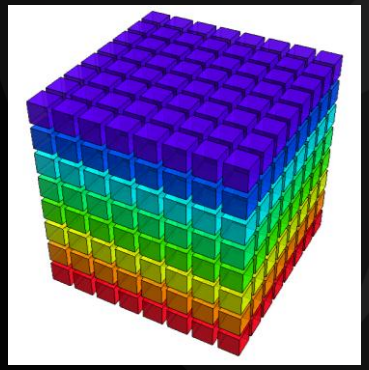
REBELLION'S CORE INNOVATION →

'SNAP-SHOT' HYPERSPECTRAL IMAGING



Traditional

Data per frame



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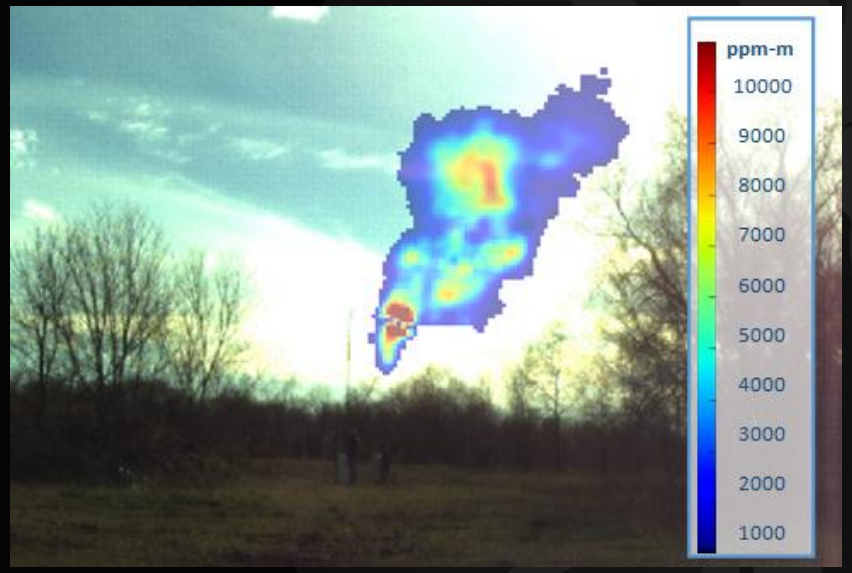
Gas Cloud Imaging with the GCI

IR Camera



GCI Detection Overlay on VIS Camera

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How is the GCI different from other camera systems?

GCI Camera…

- Can identify that gases are present AND tell the difference between steam and a gas.
- No operator needed and alarms can be set to automatic based on specified limits.
- Virtually no false alarms.
- Can operate night and day.
- Have a long lifespan since there are no cooling components.

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The GCI Operates in ALL Weather Conditions

- Detects gas leaks in all weather conditions
  - Sunny +55 C (131 F)
  - Freezing -40 C (-40 F)
  - Snow
  - Rain

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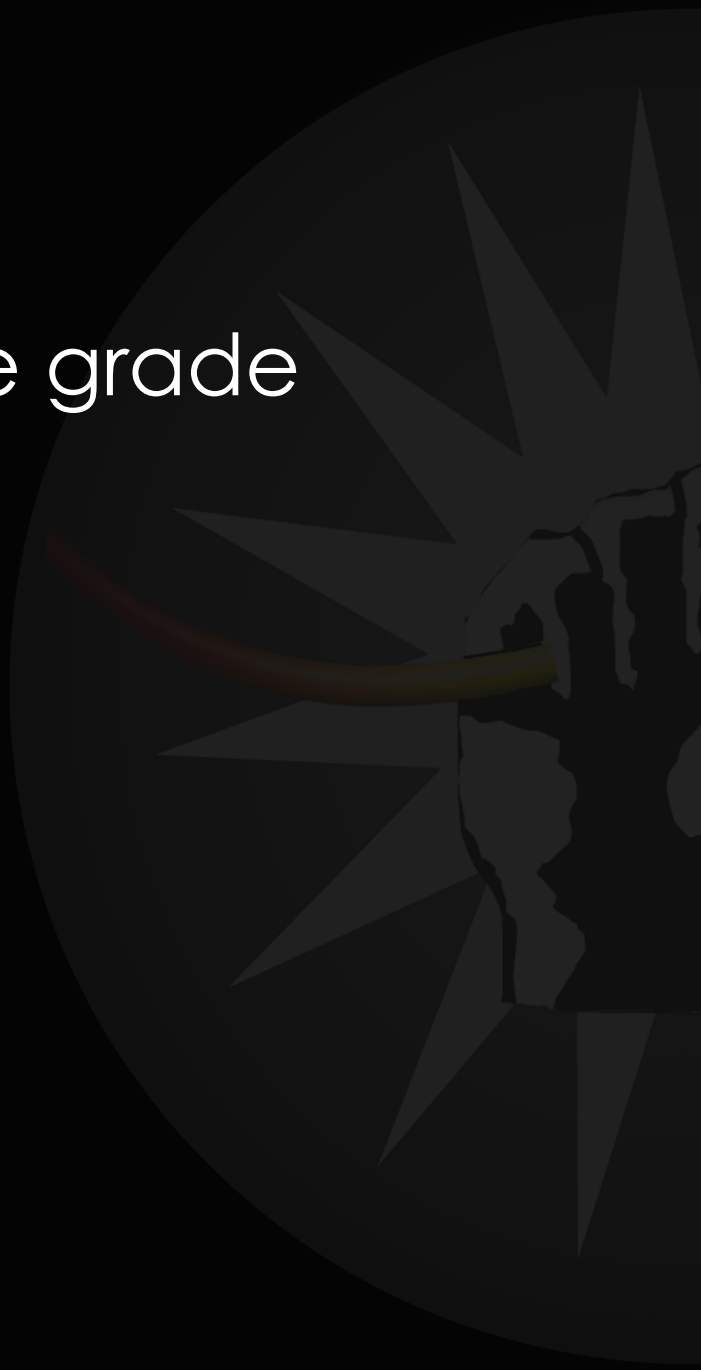
Certifications

