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Methane emissions from oil and gas (O&G) operations have been found to be one of the major factors contributing to greenhouse gas emissions around the world. As a result, it is important that we carry out the quantification and modelling of O&G leaks and emissions to predict, measure,

monitor, and make the release of methane less severe, wherever and whenever necessary. Over the years, The Colorado State University's Methane Emission Technology Evaluation Center aims to mitigate methane emission in various ways, one of which includes my current project on the use of a mobile emission device (controlled release rig) intended to perform controlled testing to evaluate the performance of an in-situ methane detection system. In addition, the system involves measuring and generating emission metrics, flow rates, pressures, mass flow readings, and other associated readings to validate the efficiency of the leak detection and quantification solution providers' technologies that measures continuous monitoring of methane emission or pipeline quality natural gas.

The measurements involve the supply of gas (methane or other natural gas) to the inlet and metering through critical orifices. The fluid components upstream of the orifices are rated up to 3600 psig, while the mass flow meter is rated at 100 psig, protected by a pressure relief valve to open at 60 psig. Thus, the choked flow measured by a mass flow meter is delivered to the desired release point through flexible tubing attached to the outlet, which should always be connected to an open-ended line venting to the atmosphere. The CRR device has five outlet points, which means it can measure five emission points simultaneously. Furthermore, the project also involves the use of a logger and the development of a dash app website. The dash app serves as the interface to control and monitor the behavior of the gas and the CRR. The logger, written in a Sqlalchemy environment, collects data and stores it in the database at every time interval (5 minutes). Hence, the control release rig intends to aid the testing capabilities of the emission detection system by creating a constant emission rate to validate leak detection and quantification solution providers technologies.

RESEARCH PROGRESS

My research is currently at the validation stage. The control release rig (CRR) and the website have been completely developed. I am assessing the dash app's ability to effectively manipulate and regulate the essential control parameters of the controlled release rig. Our focus extends to understanding how the collection and storage of pertinent data generated during rig operations are evaluated. This evaluation is crucial for ensuring the optimal performance and reliability of our controlled release rig, and we are committed to thoroughly documenting our findings. In the event that we identify any areas for improvement or encounter noteworthy observations, we will implement and communicate these promptly to ensure the continuous enhancement of the system.

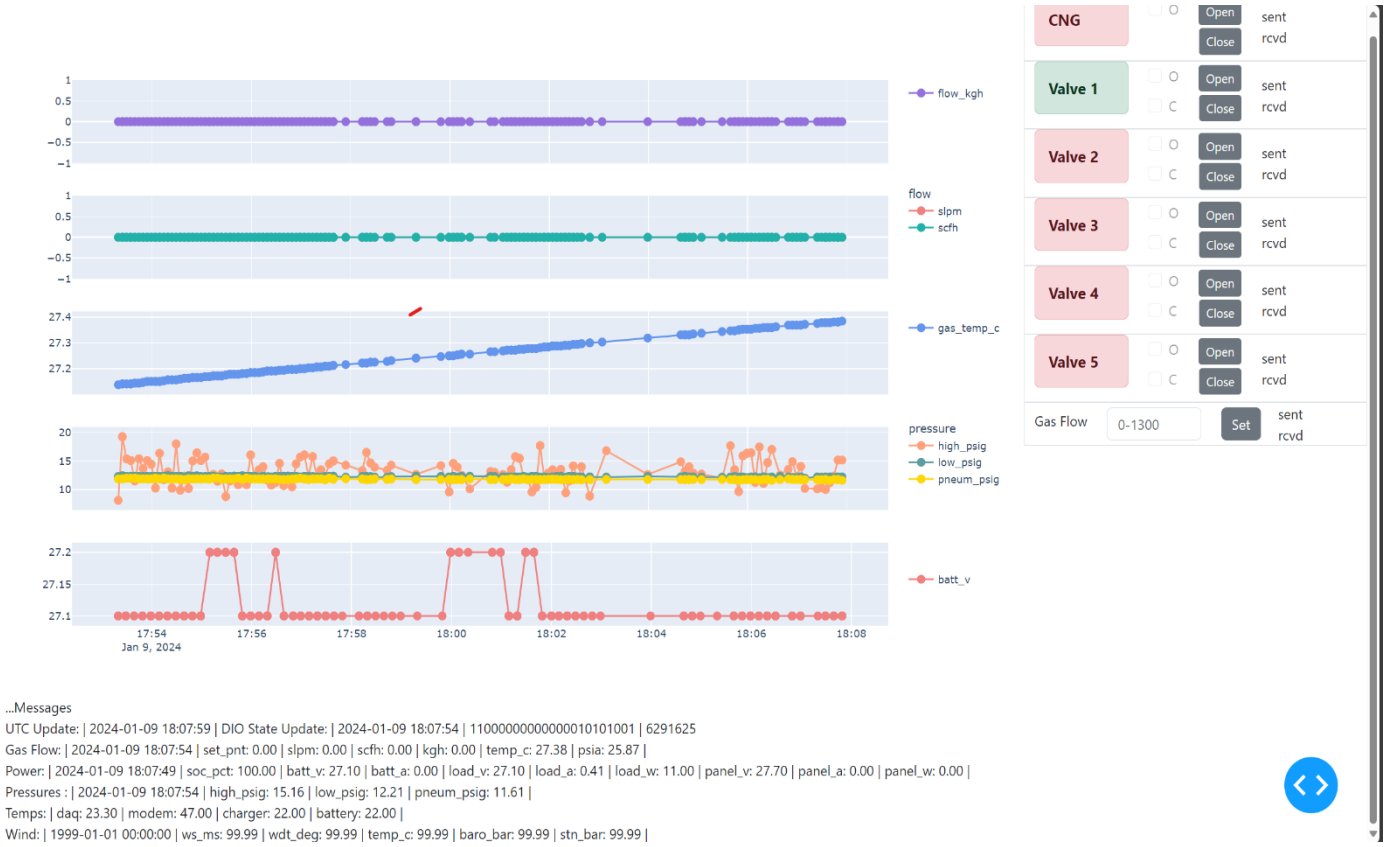

Figure2: Dash App interface

Research Plans

1. Validate the Dash App with the CRR behavior and fix code if there is any discrepancy.
2. Determine area of improvement in the system.
3. Validate the control release rig data with the data from solution provider.
4. Drafting a test plan for the control release rig.

Publication

No publication yet

References

No citation