Automated Scintillator Quality Control Process

Overview
Saint-Gobain desired a device to aid in the flame-sealing required during their quality control process for their scintillators. During the initial testing of materials for these scintillators, it is required that some of the components are vacuum sealed in quartz tubes for testing. Saint-Gobain asked the group to design a structure that would improve the safety of the testing as well as automate the process.

Objectives
- Create a structure that safely contains the oxygen-hydrogen torches and reduces manual interaction with the flames.
- Build the structure with the corrosive environment it will be housed in in mind.
- Automate the design so that the test is easier and safer to run with the same level of control a manual test provides.

Approach
- Due to a scope change early in the design process, needs were established in an on-site meeting with the contacts from Saint-Gobain.
- Concepts were generated looking for methods of achieving the desired base testing requirements.
- The site visit was essential in establishing the needs, beginning concept generation, and understanding the risks that established the primary needs.
- Several CAD models were generated during the process to visualize the final prototype.
- A final physical prototype was manufactured and had its mechanical and electrical components tested as a proof of concept that the design would function.

Outcomes
- The design’s electrical components all operate independently and together so flam-sealing can be done.
- The design is built out of aluminum and coated in polycarbonate to combat the corrosive environment.
- The overall safety is enhanced by giving the operator 10ft of space between the flame and the control box. The control box allows for fine control of tube motion as well as flame position.