**Alberta Methane Field Challenge©**

**Application Form**

**Application deadline: 11:59 p.m. MT, March 21st, 2019**

Thank you for your interest in the ***Alberta Methane Field Challenge****.* The aim of this challenge is to assess the real-world performance of new methane sensing technologies in comparison with conventional optical gas imaging-based leak detection surveys. Operators and regulators in Canada are interested in new technologies that can deliver cost-effective methane emission detection/quantification compared to conventional approaches.

The **Alberta Methane Field Challenge** will permit selected technology teams (“participants”) to participate in leak detection surveys at oil and gas facilities in Alberta. These trials will be administered by a scientific team and will take place at selected oil and gas facilities in Alberta. Participants may be invited to participate in multiple field trials. Limited funding up to $20,000 per participant may be available to selected participants.

While we welcome all types of technologies (stationary, mobile, remote, etc.), we want to ensure a good match between our field capabilities and sensor abilities so that all parties involved can derive maximum benefit from this study. In this spirit, we ask that you answer the following questions with as much detail as is possible without divulging sensitive information.

We look forward to reviewing your application.

By submitting this document with my typed name below, I acknowledge that it contains no confidential business information and that the “project team” consisting of members from Petroleum Technology Alliance Canada (PTAC), Alberta Energy Regulator, Harrisburg University, University of Calgary, and select independent experts will review it.

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Typed Name

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Position

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Organization

**General Instructions:**

1. Please submit the application as an MS Word or PDF file. Attachments, if any, should be added to the end of the application form. The application form and attachments may not exceed 10 pages and 5 MB in size.
2. All four parts of the application are required. Answer as thoroughly as you can to help the selection committee in selecting applicants.
3. Do not disclose proprietary or confidential business information in this application form. If you cannot answer any of the questions on this application because of confidentiality, simply mention this as part of the answer.
4. Note that if selected to participate in the *Alberta Methane Field Challenge*, the name of your company and your performance in the study will be publicly released through reports and/or peer-reviewed publications. No confidential information will be released to the public.
5. Submit your applications to albertamethanefieldchallenge@ptac.org.

**Contact Information:**

For technical or scientific questions about the *Alberta Methane Field Challenge*, please contact Arvind Ravikumar at aravikumar@harrisburgu.edu

**Funding Information:**

1. Limited funding up to $20,000 per participant may be available to selected participants. The project team will be in touch after the selection process has been completed.

**Important Dates:**

Applications Due: **11:59 p.m. MT, March 21st, 2019**

Selection committee decisions sent to applicants: **April 22nd, 2019**

**Part 1: General Information**

1. Please provide contact information of the person responsible for this project application. Please include name, position/title, contact number, and email address.
2. Please provide contact information for a contact on the **technical/scientific development team** for your technology (if different from above). Include name, position/title, contact number, and email address.
3. If selected, you will be required to transport your technology to the field site in Alberta. In that scenario, how many personnel would be involved?
4. If selected, how quickly can you mobilize your technology and team to a field trial site in Alberta?
5. Do you have all required certifications to operate your technology at an oil and gas facility in Alberta, Canada? Please list applicable and up-to-date certifications.
6. Please provide as attachments the applicant’s resume(s) (maximum 2 pages each), including relevant experience, and publications, etc.
7. Please comment on the stage of development for your technology. Choose one: (1) research and development, (2) testing and prototype stage, or (3) available in the market. Elaborate if your technology does not strictly fall under any of these categories.
8. If you anticipate being on the market with your technology (either as a technology supplier or a service provider), please provide an estimated time when it will be available. (e.g., Q4 2019).

