GAS DETECTION: WIRELESS

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The MeshGuard gas detection monitor is a key building block of the MeshGuard intelligent network of connected sensors for gas detection in industrial safety applications. The MeshGuard system is designed for quick deployment in areas where traditional fixed gas detection monitors might have been used in the past, but a lower cost solution with faster deployment is needed. MeshGuard is available with field-replaceable precision sensors specifically designed to sense toxic and flammable gases.

**Features:**
- Self-forming wireless network; units come online automatically
- Compact and lightweight
- IP-65 rated weather resistant, and splash guard equipped for sensor protection
- Multiple controller options for real-time wireless data collection and viewing
- Self-healing network automatically routes data back to controller through best wireless path available
- Battery powered operation for up to 6 months
- Intrinsically safe
- Magnetic mounting option for very quick and easy MeshGuard installation

**Applications:**
- Oil and gas drilling operations
- Oil and gas production
- Plant maintenance turnarounds
- Industrial safety
- Tank farms
- Shipyards and maritime

**FMC 2000 Controller**

FMC 2000 is a multi-channel controller with built-in modem designed for integration with RAE Systems’ wireless mesh network products. It is simple to install and operate, versatile, and dependable. Housed in stainless steel and equipped with a backup battery, the FMC 2000 is the ideal controller for MeshGuard systems used on drilling rigs and during plant maintenance operations requiring gas detection.

**Features:**
- Built-in wireless modem for use in MeshGuard networks
- Manages up to 24 channels
- 5 programmable SPDT relay outputs
- Backup battery for up to 15 hours of operation
- Built-in data logging
- Stainless steel enclosure
- RS-485 and ethernet interface

**Wireless AlarmBar**

Concept Controls wireless alarm bar with an Integrated WirelessLink module can be deployed to alert workers of critical alarm conditions in remote areas of a work site.

**Features:**
- User friendly and cost effective
- Ease of deployment for universal applications
- Designed to operate on commercial power or can be integrated with a solar supply option
- Class 1 Division 2 certification
### Sensor Specifications

<table>
<thead>
<tr>
<th>Gas Monitor</th>
<th>Range</th>
<th>Resolution</th>
<th>Response Time T90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbon Monoxide (CO)</td>
<td>1-2000 ppm</td>
<td>1 ppm</td>
<td>30 sec</td>
</tr>
<tr>
<td>Hydrogen Sulfide (H2S)</td>
<td>0.1-100 ppm</td>
<td>0.1 ppm</td>
<td>20 sec</td>
</tr>
<tr>
<td>Flammables (LEL)</td>
<td>0 to 100% LEL</td>
<td>1% LEL</td>
<td>15 sec</td>
</tr>
<tr>
<td>Sulfur Dioxide (SO2)</td>
<td>0.1 to 20 ppm</td>
<td>0.1 ppm</td>
<td>30 sec</td>
</tr>
<tr>
<td>Oxygen (O2)</td>
<td>0 to 25%</td>
<td>0.10%</td>
<td>15 sec</td>
</tr>
<tr>
<td>Ammonia (NH3)</td>
<td>0 to 100 ppm</td>
<td>1 ppm</td>
<td>T90&lt;90 sec, T10&lt;200 sec</td>
</tr>
<tr>
<td>Chlorine (Cl2)</td>
<td>0 to 10 ppm</td>
<td>0.1 ppm</td>
<td>30 sec</td>
</tr>
</tbody>
</table>

### Detector Specifications

- **Size**: 10.5”L x 3.7”W x 2.1”H (26.5cm x 9.5cm x 5.5cm)
- **Weight**: 1.3 lbs (0.6kg)
- **Visual Alarm**: 2 super-bright red LEDs
- **Audible Alarm**: 90dB @ 30cm
- **Calibration**: Two-point field calibration
- **RF Frequency**: 2.4GHz ISM Band, IEEE 802.15.4 standard compliant
- **Operating Range**: 300 metres (line of sight)
- **Keypad**: Three operation and programming keys
- **Display**: Customized LCD (1 x 1.5”/72mm x 108mm) with backlight
- **Power Supply**: Disposable Lithium Battery, +3.6V (optional rechargeable external battery for extended run time)
- **Operating Time**: **Toxic Gas Sensors**: Up to 6 months on internal battery (up to 2 years on external)
  - **Flammable Gas Sensor**: Up to 5 days on internal battery (up to 22 on external)
- **Operating Temperature**: -40° to 122° F (-40° to +50° C) for LEL, CO and H2S sensors
  - Other sensors -4° to 122° F (-20° to +50° C)
- **Humidity**: 10% to 90% relative humidity, non-condensing
- **IP Rating**: IP-65
- **Certifications**: US and Canada: CID1, Groups A, B, C, D, T4
  - Europe: ATEX IM1/II 1G Ex ia I/IIC T4
  - IECEx Ex ia I/IIC T4
  - Contact manufacturer for country-specific certification
- **RF Certifications**: FCC Part 15, CE, SRRC

