Request for Proposal RFP_2018_3884: Automatic, Remote Gas Detection Technologies for Demanding Environments

RFP Title
Automatic, Remote Gas Detection Technologies for Demanding Environments

Due Date
Jan 31

Opportunity
Licensing, product acquisition, contract research, proof of concept leading to scale-up to manufacturing, joint development, supplier agreement.

Timeline
Phase 1 – Evaluation of proposed technology, early 2019
Phase 2 – Feasibility testing, mid 2019

Financials
A complete and effective sensor technology solution is required for implementation in devices used in up to 100,000 industrial applications annually.

RFP Description
NineSigma, representing a global leader in engineered technologies for the Oil & Gas industry, invites proposals for a gas sensing technology that can detect and quantify leaks of process gas from refining, gas transmission or petrochemical assets. The proposed technology must be able to detect a wide range of gases at a low threshold of detection, and to determine leakage rate. The approach must be robust for use in challenging industrial environments.

Background
The ability to monitor gas emissions from turbomachinery equipment has significant benefits for the refining, gas transmission and petroleum industry. Devices that can detect gas leaks:

- Ensure properly working turbomachinery, thereby preventing leakage of process gas to the atmosphere
- Help customers reduce their environmental footprint by early identification of emissions sources
- Prevent fires and injury resulting from high concentrations of VOC’s
- Reduce the cost of regulatory compliance

The RFP client is seeking technologies and approaches that indicate leaks of process gasses in turbomachinery. Any proposed approach must have the ability to both detect and quantify the leak.

Facilities are generally required to report when leakage rates result in a concentration in the area immediately surrounding the equipment above 10,000 ppm. Many sites voluntarily track when concentrations are above 250ppm. The client would like to find an approach that allows for a minimum detection threshold of 0.5 ppm. Based on current technologies, an accuracy of +/- 25% is considered possible.

Key Success Criteria
A successful solution will:

- Detect from a variety of vapor phase hydrocarbon and other gases (See attachment for a list of gases)
- Detect at a low threshold limit, preferably 0.5 ppm. It is acceptable if the technology requires to sample or concentrate a specific volume of the gas.
- Be an automated mechanism, i.e. does not require a person to perform sampling and testing. Ideally, the sampling will occur continuously or at regular intervals such as every 1 to 10 minutes and be able to direct the sensing point up to 4 feet away from the mounting point of the device.
- Be applicable to a remote monitoring system
- System must interface with a standard edge gateway, using a common interface such as 4-20mA, HART, WiHART, Bluetooth, Zigbee, Ethernet, etc.

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Operate within a challenging industrial environment and in harsh operating conditions:

- Maximum ambient temperature: minimum of 45°C, objective of 60°C.
- Minimum ambient temperature: minimum of -25°C, objective of -40°C.
- Maximum relative humidity: minimum of 90%, objective of 95%.
- Minimum relative humidity: minimum of 10% non-condensing, objective of 5% non-condensing.
- Operate in explosive atmospheres (ATEX Zone 2) and hazardous locations (NEC Class 1 Division 2). EPA Method 21 requires that devices used for measurement are certified to Zone 1 or Class 1 Division 1.
- To facilitate installation in the field, enclosure volume should ideally be less than 15 inches x 15 inches x 6 inches.
- Power requirements:
  - 100 V AC to 240 V AC, 45 Hz to 65 Hz
  - 24 V DC
- Battery operated with a battery life of 2 years at minimum sampling frequency of once every 30 minutes.
- Ideally, a complete approach will be able to detect from a wide range of vapor phase gasses, determine concentration of gas in the surrounding area of the leak, and **quantify the flow rate** of the leaked gas.
- Be ultimately able to meet a per unit price point feasible for widespread use in the field. The client's objective is for a device less than $1000/unit, and ideally closer to $500/unit.
- The system must be able to recover from exposure to high concentrations of gases, such as 50,000 ppm or more.

The sensing element should have a predictable service life and the system should be able to monitor the health of the sensing element.

**Area of Interest**

- Environmental Sciences > Oil, Gas, and Energy
- Atmospheric Sciences > Physics > Remote Sensing
- Engineering-Electrical > Sensors Engineering
- Engineering-Electrical > Sensors > Gas Sensors

**Possible Approaches**

Possible approaches might include, but are not limited to:

- Visual inspection devices such as infrared camera technologies, advanced optics and spectral devices
- Laser-based or light scattering approaches
- Electronic nose (e-Nose) sensing technologies and innovations
- Other in-process detection and sensing mechanisms from adjacent industries

**Approaches not of Interest**

The following approaches are not of interest:

- Approaches that cannot meet the basic specifications for operation in the field, under the environmental conditions listed in this RFP
- Commercially available devices currently used in the field that don’t improve upon any of the properties desired by the client in a completely formed solution

**Preferred Collaboration Types**

- Contract Analysis and Testing
- Contract Research
- Consulting
- Joint Development
- Technology Licensing
- Supply Agreement
- Technology Acquisition
- Research Collaboration
- To Be Negotiated

**Items to be Submitted**

Your response should address the following:

- Non-confidential description of proposed technology and working principle
• Please note the limitations of your proposed approach against the specifications listed in this RFP
• Availability of technical data
• Technical maturity of the approach (concept, reduced to practice, prototype, ready to commercialize, ready to implement, commercialized)
• Describe the durability of the approach/device in the industrial environment, including life expectancy, maintenance considerations, etc.
• Description of performance in the operating conditions listed in this RFP
• A proposed pathway to commercial scale including timing, estimated budget, and capacity for manufacture
• Position on intellectual property including patent references
• Desired relationship with sponsor
• Team description and related experience

**Award Amount**

**Attachments**

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**Picture**

(Caption: [Image of a person working at an oil rig with a laptop])

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