

GAS CLOUD IMAGING DETECTION SOLUTIONS

The most advanced hyperspectral gas imaging systems to help keep industries safe and more environmentally conscious

Honeywell's Rebellion Gas
Cloud Imaging (GCI) Systems

Honeywell

GAS CLOUD IMAGING DETECTION SOLUTIONS FOR THE OIL AND GAS, PETROCHEMICAL AND POWER INDUSTRIES

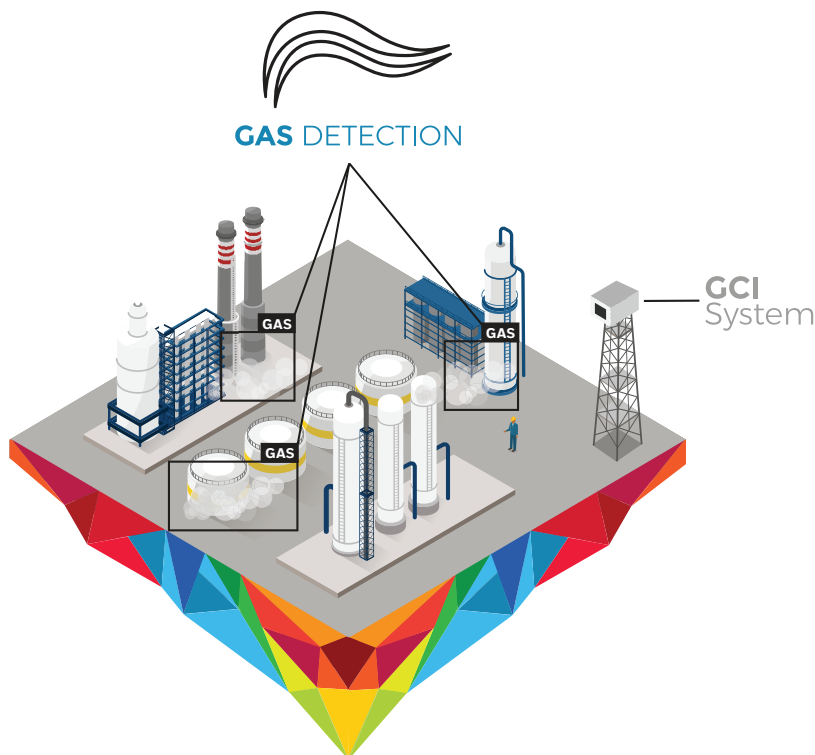
When a gas leak occurs, you need to act immediately for the safety of personnel, the site and the environment. Our hyperspectral gas imaging systems provide your personnel with reliable, intelligent information about the gas leak, including the type, size and direction of the plume, so that they can react accordingly.