- US – Class 1 Div 2, marine grade
- Europe – ATEX Level 2



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Maintenance & Calibration

- Care Instructions: Pressure Wash
- Built to Last: 10+ years
- No Nitrogen or Cooling Required
- Automatic, Self-calibrating

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Installation

- Time: ~ 3 hours for installation
- Power Needs: 200 watts & internet connection
- Pole Installation (if no buildings nearby)

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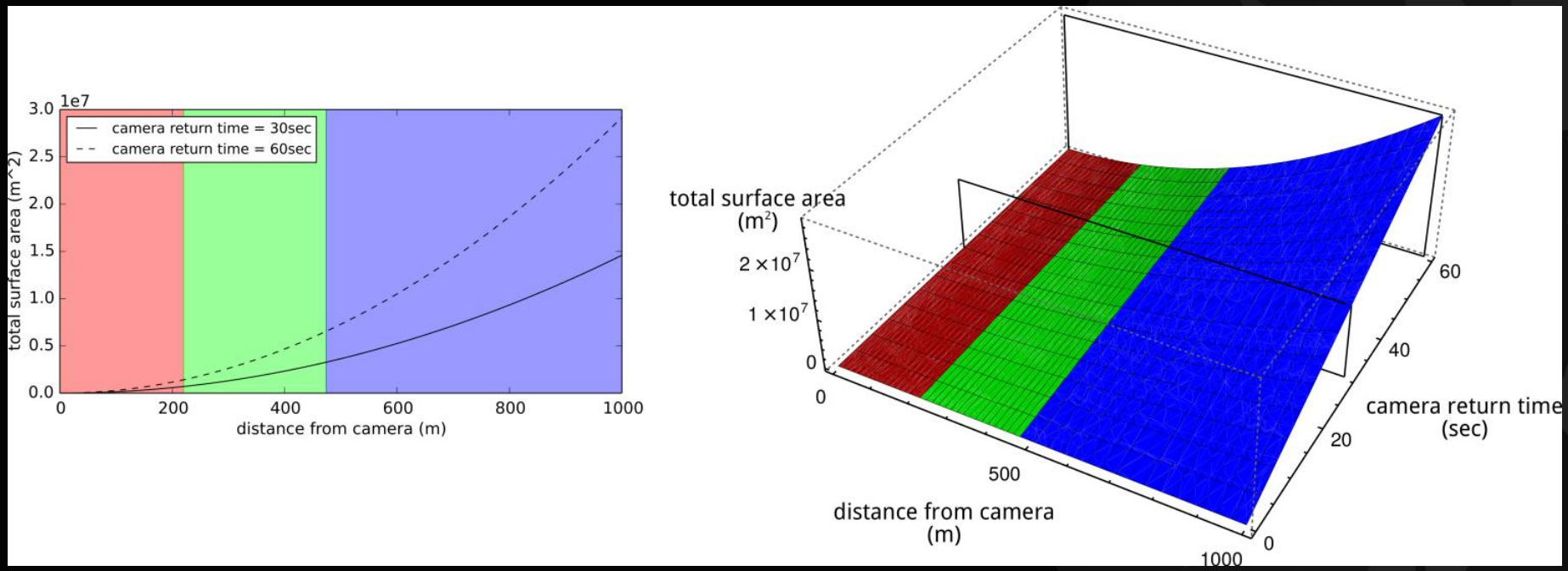
Model developed for best placement of GCI cameras



GCI's Advantages

1. Massively improved coverage
2. Detection at the source, not the sensor
3. Removes risk from human error
4. Intuitive, believable, verifiable alarm
5. Lower cost of ownership
6. True decision making tool

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Commonly Asked Questions

- Does is the GCI work at night?
  - Yes, 24/7
- What range?
  - Up to 1 mile
- Which chemicals?
  - Hydrocarbons, other chemicals like H2S & Ammonia
  - 50 – 500 ppm-m minimum sensitivity

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Join the Rebellion!

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