Project Title**: Scouty Boy**

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EECS 149 Project Charter, Fall, 2020

Project Goal:

Our goal is to create a quadcopter that can autonomously create a 3d model of a room.

Project Approach:

The project will utilize a state machine, coupled with several environmental sensors, to maneuver around a room, and capture footage which can be converted into a 3d model.

Resources:

We plan to use the arduino uno as the controller for our drone, and use 3d printed parts to craft the drone. The first key step in the project is to craft a controllable drone. Prior to obtaining a physical model, we plan to begin work on the controller in simulation. The next step is automating the control of the drone, which will require sensors to inform us of our position. One possibility is the use of an accelerometer, although other methods may be substituted. After this stage the drone should be able to follow a set of movement instructions. Next, we will integrate our environment sensors, such an ultrasonic sensor, to measure the distance to our surroundings, and use this data to inform the drone's movement, such as avoiding crashing the drone into walls or obstacles using proximity sensors. Next is to finalize the state machine of our project, and incorporate it into the drone so that it can maneuver around the room, and capture a full video recording. Finally, we will utilize autodesk's recap software to convert the video into a 3d model.

Schedule:

- 11/11: sourcing the parts, assemble drone, implement basic controls in simulation
- 11/18: automatic controls
- 11/25: incorporating sensors
- 12/2: build full state machine, and get drone to image room
- 12/9: 3d modelling/padding

Risk and Feasibility:

This project seems feasible, based on the schedule we have laid out, to be completed in six weeks. In case we fall short on time, we have identified two areas in which we can reduce the purview of the project. First, we may choose to reduce the aim of the project from an entire room, to a single wall. This will keep the core of the project intact, while potentially simplifying the implementation greatly. Second, we have decided to make the 3d modelling portion optional, which will allow us an extra week to ensure core functionality. In terms of cost, several

drone options are available which fall well below our allotted budget, and the sensors (camera, ultrasonic) are similarly cheaply available.

Links from the meeting:

Ultrasonic Sensor:https://www.sparkfun.com/products/15569

Quadcopter Assembly: https://www.mydronelab.com/blog/arduino-quadcopter.html

IMU:

https://www.google.com/shopping/product/7165506051530486214?q=imu&rlz=1C1CHBF_enUS876US876&biw=1536&bih=722&prds=eto:15260844400743939306_0&sa=X&ved=0ahUKEwiLtKmlpu_sAhUCpp4KHcRVBmsQ8wIIugM