

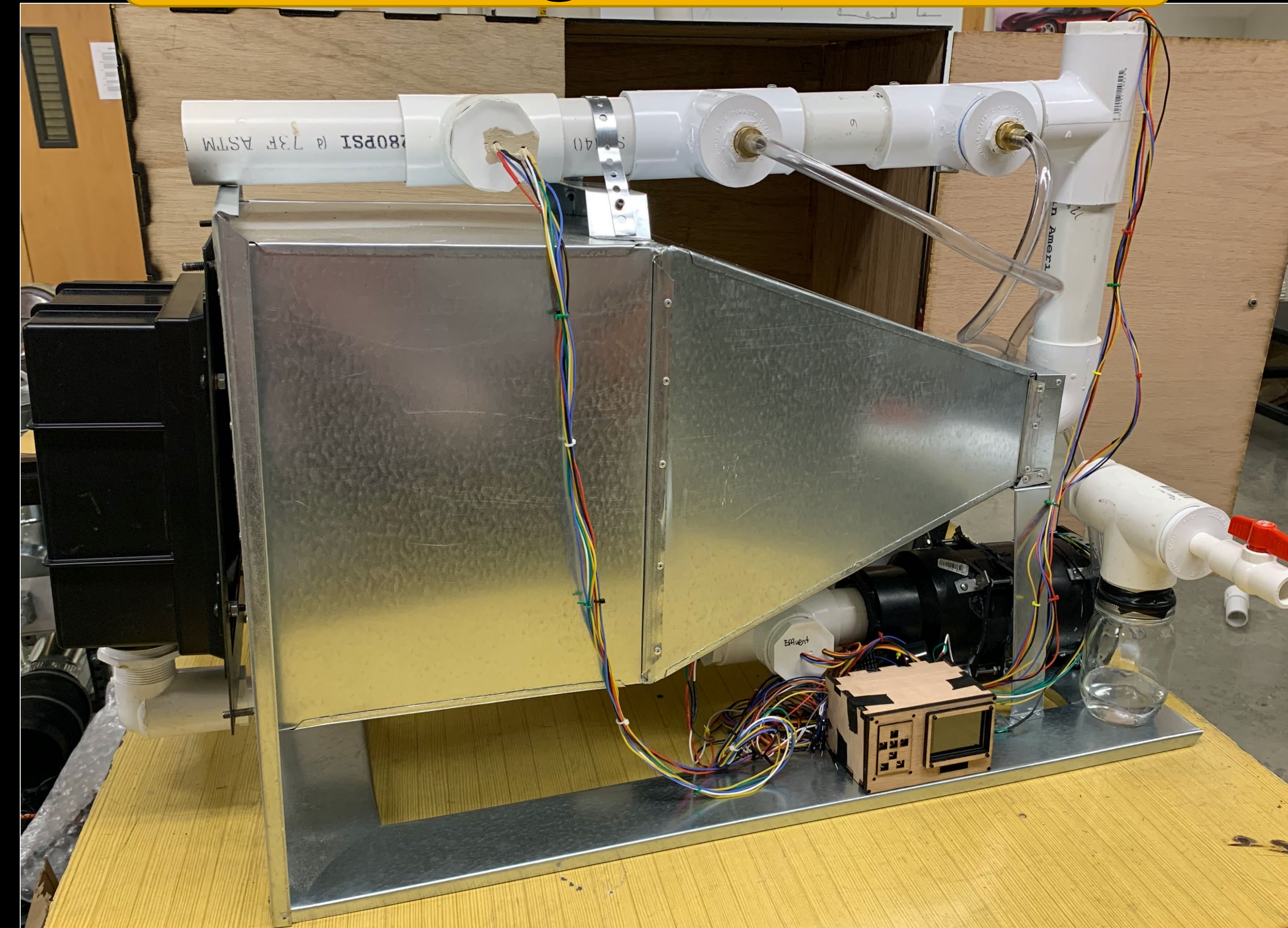
Objective

Design, build, and test a robust gas phase contaminants filtration system that will monitor filter saturation and performance.

