



Characterization of Low-Cost Methane Sensors for Outdoor Use

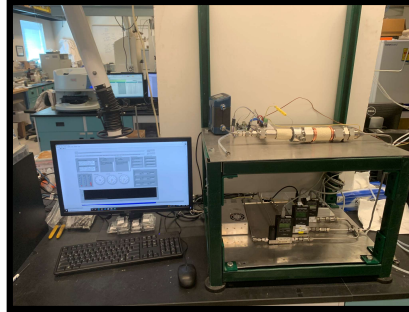
Neal Sullivan, Jayoon Yang, Johnathan Evans



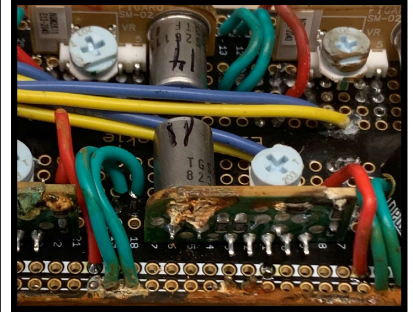
Objectives with FIGARO's TGS2611-E00 low-cost methane sensors.

- Construct a system for testing sensors.
 - Create an isolated testing chamber outfitted with gas flow of CH₄, O₂, and N₂.
 - Wire together a test chamber core of 16 sensors to test many sensors at a time.
 - Create a data acquisition system to measure and document voltages, humidity and temperature.
 - Automate experiments with scripted tests.
- Characterize sensors
 - Analyze data to understand sensor behavior in response to changes in:
 - CH₄ concentration.
 - Temperature.
 - Humidity.
 - Report errors and damages to sensors to better understand limits.
 - Explore miscellaneous scenarios that may affect sensor behavior.

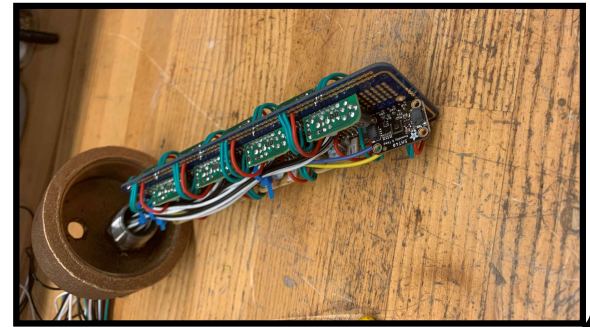
First Test Stand



Corrosion from Humidity Affecting Sensor Performance

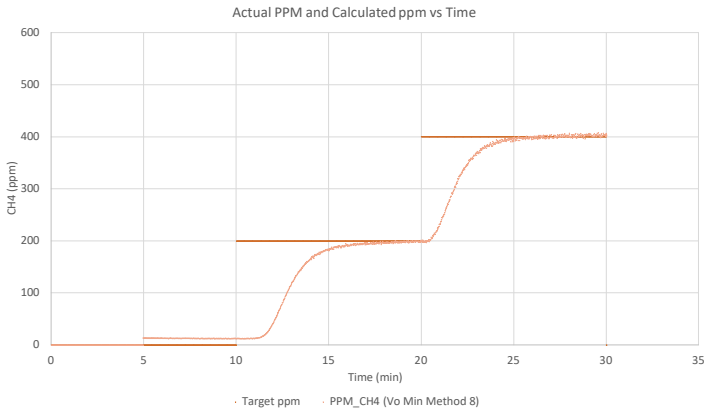


16-Sensor Insert for Mass Data Collection

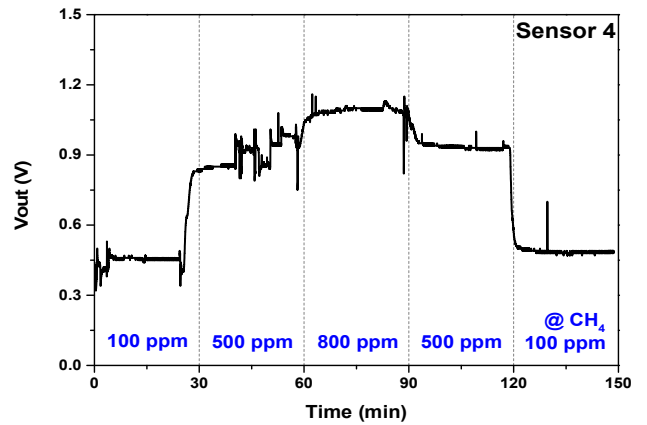


Characteristic results

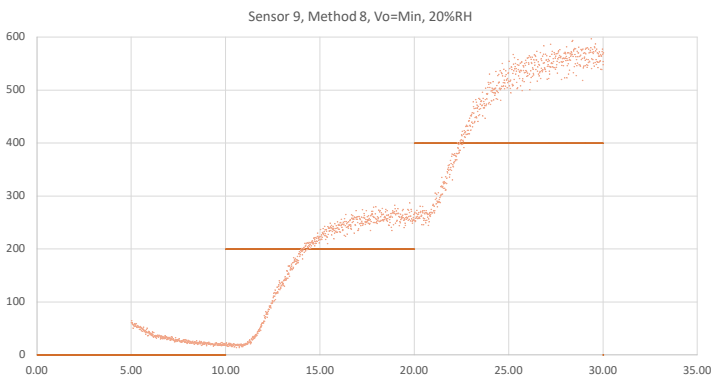
Predicting ppm_{CH₄} can be very accurate but due to sensor variability, current equations must be calibrated to each sensor.



Observing Sensor Repeatability at Low Concentrations



Same equation from above on a different sensor.



Observing Sensor Behavior During Provider's Recommended Burnin Time