### PowerPak Specifications

- **Size**: 12.2”L x 10.2”W x 5.5”H (31cm x 26cm x 14cm)
- **Weight**: 27.8 lbs (12.6 kg)
- **Certifications**: US and Canada: CID1, Groups A, B, C, D, T4
  - Europe: ATEX IM1/II 1G Ex ia I/IIC T4
  - IECEx Ex ia I/IIC T4
  - Contact manufacturer for country-specific certification
- **Operating Temperature**: -40° to 131° F (-40° to +55° C)

### PowerPak

The RAE PowerPak is a rechargeable power source for the MeshGuard system. This intrinsically safe battery is ideal for monitoring applications which require longer runtime than provided with the standard internal disposable battery.

### MeshRouter

The MeshRouter is a powerful tool that can extend network area coverage by routing signals from other monitors. It is in constant communication with the FMC 2000 controller and MeshGuard detectors in the network, and can manage up to 24 detectors.

### EchoView

The MeshGuard EchoView wirelessly receives the data shown on an FMC 2000 controller in a MeshGuard network, displays them on its screen, and delivers audible and visible alerts. This handheld device provides a safety officer with all the necessary wireless gas detection information in a portable format.

### ProRAE Guardian Software

ProRAE Guardian represents an advanced generation of real-time wireless threat detection solutions from RAE Systems. Available now, the software program serves as a “mobile command centre” for safety managers and incident commanders by connecting and relaying data from RAE Systems AreaRAE family and select third party wireless products to remote locations anywhere in the world.

ProRAE Guardian accepts real-time detector data and instantly displays device status, alarm, and sensor reading information – all integrated on a single map display. Because ProRAE Guardian is always on and always connected, geographically dispersed teams can coordinate threat responses while simultaneously viewing the same situational data, all in real time.

### Mounting Options

Two methods for mounting MeshGuard make it easy to install. The first method uses a magnet that screws onto the rear of the Meshguard, ideal for moving from one location to another. The second method uses a specially designed stainless steel enclosure that is permanently mounted. It protects the MeshGuard from damage in industrial settings.
AreaRAE RDK (Rapid Deployment Kit) System Package

The Rapid Deployment Kit (RDK) is designed for quick assessment and management of gaseous threats. The kit includes four wireless, 5-gas, AreaRAE monitors with in-case charging as well as the Host Controller for monitoring from a command center up to two miles away. The system can scale up to 32 AreaRAE monitors with the addition of Detector Kits, each containing 4 AreaRAEs. The RDK offers first responders and environmental managers all detection tools they need in two rugged carrying cases.

The AreaRAE monitors can be rapidly deployed and re-deployed in situations that require a quick and adaptable response. They can be arranged in a perimeter to detect chemical hazards and to monitor the environmental safety of a large public event. The units help response teams gain control over potentially perilous situations by assessing the environment and determining the geographic disbursement of hazardous gases and chemicals. Housed in a military-grade self-contained case, the RDK is easy to transport and easy to deploy.

The RDK also provides protection in the monitoring of environmental remediation, oil, gas platforms, petrochemical applications, and refineries. The AreaRAE can detect gaseous CO, H2S, SO2, NO, NO2, Cl2, HCN, NH3, PH3, and gamma radiation and offers datalogging for event documentation.

The RDK is available with two additional options:

- Global Positioning Satellite (GPS) option - Includes the ability to track and display readings from up to 32 remotely located detectors on a GPS map
- Gamma Radiation option - A Gamma radiation sensor replaces one of the toxic gas sensors on the AreaRAE units. (See the AreaRAE Gamma product description for more details.)

Features:

- Rapid Deployment - The Host Controller is “open & operate”, and the AreaRAE’s inside are stored with handles on
- In-case charging
- Portability - Complete system in easy to transport military grade cases

Safer Systems Real-Time®

SAFER Real-Time empowers industrial facilities like refineries, chemical plants, tank farms and depots, etc. to take control over chemical emergency events with speed and ease. Customized to meet each facility’s unique circumstance and specifications, SAFER Real-Time® connects with a wide array of gas detection and meteorological (weather) equipment to monitor for, detect, and provide warning to emergency operations and safety personnel when a chemical release event occurs. But that’s just the beginning: the system then provides vital situation analysis information in real-time so that critical response decisions can be made quickly and reliably as the release event unfolds, all in as little as two (2) minutes. And once the event has been neutralized, the system’s archiving feature allows the user to replay the event using the actual event information collected for comprehensive post-event analyses.