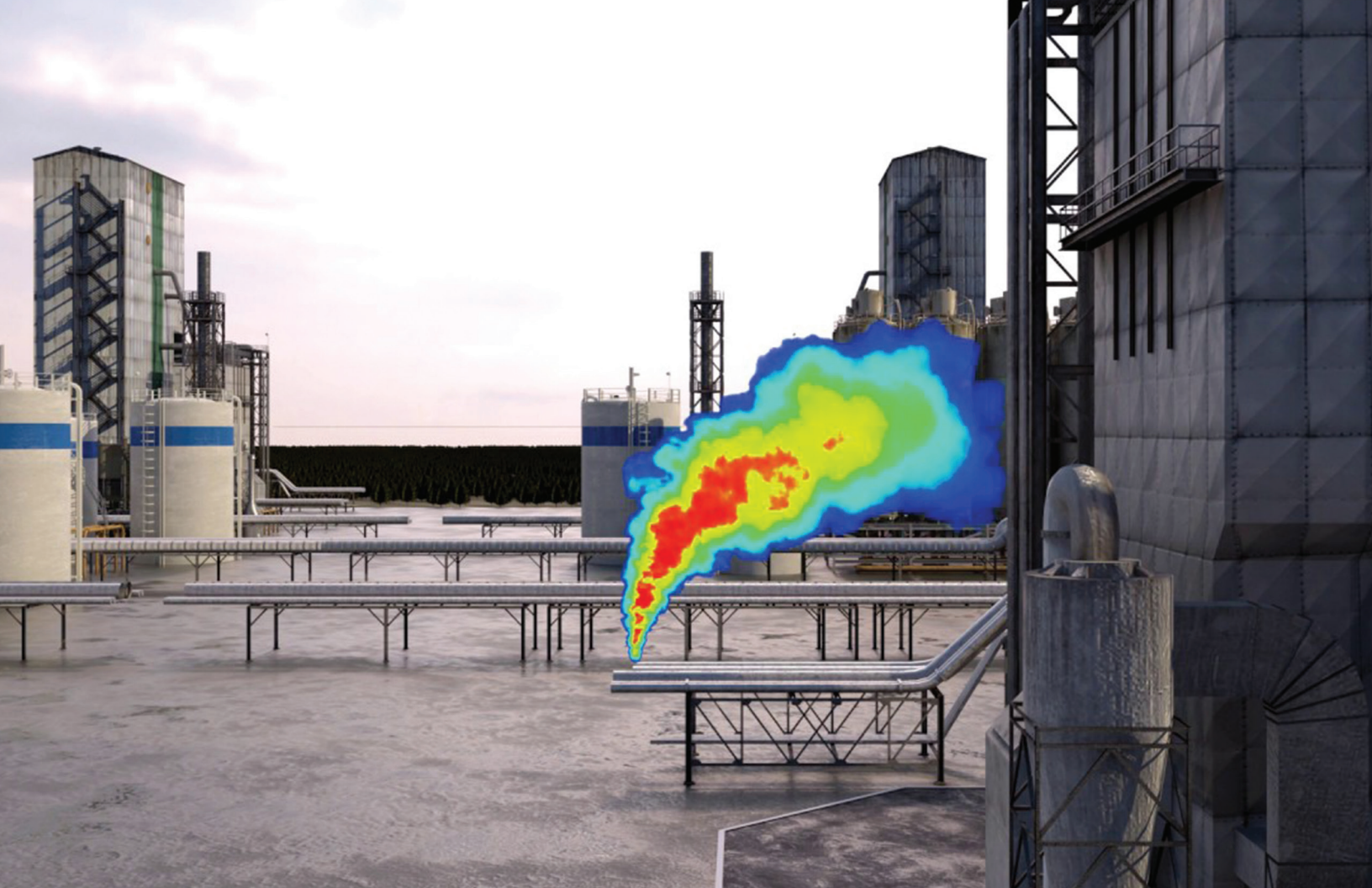
CHOOSE HONEYWELL GAS CLOUD IMAGING (CGI) DETECTION FOR A CUTTING-EDGE, ROBUST SOLUTION IN THE HARSHTEST ENVIRONMENTS

Honeywell brings a decade of experience in the most advanced hyperspectral gas imaging systems for the oil and gas, petrochemical and power industries. We provide intelligent, automated visual monitoring solutions that make industries safer and more environmentally conscious. Our rapid visual verification of gas leaks, as well as the size and direction of the plume, provides the support you need for environmental due diligence. Honeywell is dedicated to helping you protect people, equipment and the environment through gas cloud imaging detection.

HONEYWELL REBELLION GAS CLOUD IMAGING TECHNOLOGY

Honeywell delivers the future now. As a global leader in the Industrial Internet of Things (IIoT), we provide gas leak solutions to our customers globally with our technical innovation. Our Gas Cloud Imaging system uses proprietary hyperspectral imaging technology coupled with machine learning analytics to pinpoint the gas leak source and measure the volume and concentration of a leak. GCI is the industry's next generation for leak detection and monitoring.





HOW IT WORKS

Each gas has a unique emission/absorption signature in its fingerprint region, which makes it possible to differentiate gases. The system's powerful spectral imaging engine, with a patented sensor design, analyzes hyperspectral data from every pixel of the image at a rate of 60 times per second to

identify more than 50 gases. The camera captures the gas leak in the form of a visual cloud, which is captured on video. It also depicts the size of the gas cloud and the direction that the plume is moving.

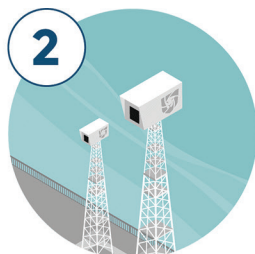
As soon as a camera captures a gas leak, the alarm management system goes off, alerting you via email.

An operator can then take targeted first responder actions using the data from the system, providing an effective response to the event. Alarm and video events are recorded and stored for later access, analysis and reporting, and alarm levels can be adjusted for your particular site needs.



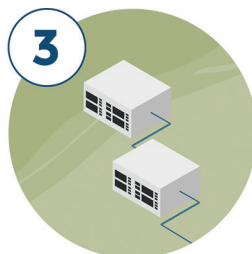
1 EVENT

A gas leak occurs at a facility.