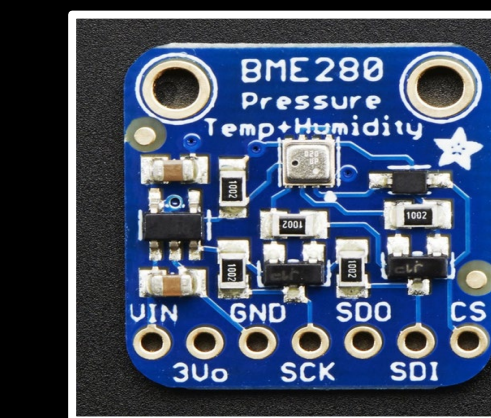
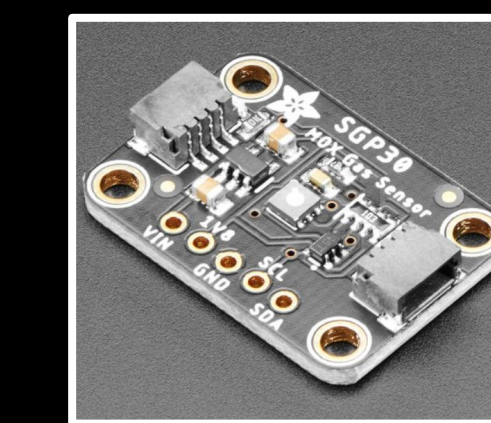
Value Proposition

Hyster –Yale is beginning to use fuel cells in their forklifts. Fuel cells exist as an alternative, cleaner power source option, but they tend to be delicate. To prevent the fuel cell from being damaged, filters are needed to keep the fuel cell protected. Our team's design will make testing these filters more efficient and cost effective.

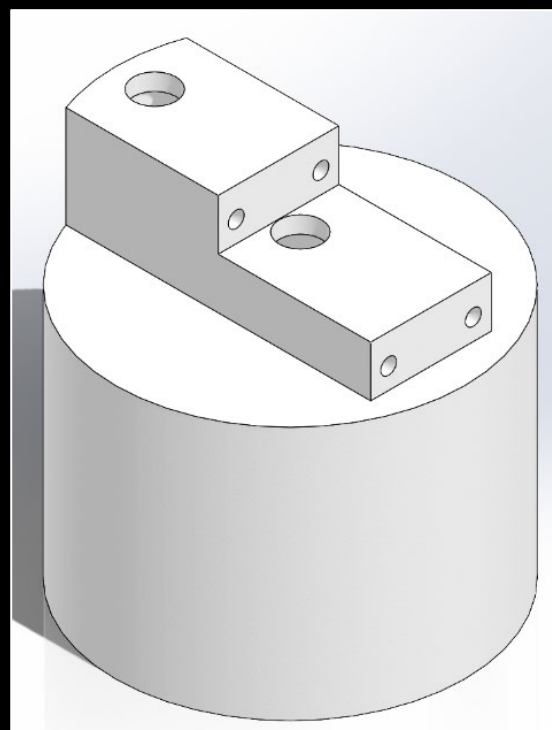
Final Design of Test Stand



Sensors

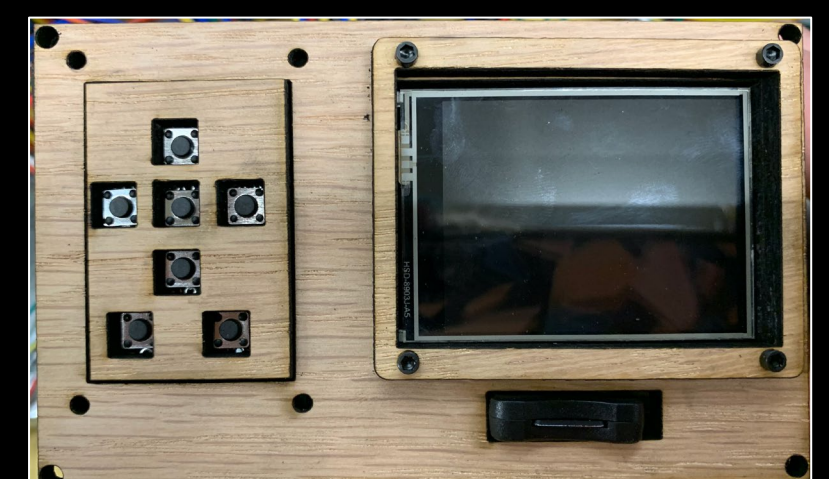


BME680 and SGP30 air quality sensors are mounted properly in place to measure gas phase contaminants for ambient, influent, and effluent conditions.

