GAS CLOUD IMAGING DETECTION SOLUTIONS

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

EVENT
A gas leak occurs at a facility.

GCI CAMERA
GCI cameras sense the leak.

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

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

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.

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 CONCIOUS

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
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
Honeywell Rebellion Gas Cloud Imaging Camera

The Honeywell GCI is a unique hyperspectral 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 (5,557 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 hyperspectral 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.

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<td><strong>HEADER</strong></td>
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<td>Detection Approach</td>
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</table>
| 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.
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.

PRODUCT SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
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<tbody>
<tr>
<td>Detection Approach</td>
<td>Snapshot Hyperspectral Infrared Imaging</td>
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<tr>
<td>Detection Time</td>
<td>&lt; 1 second</td>
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<tr>
<td>Field of View</td>
<td>42.0° x 42.0°</td>
</tr>
<tr>
<td>Position Control</td>
<td>Pan +/-180° (360° full rotation), Tilt ±45°</td>
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<tr>
<td>Detection Range</td>
<td>Up to 100 m (328 ft)</td>
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<tr>
<td>Alert/Alarm</td>
<td>Fully automatic alarm with live visual display, audible alert, email and/or text message</td>
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<tr>
<td>False Alarm Rate</td>
<td>≤ 1%</td>
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<tr>
<td>DCS Integration</td>
<td>Modbus TCP/IP</td>
</tr>
<tr>
<td>Video Output</td>
<td>160 x 160 pixels (IR) / 640 x 640 pixels (Visible) at 15 Hz</td>
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<tr>
<td>Weather Conditions</td>
<td>Validated for all weather and light conditions</td>
</tr>
<tr>
<td>Temperature Range</td>
<td>-40°C to 55°C (-40°F to 131°F)</td>
</tr>
</tbody>
</table>
| 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 NS006E                                                   |
| 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
safety.honeywell.com

Honeywell Gas Analysis and Safety
9680 Old Bailes Rd., Fort Mill, SC 29707
803.835.8000

Contact us
US: Tel: 800.430.5490  
Fax: 800.322.1330  
informationsp@honeywell.com

Canada: Tel: 888.212.7233  
Fax: 888.667.8477

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