Safer Systems Homeland Responder™ and Hazmat Responder™

In the U.S. and around the world, SAFER Homeland Responder™ and SAFER Hazmat Responder™ support the efforts of firefighters, hazmat teams, and other first responders, plus military and civil defense teams and environmental and emergency management agencies, in rapidly and effectively taking command of a chemical emergency from anywhere, at anytime. As with SAFER Real-Time™, these mobile solutions provide easy visualization of real-time chemical emergency data that permits more rapid and effective incident command and control. The systems can even be utilized on route to an event providing early situational assessment for determining the best incident approach routes and command post placement.
The RemoteLink I.S. is a perimeter mounted gas monitoring system which utilizes the RAE System’s AreaRAE. It is a standalone monitor capable of measuring up to 5 gases and requires no external power or communication wires once installed.

The system is powered by two 80 watt solar panels with two 12V solar batteries and it transmits the gas readings wirelessly and in real-time using the 902 to 928 MHz frequency range. With a Class 1 Div 2 CSA certification, the monitor is suitable for installation in most hazardous locations.

The RemoteLink Monitor has a communication range of up to 3km which can be extended with additional RAE Link repeaters. An optional GPS allows the user to track and display readings from remote detectors. The AreaRAE gas monitor installed inside the unit is capable of measuring a variety of hazardous gases including O2, combustibles, VOCs, CO2, H2S, SO2, NO, NO2, Cl2, HCN, NH3, HCl, and more. Gas sampling is achieved through an integrated diaphragm pump with programmable high (400cc/min) and low (300cc/min) flow rate settings.

A variety of optional additions to the system are available including; a ‘Pyrolyzer’ for sample heating in conditions down to -40 °C, a ‘VAAM’ module for local visual and audible alarm notification, or a Dehydrator to dry and cool the sample for very hot and humid applications.

### Additional Options:

**‘VAAM’ Visual/Audible Alarm**

A VAAM alarm option provides local alarm notification in the field where the system is installed. The alarm system is comprised of a Federal Signal strobe warning light capable of 80 high intensity flashes per minute as well as a Federal Signal audible signaling horn with an adjustable output from 0dBa to 110dBa. An alarm module mounted inside the Remote Link Monitor drives the alarm signal from the AreaRAE to the outside horn and strobe located above.

**Dehy Sample Cooler/Dehydrator**

For conditions in which high heat and humidity can affect the accuracy of gas readings and contaminate sensors, there is a dehydrator option available. The dehydrator is mounted to the side of the RemoteLink Monitor enclosure and as the sample is drawn through it removes the moisture while simultaneously cooling the sample.

**Pyrolyzer Sample Heater**

The pyrolyzer is a small sample heater which mounts inside the enclosure between the AreaRAE monitor and the enclosure inlet. It is capable of heating the sample and preventing pump freezing in temperatures as low as -40°C. It also helps heat all internal components including the LCD display.

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**Specifications:**

<table>
<thead>
<tr>
<th>RemoteLink Monitor</th>
<th>Certification</th>
<th>CSA Field Certified for Class 1 Div 2, Groups B, C, &amp; D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Power Options</td>
<td>Solar Power System OR 120VAC Commercial Power</td>
<td>*If Solar: Powered by two 80W panels and two 12V 100Ahr AGM batteries.</td>
</tr>
<tr>
<td>Enclosure</td>
<td>NEMA 4X Enclosure</td>
<td>28” X 21” X 12”</td>
</tr>
<tr>
<td>Mounting Options</td>
<td>-Wall Mount (for 120VAC or Remote Mounted Solar Panels)</td>
<td>-3 Inch Schedule 80 Pole Mount Complete w/ Solar Panel Mounting Brackets</td>
</tr>
<tr>
<td></td>
<td></td>
<td>* Option for Powder Coated OR Hot Dip Galvanized Pole Mount Assembly</td>
</tr>
<tr>
<td>Additional Options</td>
<td>-Sample Heater for use in colder temperatures</td>
<td>-Sample dehydrator for more humid applications</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Horn/strobe addition for field alarm notification</td>
</tr>
<tr>
<td>Gas Detector:</td>
<td>Wireless (902 to 928 MHz)</td>
<td></td>
</tr>
<tr>
<td>Communication</td>
<td>Up to 3.2km (2 miles), extendable with RAELink2 repeaters</td>
<td></td>
</tr>
<tr>
<td>RF Range</td>
<td>Up to 5 Sensors</td>
<td>Toxic Gases and Oxygen – Electrochemical Combustibles – Catalytic VOC – Photoionization</td>
</tr>
<tr>
<td>Sensors</td>
<td>Internal integrated diaphragm pump with programmable High (400cc/min) and Low (300cc/min) flow rate setting</td>
<td></td>
</tr>
</tbody>
</table>
Integrates with SAFER Systems Solutions

