

Rapid Vehicle-based Methane Emissions Mapping System (PoMELO)



Blind Testing at the Methane Emissions Technology Evaluation Center (METEC)



Overview

Testing was recently performed to evaluate the University of Calgary PoMELO vehicle system for detecting and mapping emissions sources at METEC. PoMELO detected nearly all tested emissions rates through 105 mock upstream pad experiments, spread over 5 days.

A [new report](#)¹ is now available with test details.

PoMELO Padmapper is a technology developed at the University of Calgary to rapidly identify emitting equipment for regulatory Leak Detection and Repair (LDAR) applications. The system consists of a vehicle-based, roof-mounted multi-sensor package, coupled with advanced analytics. Detected emissions can then be immediately surveyed with a close-range method such as OGI and queued for repair. This '**one visit model**' allows anomalous emissions to be resolved faster, limits follow-up callouts (and associated costs), helps resolve venting ambiguity, and importantly: **PoMELO reduces time-consuming OGI surveys of equipment that is not emitting.**

PoMELO Padmapper is presently undergoing commercialization with Innovate Calgary, the University of Calgary technology transfer and commercialization organization. We are seeking action-focused organizations to roll this made-in-Alberta technology out in domestic and international markets in 2020.

Single-blind testing at METEC

METEC is a dedicated upstream oil and gas LDAR technology testing facility at Colorado State University. Precisely metered emissions points are expertly hidden in real oil and gas equipment installed in a mock facility. Participants arrive blind and report what their technology can find. Results are compared with the real answers after all tests are run. Mock pads can be run in quick succession, in different conditions, with complete control over emissions. This world-class facility is widely regarded as the global leader for testing LDAR technologies.

We tested PoMELO with mock pads, configured by METEC personnel with 0-6 emissions points, with total pad emissions ranging from 0.0 – 45.9 scfh CH₄ (0.24 g/s, 30.52 m³/day). The University of Calgary PoMELO team quickly surveyed each pad (blind to the pad configuration), and at the end of the week reported all data. Following data reporting, the real answers were shared and analyzed.

Key Results

The PoMELO system detected 98.6% of emitting equipment groups, correctly flagging the equipment for follow-up. Survey times per pad had an average of 5.68 minutes.

The absolute minimum emissions rate detected was 0.3 scfh CH₄ (0.0016 g/s, 0.2 m³/day). These results suggest few equipment emissions would be missed in real applications. The functional minimum detection limit of the PoMELO system is likely lower than METEC can meter.

On the efficiency gains possible, 83.3% of clean equipment groups were mapped as clean. In practice, the PoMELO system would allow LDAR workers to skip these areas, unlocking cost savings by reducing unnecessary OGI.

Analyzing the data at the finer spatial scale of individual equipment units helpfully constrains where future improvements in algorithms may expose further efficiency gains. Please refer to the full report for all results¹.

Implications for Alberta commercial deployment

Given that few emissions points were missed, and the range of emissions rates was very low relative to many upstream pads – we believe the most viable approach is to perform LDAR with regulator-mandated frequencies (e.g., 1-3x / yr) – but do so more efficiently with the hybrid PoMELO / OGI system.

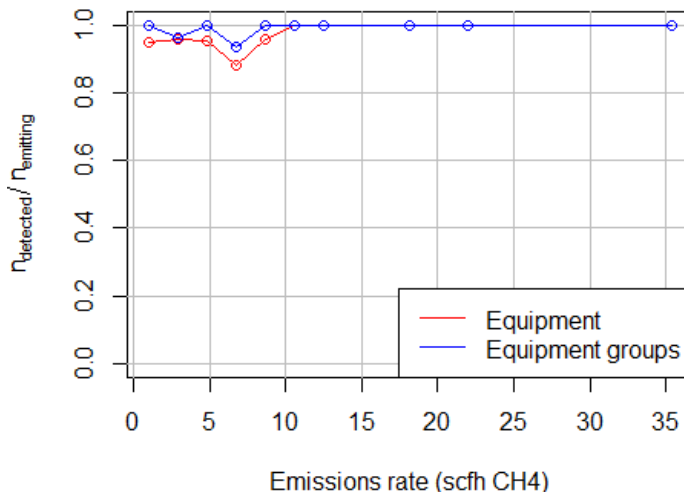
This approach would result in near equivalent emissions reductions compared to regular OGI-only surveys – and could be implemented with minimal modeling or complicated multi-visit, multi-technology efficiency schemes. We believe this simple approach is a defensible, robust, and effective method to deploy alternative LDAR technologies in a focused and reliable manner.

Want to learn more?

Thomas Barchyn
Chris Hugenholtz
Jelena Matic

University of Calgary
University of Calgary
Innovate Calgary

tbarchyn@ucalgary.ca
chhugenh@ucalgary.ca
jmatic@innovatecalgary.com



Above: Proportion of detected emissions (y-axis) binned across a range of emissions rates. Detection frequency was ~100% across all rates tested.

¹ Barchyn TE, Hugenholtz CH, 2020. University of Calgary Rapid Vehicle-based Methane Emissions Mapping System (PoMELO) Single-Blind Testing Results from the Methane Emissions Technology Evaluation Center (METEC). Harvard Dataverse. DOI: <https://doi.org/10.7910/DVN/BUT8GA>.