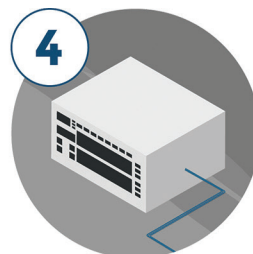
2 GCI CAMERA

GCI cameras sense the leak.



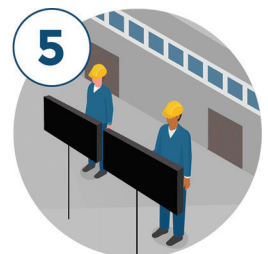
3 ANALYZERS

The Analyzer processes the data in real-time to identify, quantify and track the gas plume.



4 DVR

The DVR records the gas leak videos and sends the live results to operators.



5 MONITORING

Operators can now "see" the gas leak and respond to it.

HONEYWELL REBELLION GAS CLOUD IMAGING SOLUTIONS

Honeywell Rebellion Gas Imaging Systems feature unique gas cloud imaging through hardware monitoring devices, software and analytics. Our complete solutions include installation, set-up and technical support services .

Hardware Monitoring Devices

GCI cameras use a proprietary hyperspectral imaging technology to capture both visible spectrum and infrared video to monitor, quantify and display over 50 types of gases as a leak occurs. With a pan, tilt and zoom (PTZ) feature, cameras cover a large, pre-programmed area and quickly move to any area of interest. Cameras are typically 100 times more accurate than traditional hardware, so additional gas detection equipment is not needed. These self-calibrating cameras operate 24/7 in all weather conditions.

Analytics

Combining the latest advancements in data science, optical physics and artificial intelligence, our real-time monitoring analytics are the most advanced and deliver smarter, faster and more accurate information. Customers use our analytics to make decisions about their site. Analytics can be customized to meet our customers' unique needs and situations. Our analytics improve over time as they learn and gather more data, leading to better performance of the detection algorithms.

Software

Honeywell Rebellion's propriety AI-driven software platform, Spectra, manages the analytics through its own user interface and displays real-time video footage. A dedicated server has an extraordinary storage capacity and processing power. The software is capable of managing up to 4 TB of data daily from multiple GCI cameras.

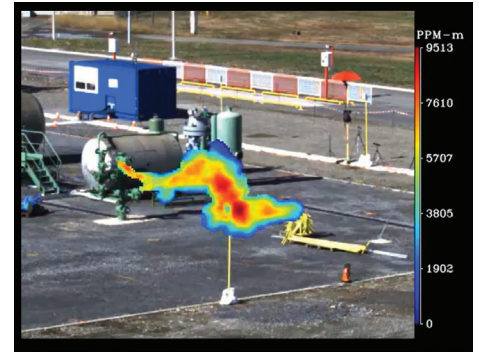
Operators can oversee camera feeds and adjust camera movement as needed through a DCS. Operators don't need to monitor the cameras continuously as alert levels are built into the software.

Installation, Set-Up and Technical Support Services

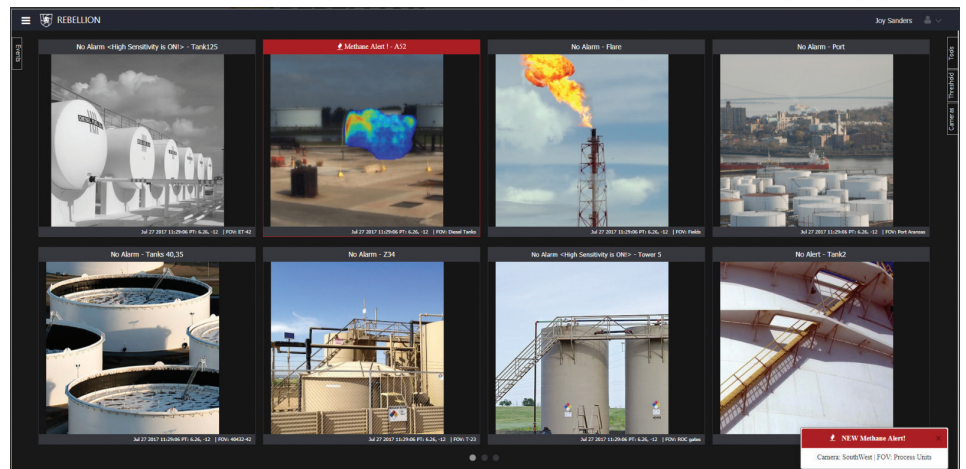
As part of a complete offering, we provide an installation, commissioning and training package. Once the installation is complete, you will be provided with a fully functioning and accurately configured system on a dedicated server along with a full training package. Technical support is available after the installation is complete. The system will be maintained at peak uptime and performance with an annual maintenance service pack.