SAFER Systems is the global technology leader in chemical emergency management solutions. The company’s advanced solutions, incorporating patented technologies, are designed to detect, measure, monitor, predict and document in real-time the dispersion caused by an accidental or intentional release of hazardous chemicals, permitting more effective event situation analysis, decision making, and response.

SAFER Real-Time® is the company’s chemical emergency management solution for industrial environments. The system is used by major industrial organizations worldwide to detect the release of hazardous chemicals at the earliest stages and to predict in real-time how the plume will disperse. Using SAFER Real-Time®, users are better able to see what the effects would be on an industrial facility, local community, and the surrounding environment of different chemical release scenarios so that emergency management and response personnel can plan accordingly and respond more quickly and collaboratively.

SAFER Real-Time® Features:

- An array of specialized modeling algorithms for handling fire, explosion, complex terrain, and many other unique modeling situations
- The patented Advanced Back Calculation™ (ABC) model for estimating the release rate of an event
- An expansive chemical library of over 500 chemicals
- GIS data for mapping the projected impact of an event
- Simple to read and understand event visualizations
- Available modules for determining the source area of a release and for analyzing the products of combustion in a chemical fire
- A broad array of useful reports

Process Event Information from a Wide Variety of Sources

SAFER Real-Time® can process information from a variety of meteorological data sources (fixed and portable stations and internet-based weather data feeds) and specialized gas detection equipment (fixed, portable, wireless/GPS enabled, and open path) enabling critical event data to be gathered, integrated and applied quickly.

View Plumes and Impact Area on Google Earth

The system can utilize internet-based terrain mapping to render geocoded graphical plume models using Google Maps software and export the models to Google Earth as a Keyhole Markup Language (.kml) file for display on any computer running Google Earth.

OPC Linkage for Data Communication with DCS Systems

The system’s OPC linkage facilitates data communication between the SAFER Real-Time system and the distributed control systems (DCSs) at the heart of most manufacturing processes today, providing SAFER Real-Time® users with access to the real-time plant data needed for effective detection, analysis and response.

A Global Customer Base

SAFER Systems’ customers include global Fortune 500 chemical and oil companies, railroads, Hazmat/First Response teams, government agencies, and more. SAFER Systems is headquartered in Camarillo, California, USA, and maintains offices worldwide. For more information, visit www.safersystemv10.com.
RAELink 3

The RAELink 3 Wireless Modem is a key building block of the AreaRAE Wireless Platform. It is built into the AreaRAE monitor and is used in a stand-alone configuration with the ProRAE Remote Base Station, RAE Systems portable monitors and a wide variety of third-party products.

It allows real-time data transmission between the monitors and the base station, which can be located up to two miles away. Each ProRAE Remote Base Station can communicate with and display data from up to 32 remote monitors.

The AreaRAE Wireless Platform integrates information from a wide variety of sensors and monitors, including the following:

- RAE Systems AreaRAE and AreaRAE Gamma Monitors
- RAE Systems wireless portable monitors
- Coastal Environmental Systems WEATHERPAK® portable weather station
- A wide variety of third-party products for chemical weapons detection and other applications

ProRAE Remote Host Package

ProRAE Remote is the PC based software that provides a simple Windows user interface that integrates the outputs of up to 32 remote AreaRAE monitors into user-friendly displays. It also facilitates real-time, two-way wireless communication between AreaRAE and a base controller:

- Continuously displays sensor data from up to 32 AreaRAE units
- Shows alarm status when necessary with a single red light/green light display
- Can send alarms to cell phones and pagers
- Can communicate back to the remote sensor with text messages
- With GPS option, displays location of individual remote monitors on a geographic map

The RF modem allows real-time data transmissions with a base controller located up to two miles away from the AreaRAE detector. A personal computer can be used as the base station for an AreaRAE system. The standard ProRAE Remote software used to control AreaRAE systems is capable of monitoring the input of up to 32 remotely located monitors.
HAZ-SCANNER Wireless Environmental Perimeter Air Station

The portable HAZ-SCANNER™ EPAS wireless environmental perimeter air station is easily deployed as an ambient air quality monitor to scan, measure, and document critical EPA criteria pollutants including nitrogen dioxide, sulfur dioxide, ozone, carbon dioxide, particulates, VOCs, and more. The EPAS provides direct readings in real time with datalogging capabilities. Contact a CCI product specialist to build your own EPAS including up to 14 simultaneous critical air measurements in one battery-operated instrument.