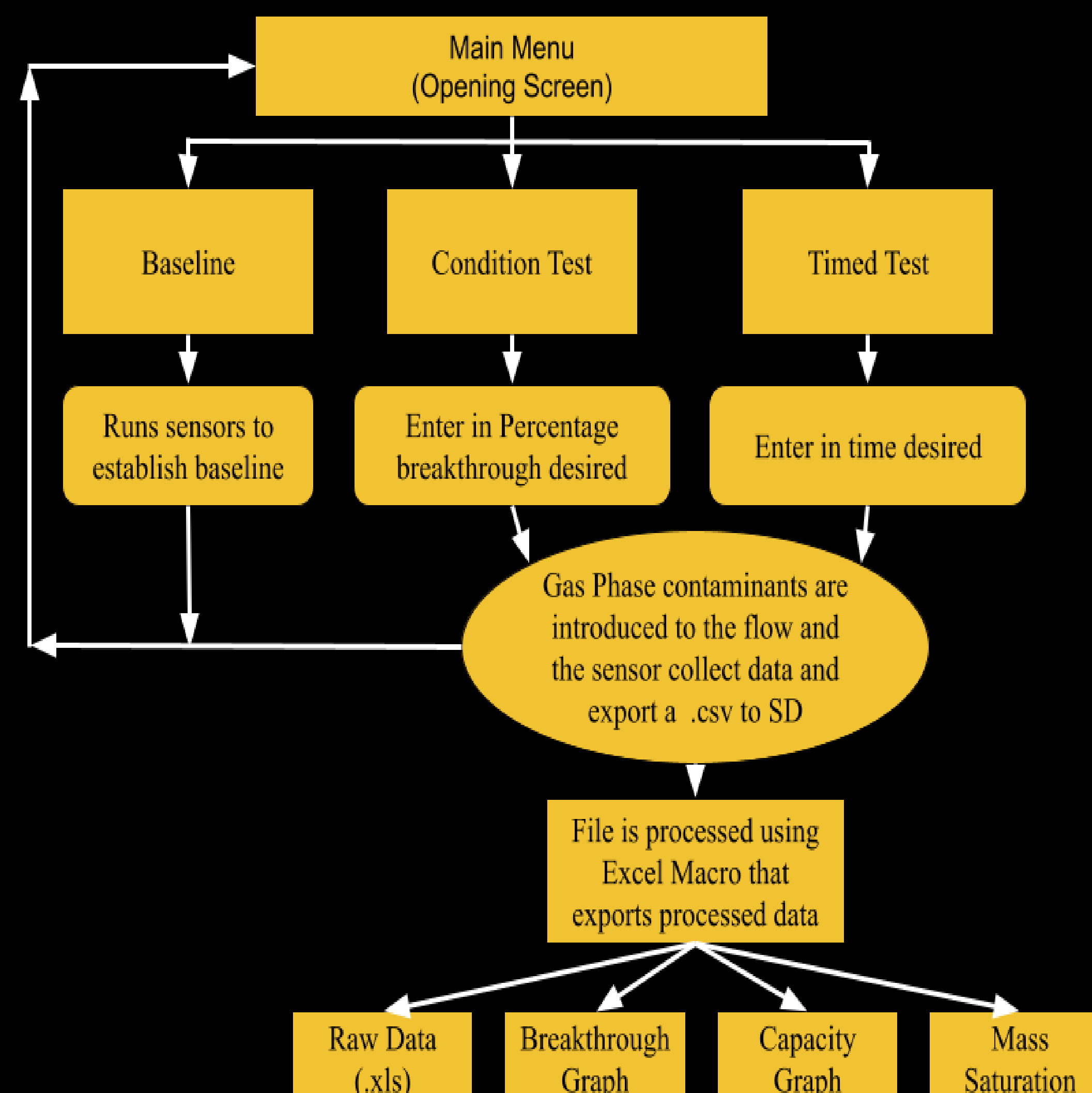


Electronic Components

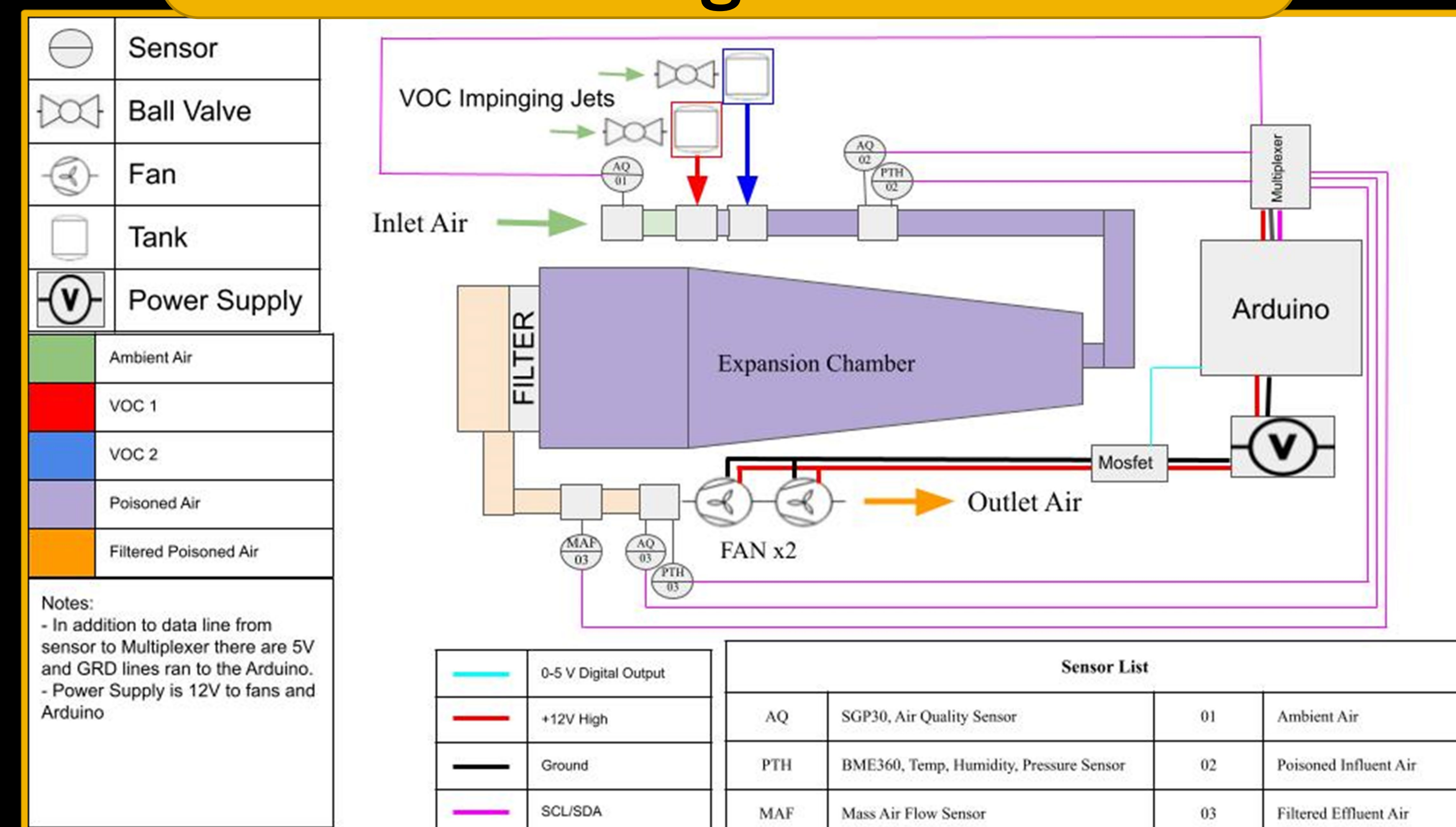
Sensors, GUI, fan, and MAF sensor are programmed using an Arduino and powered with 24V power source.



Process Description

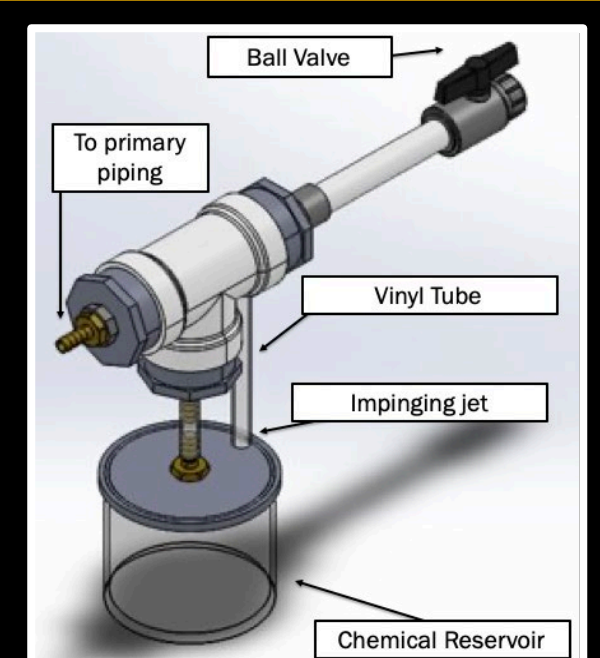


Piping and Instrumentation Diagram



Impinging Gas System

Two impinging gas modules use quasi – passive evaporation into the influent airstream.



Enclosure

Laser cut wood panels to encase stand for safer testing and keep components safe.



Acknowledgments:
Dr. Swenson, John Robey, Ammon Markstaller, Kirk McKenzie