ARIZONA STATE UNIVERSITY

Ira A. Fulton Schools of Engineering

Mechanical Engineering Capstone Design Project
Fire Extinguisher Mechanism for Automobiles

Problem Statement

Team LEDJAM has designed a fire extinguishing mechanism for use in automobiles that sense fires originating in the vehicle engine bay and automatically activates to extinguish it. This mechanism is designed to withstand the forces associated with rollovers and collisions.

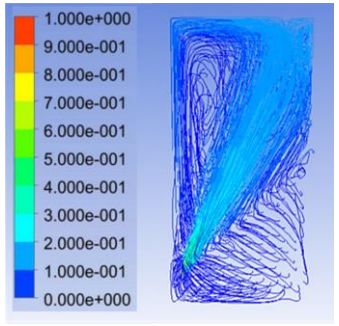
Example of Vehicle Engine Fire Targeted by Prototype

Conceptual Design

Various concepts in regards to to fire suppression within vehicles were explored. The chosen design was based on effectiveness, cost, & feasibility.

Preliminary Design

The selected conceptual design was enhanced further and dimensions were addressed leading up to a CAD model.



Ansys Volume Fraction Distribution of CO2 at 2 Seconds after Entrance into the engine bay with an angled Diffuser

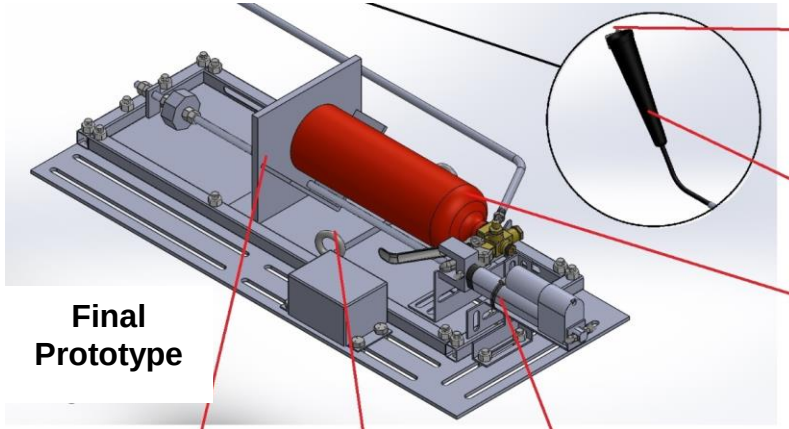
Requirements and Constraints

- Must sense and extinguish fires quickly
- Must function under accident conditions

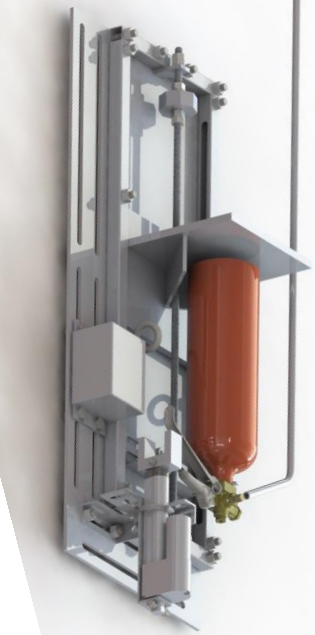
Prototype Manufacturing and Assembly Photos

Validation Testing

- Leakage Proofing
- Fire Detection Thresholds
- Sensor Response Speed
- Fire Class Effectiveness
- Fire Supression Speed
- Weight
- Operational Reliability



Final Prototype



Summary

- Flame Sensing Validated
- Extinguisher Actuation Validated
- Fire Suppression Validated
- Implementation would require industry partnership