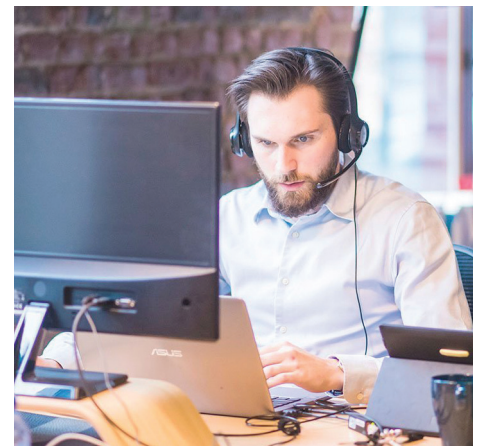
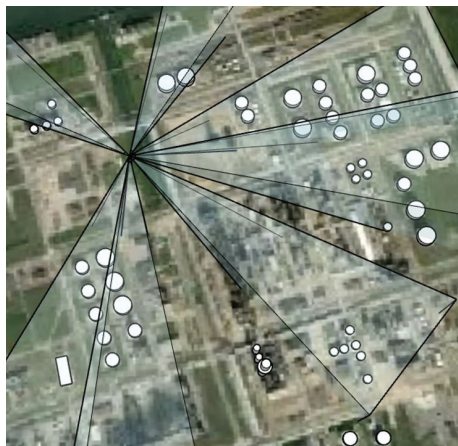
Hardware monitoring devices installed.



Advanced real-time visual monitoring analytics.



Edge computing with extraordinary storage capacity and processing power.



We work with you from initial planning to installation and set-up, and we provide ongoing support.



BENEFITS

The Honeywell Rebellion portfolio is a platform of intelligent, automated visual monitoring solutions that make industries safer and more environmentally conscious.

SAFER

Our systems provide a timely and clear visual indication of previously invisible gas clouds, thereby detecting and verifying safety instrumented systems. Honeywell Rebellion platforms instantly provide the type of gas leak, the location and the size, which enables you to respond rapidly and with an effective, targeted plan. With an early intervention, you can prevent further risks from escalating. Our systems are safer because of:

- Monitoring real-time 24/7
- Detecting leaks indoors and outdoors
- Identifying the leak source
- Issuing gas leak alerts
- Preventing accidents

ENVIRONMENTALLY CONCIIOUS

We're helping make sites more environmentally sound because with our 24/7 plant coverage, you can respond to a leak as soon as it occurs, which reduces harmful emissions. You can enable a more coordinated approach to achieving net zero greenhouse gas emissions. Our systems help the environment by:

