

ME 100 Final Project

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Overall Design

We wanted to create our final project so it would allow us to best demonstrate skills we learnt in ME100. To do so, we decided on creating an Automatic Fire Suppression System.

This device is mounted above a StoveTop, and is able to detect an unregulated fire on any of the 4 stoves, turn to that quadrant, and spray fire retardant spray till the fire is put out.



Overall Design (cont.)



Part 1: Actuation

The most important part of the project is the can's ability to spin 360 degrees. This is done through a belt-pulley system actuated by a motor attached to the can.



Part 2: Computation

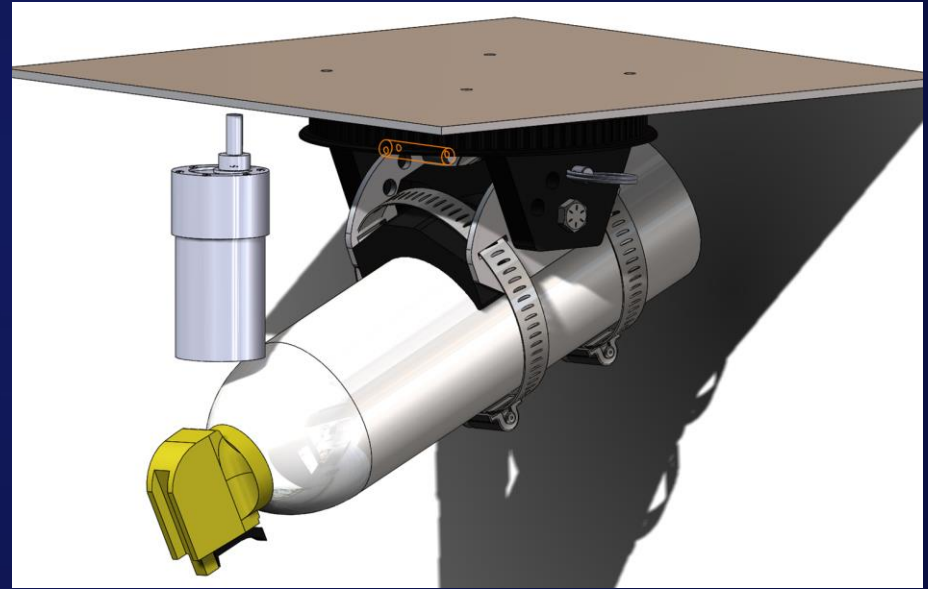
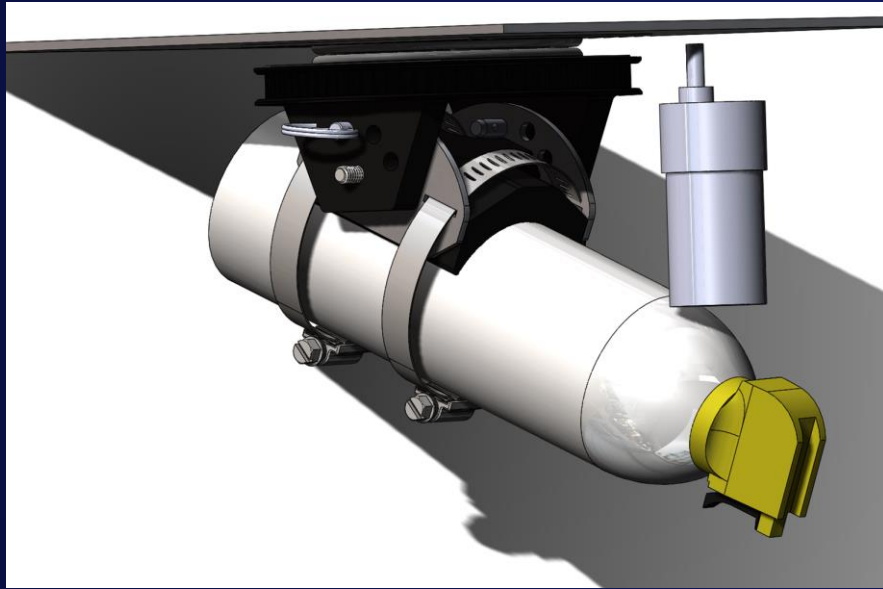
The computation part of the project comes from the calculator of what position the can needs to go. Based on the readings of the fire-sensors, the ESP32 will calculate how far to spin to reach the desired position.



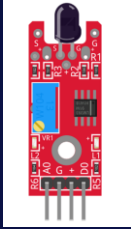
Part 3: IOT

After initially receiving a signal from the fire sensor, the device will send the user a text to warn them of the hazard, and also a text when the first is put out!

CAD Images



Electronic Components



K-026 Flame
Sensor to detect
where the fire is



ESP32 used as main
microcontroller to
receive and compute
data



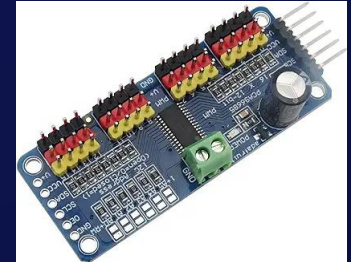
DC Servo +
Controller for
activating trigger



DC Geared Motor w
encoder used to
actuate the can to
desired position



MakerDrive Motor
Drivers to control
actuation accurately



Initial Code

```
1 import time
2 from machine import Pin, PWM, Timer
3 from time import sleep
4 SpinPin1 = Pin(13, Pin.OUT)
5 SpinPin2 = Pin(12, Pin.OUT)
6 ShootPin1 = Pin(14, Pin.OUT)
7 ShootPin2 = Pin(15, Pin.OUT)
8 #starting position is on StoveTop1
9 int currentQuad = 1;
10
11 def turnOneQuad():
12     SpinPin1.value(1)
13     SpinPin2.value(0)
14     sleep(1)
15     SpinPin1.value(0)
16
17 def shoot():
18     #code to make it spray
19
20 #recieve which fire sensor is triggered here
21 int goalQuad = x;
22 while(currentQuad != goalQuad):
23     turnOneQuad()
24     currentQuad++;
25     #while loop will spin motor till reaching desiredPos
26
27 if (currentQuad == goalQuad):
28     shoot();
29
```

Future Plans

Implement Sensors

Ordered recently, will attempt to integrate them and read their values

Implement IOT

Send Text message after fire is detected, and eventually put out

Cad Finalizing

- Belt / Pulley System finishing
- Trigger Mechanism
- Hardware

Test Rotation Speed

See how fast we are able to spin to put out fires

Manufacture Parts

WaterJet main plate, 3D print most of the structural parts,