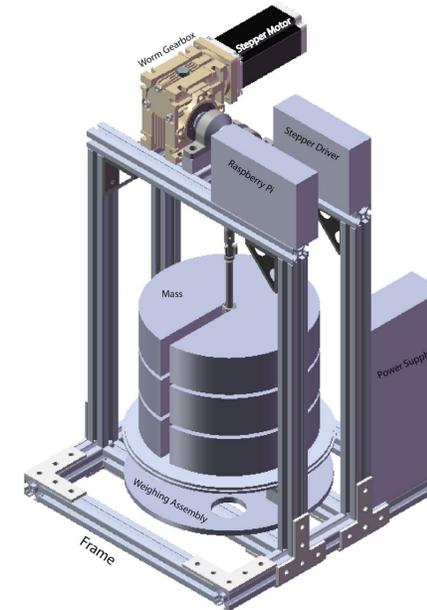


# Calibration Station

## Project Description

- Automate the calibration process of Apogee Instruments' new precipitation gauge weighing assembly.
- Requirements and Constraints:
  - Apply calibration mass total of 30 kg
  - Place and remove 10 kg at a time
  - Perform the calibration measurements
  - Automated Process

## Design Description



- A mechanical winch, driven by a stepper motor and controlled by a raspberry pi, raises and lowers a mass addition system on a linear rod.
- The mass addition system adds and removes mass incrementally onto the weighing assembly being calibrated.
- The design is compact to facilitate multiple units being joined together or enclosed in a larger unit.

## Performance Review

- The disengagement of masses from the linear rod as mass was added to the weighing assembly was examined to ensure no additional force was induced.
- The disengagement of the linear rod was inconsistent and frequently caused additional mass to be detected during measurement.
- Additional testing was planned to determine the accuracy of the calibration, but was not performed as the motion system prevented accurate mass addition.

## Conclusion

- In initial design, a different mass addition system was proposed and later changed to the current design for ease of manufacture. The design changes caused unforeseen complications and delays which resulted in missed performance targets and deadlines.
- **Lessons Learned: What did you learn from doing the project?** A lot can change between concept development and actually production. Many things can come up that require adaptation that we couldn't have planned for.
- **Recommended Future Work: Where should your design go from here?**
  - Re-examine methods for accurate mass addition to ensure accurate calibration.
  - Build multiple of new design
  - Place in climate controlled enclosure for temperature calibration