Features:

- **Build your own station with up to 14 simultaneous air measurements including U.S. EPA criteria air pollutants**
  - Standard configuration measures PM10 or TSP particulates, VOCs (PID), wind speed and direction, temperature, and relative humidity
  - Add one or all optional plug and play sensors (up to 4) and/or EPAS-specific meters (up to 4) as listed below - Choose from additional toxic gas (including hydrocarbons and methane) and biological/chemical agent sensors and EPAS-specific meters for solar irradiance/UV or IR, barometric pressure, sound/noise, atomic radiation, ELF radiation, and rain
  - Available analog input port for alternative meter
  - Interchangeable size-selective impactors are available for PM1.0, PM2.5, or PM4.0 (close approximation of respirable)

- **Real-time readings, datalogging capabilities**
  - Optional wireless data transmission up to 10 miles
  - Optional ethernet internet connection for 24/7 data reporting

- **Easily portable and deployable**
- **Battery operated**
- **Network up to 8 EPAS to one central PC or Mac**
- **Easy-to-use graph and reporting software compatible with PC and Mac**

**Performance Profile**

<table>
<thead>
<tr>
<th>Particulates (EPAS Sensor)</th>
<th>Particle Size Range</th>
<th>Particle Size Measurement</th>
<th>Volatile Organic Compounds (VOCs) (EPAS Sensor)</th>
<th>PID (10.6 eV)</th>
<th>Carbon Dioxide (EPAS Sensor)</th>
<th>NDIR</th>
<th>Toxic Gases (Electrochemical) (EPAS Sensors)</th>
<th>CO-Carbon Monoxide</th>
<th>CH4-Methane</th>
<th>Hydrocarbons</th>
<th>NO2-Nitrogen Dioxide</th>
<th>SO2-Sulfur Dioxide</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM10 or TSP particulates, VOCs (PID), wind speed and direction, temperature, and relative humidity</td>
<td>0.1 to 100 µm</td>
<td>1 µm, 2.5 µm, or 4.0 µm (optional), 10 µm or TSP (standard)</td>
<td>0 to 100 ppm (standard)</td>
<td>0 to 100 ppm (optional)</td>
<td>0 to 100 ppm (optional)</td>
<td>0 to 5000 ppb (0 to 5 ppm) (optional)</td>
<td>0 to 100 ppm (optional)</td>
<td>0 to 100% Vol. (optional)</td>
<td>0 to 10% Vol. (optional)</td>
<td>0 to 50 ppm (optional - specify gas type when ordering)</td>
<td>0 to 5000 ppb (0 to 5 ppm) (optional)</td>
<td>0 to 5000 ppb (0 to 5 ppm) (optional)</td>
</tr>
</tbody>
</table>

**Other Parameters (EPAS Meters)**

- **O2-Oxygen** 0 to 50% Vol. (optional)
- **O3-Ozone** 0 to 150 ppb (0 to 0.150 ppm), 0 to 500 ppb (0 to 0.5 ppm) (optional)

**Sound and Noise** 30 to 135 decibels (dB) (optional)

- **Rain Gauge heated, tipping bucket** 0 to 5 inches (optional)
- **Temperature** -4 to 140 F (-20 to 60 C) (standard)
- **Relative Humidity (RH)** 0 to 100% (standard)
- **Solar Irradiance** 0 to 111 watts per square metre (w/m²) (optional)
- **Atomic Radiation** 1 to 19,999 counts per minute (cpm) or 0.001 to 100 miliRad/hr (optional)
- **ELF Radiation** 1 to 200 milligauss (mG) (optional)
- **Wind Speed/Direction** 0 to 125 mph/5 to 355 degrees (standard)
- **Barometric Pressure** 28 to 31 inches Hg (optional)
- **Dew Point Temperature** -47.2 to 122 F (-20 to 60 C) (optional)
- **Wet Bulb Temperature** 3.2 to 122 F (-16 to 50 C) (optional)