Bechtel Plant Machinery, Inc. Gas Mitigation Project

Overview
Our design team constructed a gas mitigation system capable of automatic gas level acquisition and appropriate gas ignition. The design was thoroughly researched and tested to demonstrate the uniqueness and functionality of our design.

Objectives
Our design team was expected to design an explosive gas mitigation system. We were limited to a $1000 budget so we had to make decisions to use parts that may or may not fit into BPMI’s specifications for the system. BPMI needs a system with a military grade parts. Our objective was to create both a conceptual design and a prototype design that demonstrated the system’s functionality while staying within the budget.

Approach
- Thorough review and questioning of BPMI’s project specifications
- Initial design conversation and sketches
- Weekly meetings with sponsor BPMI engineers
- Material and part research to meet system demands
- Reviewed current patents and existing systems to confirm that our design was unique
- Development of Solidworks, mechanical, and electrical schematics
- Multisim and Solidworks simulations
- Ordered parts for prototype based on design decisions
- Fabrication of both GMS and GMCP separately
- Tested fabricated system at ARL facilities
- Results validated a working design but need for small modifications

Outcomes
- This design can be compared and contrasted with a second system that a professional team is working on. It may bring attention to different problems that may have gone unforeseen, which would save time and money for BPMI.
- We found that the gas type is important in the design. In our test we found that propane, heavier than air, actually sank down in the system and would cause a gas reading error when the fan was turned off.
- This project, to the best of our team’s knowledge, is a completely new and unique design.