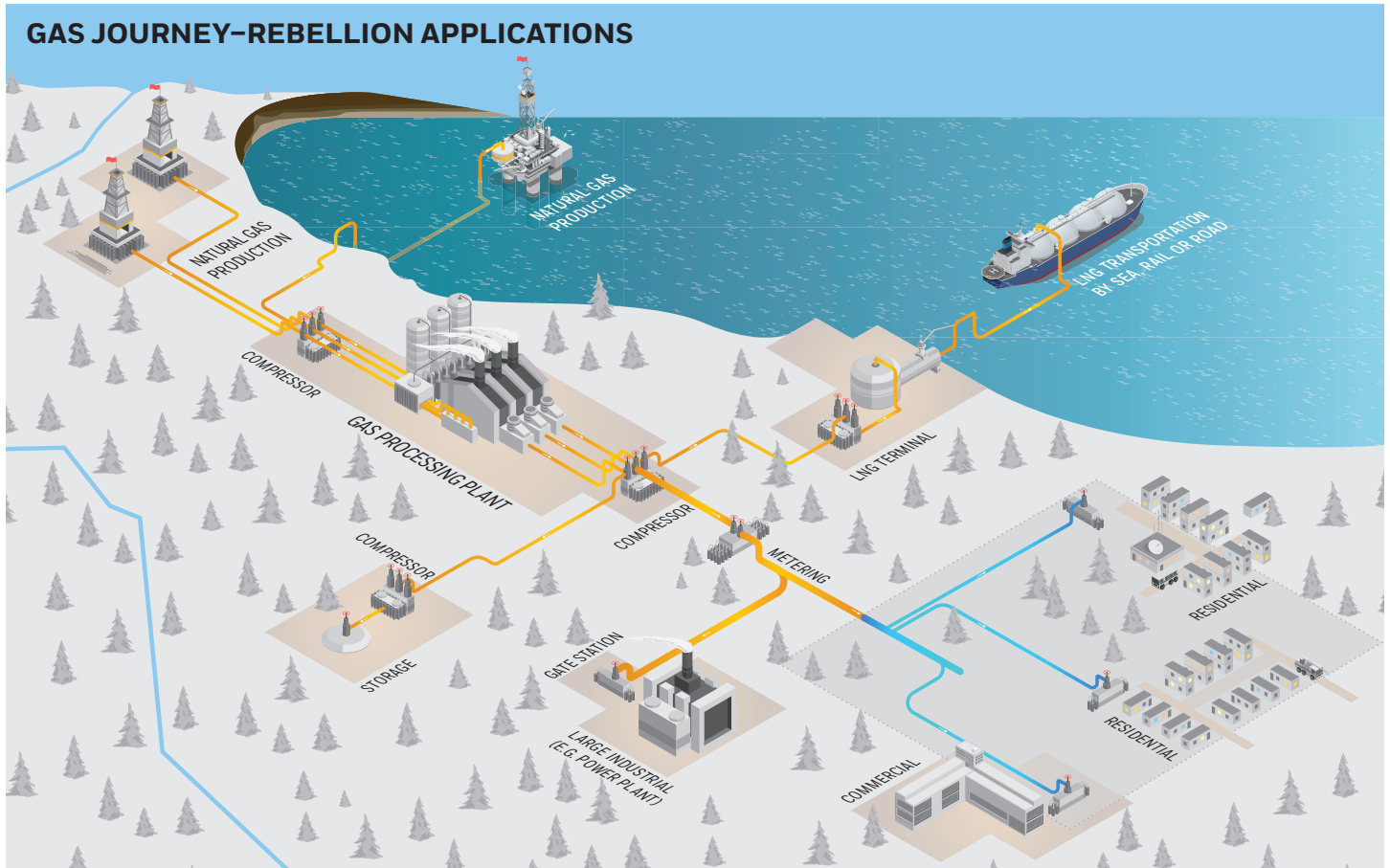
- Reducing methane intensity
- Capturing real-time emission data visualization
- Providing a total emission profile and evaluation (Coming in 2021)
- Monitoring cost-effective emissions
- Measuring quantifiable emissions

PROFITABLE

Businesses are always facing the challenge of being more efficient and profitable. We're making businesses more profitable by:

- Reducing the cost of unplanned safety and emissions intervention
- More effectively targeting the response to gas leak events
- Reducing the cost of carbon credits and potential fines
- Making the site safer, thereby reducing fiscal risks
- Enabling increased sale of the retained product
- Eliminating the need for additional gas detection equipment
- Reducing downtime with preventive maintenance

GAS CLOUD IMAGING SYSTEMS: INDUSTRIES AND APPLICATIONS



The Honeywell Rebellion portfolio of Gas Cloud Imaging systems addresses a wide range of safety and emissions applications:

- Oil and Gas Upstream (offshore and onshore)
 - Exploration
 - Production
 - Processing
- Oil and Gas Downstream
 - Transmission
 - Storage
 - Distribution
- Heavy industrials such as chemical and power plants

APPLICATIONS INCLUDE:

- Exploration platforms and FPSOs
- Gas processing plants
- Gas transmission and distribution compressors and metering skids
- Tank farms
- Pipelines
- Refineries
- LNG / LPG transportation
- LNG / LPG loading / unloading
- Chemical plants
- Power plants



GAS CLOUD IMAGING CAMERAS

HONEYWELL REBELLION GAS CLOUD IMAGING CAMERA

The Honeywell GCI is a unique hyper-spectral unit that comes in two versions:

- The standard GCI LR (Long Range) is designed to cover large sites and extended areas. It has a long range of 1,700 m (5,577 ft) and a field of view of 5° x 5°.
- The standard GCI WR (Wide Range) is designed for closer, broader self-contained areas. It has a wide range of 660 m (2,165 ft) and a field of view of 22.6° x 22.6°.

Both models employ snapshot hyper-spectral imaging for real-time detection of gas leaks in less than a second, as well as identifying the type of gas and quantifying it. The cameras provide the gas concentration and leak location, and real-time alerts create actionable alarms and display live videos of the leak while simultaneously issuing notifications to personnel via email or text.