**Part 2: Technology Specifications**

1. Does your technology use a methane-only sensor or a multi-gas sensing system? If so, please explain what other co-emitted species are measured.
2. Describe the deployment platform for the sensor (e.g., vehicle-, drone-, aircraft-mounted, fixed in-situ monitors, hand-held, satellite, etc.)
3. Does the sensor require line-of-sight access to the leak source to detect a methane plume?
4. For fixed or in-situ continuous monitoring technologies, how often do you need manual intervention? How is data collected from the sensor?
5. For non-continuous monitoring technologies (mobile or stationary), what is the average time to complete measurements for (a) a small battery (50 x 50 m), (b) a large gas processing plant. What are these estimates based on? Note that measurements include detecting, locating, and quantifying a leak.
6. Describe the type of measurement (e.g., single point, continuous, fixed-rate, variable-rate, etc.) and temporal resolution of your data. If you collect data periodically, please specify frequency.
7. What is the spatial resolution (component-level, equipment-level, facility-level, basin-level) of your sensor/technology?
8. If your technology does not identify leak locations that would assist with repair operations, how do you propose operators use your data?
9. Describe briefly the physical mechanism underlying your sensor (e.g., hyperspectral infrared imaging, cavity ring-down absorption spectroscopy, etc.). Please be specific.
10. What is the sensor’s absolute minimum and maximum detection limits (please specify in flow rates: g/h, scfh, m3/h)? At what distances and meteorological conditions have these been tested? Please also specify native detection limits (in ppm or ppb, or other suitable units).
11. What is the dynamic range of your sensor? [Note: this is different from absolute maximum limits. Dynamic range refers to the minimum and maximum limits of your sensor in a specific setting/configuration].
12. What is the precision of the sensor? Describe how the precision was determined.
13. What output data are generated (i.e., ambient concertation enhancement, volumetric or mass emissions rate)?
14. In order to estimate emission magnitude, do you need to collect other relevant parameters like wind speed, temperature, radiance, line pressure, etc. If so, please specify the parameters and how you collect these data.
15. How frequently do you have to calibrate the system? Do/Can you perform calibration measurements on-site? If not, please specify how your system is calibrated.
16. When will output data from your technology be available to operators? If non-instantaneous reporting, how much additional time is required after field trials for data processing and quality assurance before a final report is provided?
17. What are the power requirements for the technology in the field? Please specify how you plan to supply power to your system during the field test.
18. Can your technology distinguish between leaks (unintentional releases) and vents (intentional releases)? If yes, briefly explain how.
19. Describe any operating limits (known or suspected) of your technology for the following variables:
	1. Air temperature:
	2. Humidity:
	3. Wind speed and direction:
	4. Land cover (vegetation type, bare ground, water):
	5. Sunlight:
	6. Aerosols (smoke, dust):
	7. Cloud cover:
	8. Snow cover:
	9. Other atmospheric/surface conditions:

**Part 3: Controlled Testing and Calibration**

**Note:** *Participants will be required to provide evidence of controlled-release calibration experiments conducted by an independent third-party at test sites in the US or Canada. This evidence will be used by the project team to decide if the technology has sufficient and reliable test-data to proceed directly to field trials. If the project team decides that more controlled-release tests are needed, participants will be required to either (a) provide controlled-release test data collected independent of this challenge, or (b) participate in controlled-tests conducted by the* ***Alberta Methane Field Challenge*** *project team.*

1. Have you participated in independently-run, single-blind, controlled release experiments in the past? Please specify dates when these experiments were conducted. Examples include the ARPA-E MONITOR program, EDF Methane Detectors Challenge, Stanford/EDF Mobile Monitoring Challenge or other similar tests.
2. If you answered yes to Q1 above, please provide a link to the test results for review by the selection team. Attached reports are acceptable if results are not available online.
3. If you answered no to Q1 above, are there any plans to participate in independent controlled-release tests between now and September 2019? If yes, please provide details.
4. Have you conducted field trials with any operator in the US or Canada? If yes, please provide details of the general location (state/province and geologic basin), facility type, and season/time of testing. Are the results publicly available? If not, could you provide the name of the operator you tested with?

**Part 4: Commercial Viability**

1. What is the fundamental goal and the value created by your solution?
2. Describe the deployment method(s) of your technology in leak detection and repair programs.
3. How might your solution compare to more established approaches for detecting fugitive methane emissions, such as handheld, on-site deployment of optical gas imaging cameras? What are key points of differentiation?
4. How do you consider tradeoffs between parameters of detection sensitivity, monitoring frequency, and monitoring cost, in the context of seeking solutions that provide equal or greater environmental benefit to established approaches?
5. Is your marketing strategy a technology-as-product or technology-as-service type system?
6. Are you using commercially available sensors/sensor-parts for your system?
7. If someone were to purchase your technology or service today, what would it cost? (Please explain any relevant metrics or assumptions, e.g., cost to survey 1000 wells across 100 sq. km. If you are using a technology-as-service type strategy, use any relevant metric)
8. If your technology were mass-produced, what is your estimate of what it would cost to build: 100 units? 10,000 units? Please provide rationale and identify costs excluded from your estimate.
9. What stage(s) and/or facility type(s) in the natural gas supply chain are the prime candidate(s) for your solution?
10. If you have a technology-as-product strategy, what expertise are required to operate? If so, what kind of training requirements will be required of a potential operator?
11. [For academic or other non-business sector applicants]: Do you aspire to seek commercialization for your innovation? What types of path(s) to commercialization are you assessing?