CALIFORNIA STATE SCIENCE FAIR
2017 PROJECT SUMMARY

Name(s)
Sasha Jaffarove

Project Number
S0306

Project Title
Cave Mapper

Abstract

Objectives/Goals
The Cave Mapper is designed to make a map of a cave, room or any enclosed space. This years project was about making the fourth version of the cave mapper which is the transition phase from a sedentary Cave Mapper to the quadricopter (drone) version. The goal of this years project was to make it lighter and more compact so it would be easier to attach it to a quadricopter.

Methods/Materials
Raspberry Pi 3rd generation, Lidar 3rd generation, rechargeable battery, 2 micro servos, micro usb cable, 3D printed box, 3D printed servo attachments, Lidar cable, motorhat. I 3D printed my own parts because the material is quite lightweight, as well as being able to edit and change the design in only a couple hours.

Results
I managed to make my project way lighter and much more compact. I made it lighter using 3D printed materials and smaller plastic servos instead of the previously large and bulky ones. To make it more compact I carefully compartmentalized everything to fit nice and tight without damaging any equipment. Now this way I will be able to attach it easily to the quadricopter without having to worry about space and weight. An issue, that I could not find the source of, was that the servos were vibrating and less accurate which means I was unable to create a map. So I realistically will not be able to move on to the quadricopter step without finding out the solution to this problem.

Conclusions/Discussion
With this cave mapping technology it becomes easier to map deeper areas where there is a lack of oxygen. This is why it has to be automated. Not only this but for steeper areas a cave mapper on wheels will have many constraints of where it can and cannot go. With a drone it will be able to have a larger radius of movement. I accomplished to make the project more compact and lighter however couldn't produce an accurate map because of the over vibrating of the servos.

Summary Statement
My project is based on a device I built which designed to create a 3D map of a cave.

Help Received
This year I wasn't working with any mentors because I already had the knowlege from previous years of working on this project to accomplish what I had in mind