A pan, tilt and zoom (PTZ) capability provides controlled coverage and response across the site area. Cameras can be sequentially moved in a pre-programmed, repeating cycle or an operator can move the camera to specific positions. GCI cameras are designed to be installed at elevated positions in a non-hazardous area with an unimpeded view over the covered area.

A DCS monitor displays fully automatic alarms with a clear live visual display. The camera connects to a DCS via Modbus TCP/IP. A server stores up to 5 million detection events with custom auto-erase settings.

The cameras can detect a wide range of gases, including methane and typical flammable hydrocarbons as well as other potentially dangerous flammable and toxic gases.



Honeywell Rebellion Standard GCI Camera.

PRODUCT SPECIFICATIONS

HEADER	HEADER
Detection Approach	Snapshot Hyperspectral Infrared Imaging
Detection Time	< 1 second
Field of View	Long Range: 5.0° x 5.0° Wide Field: 22.6° x 22.6°
Position Control	Pan +/-180° (360° full rotation), Tilt ±45°
Detection Range	Long Range: up to 1,700 m (5,577 ft) Wide Field: up to 660 m (2,165 ft)
Alert/Alarm	Fully automatic alarm with live visual display, audible alert, email and/or text message
False Alarm Rate	≤ 1%
DCS Integration	Modbus TCP/IP
Video Output	200 x 200 pixels (IR) / 600 x 600 pixels (Visible) at 15 Hz
Weather Conditions	Validated for all weather and light conditions
Temperature Range	-40°C to 55°C (-40°F to 131°F)
Electrical Requirements	Camera: 24 VDC, 10 A (peak), 5 A (continuous) Pan/Tilt: 48 VDC, 12 A (peak), 6.4 A (continuous) Analyzer: 24 VDC or 120/240 VAC (< 600 W)
Network Connections	1 Serial RS-422 + 1 CAT 6 - Pan/Tilt 3 Multi-mode Fibers, LC Connectors - Camera
Running Time	Continuous (24/7, 365 days)
Self Calibration	Every 7 and 22 minutes
Maintenance	No regular maintenance (except exterior cleaning)
Analyzer	Custom Dell Poweredge R630
Analytics	Up to 7 simultaneously
DVR (Video Storage)	Custom Dell Poweredge R540. Stores up to 5 million detection events with custom auto-erase settings.

See the [online datasheet](#) for full technical and operational details.

GAS CLOUD IMAGING CAMERAS

MINI GAS CLOUD IMAGING CAMERA

The Honeywell Rebellion Mini GCI is designed for congested areas and smaller sites. With a small format and useful 100 m (328 ft) coverage range, the Honeywell Rebellion Mini GCI provides cost-effective gas cloud identification and measurement over smaller, specific areas such as metering skids or discharge and loading bays.



Honeywell Rebellion Mini GCI Camera.

PRODUCT SPECIFICATIONS

HEADER	HEADER
Detection Approach	Snapshot Hyperspectral Infrared Imaging
Detection Time	< 1 second
Field of View	42.0° x 42.0°
Position Control	Pan +/-180° (360° full rotation), Tilt ±45°
Detection Range	Up to 100 m (328 ft)
Alert/Alarm	Fully automatic alarm with live visual display, audible alert, email and/or text message
False Alarm Rate	≤ 1%
DCS Integration	Modbus TCP/IP
Video Output	160 x 160 pixels (IR) / 640 x 640 pixels (Visible) at 15 Hz
Weather Conditions	Validated for all weather and light conditions
Temperature Range	-40°C to 55°C (-40°F to 131°F)
Electrical Requirements	Camera: 24 VDC, 17 W Pan/Tilt: 24 VDC, (Configuration dependent) Mini-GCI Analyzer: 24 VDC or 120/240 VAC (120 W)
Network Connections	1 Serial RS-422 + 1 CAT 6 - Pan/Tilt 2 CAT 6 Ethernet Connection - Camera
Running Time	Continuous (24/7, 365 days)
Self Calibration	Every 7 and 22 minutes
Maintenance	No regular maintenance (except exterior cleaning)
Analyzer	Custom Nuvo N5006E
Analytics	Up to 3 simultaneously; max 7 with enhanced analyzer
DVR (Video Storage)	Custom Dell Poweredge R540. Stores up to 5 million detection events with custom auto-erase settings.

See the [online datasheet](#) for full technical and operational details.

For more information

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THE
FUTURE
IS
WHAT
WE
MAKE IT

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