Project Charter

Purpose: This project aims to provide ecologists a detection mechanism that could be mounted on an airborne device to easily scan an area and identify religions that are potentially bird's habitations.

Approach: There are three major component of our project. First, we are planning to use a regular camera (Canon S100) which has been modified to replace the Red channel with Near IR. We will use this to visualize the amounts of infrared and other wavelengths of light reflected from a region by comparing ratios of visible light absorbed versus green and IR light reflected, they can be used to evaluate what are living plants and what's not. Next, we have Far IR, or thermal. This camera lets us see the difference in temperature between objects in the environment. In particular, we anticipate being able to use this when nesting chicks, which lack feathers to keep in heat, are left alone in the nest, as they will be over 100 degrees Fahrenheit, which could present up to a 40 degree difference in temperature. Last but not least, by using a calibrated microphone, we can determine how much noise is being created across the frequency spectrum, so we can be aware of whether our aerial vehicle might bother animals sensitive to high frequencies or such. This will also enable us to see what designs work best for minimizing acoustic impact.

Project Team Roles & Responsibilities:

Name	Role	Responsibility
Eric Lo	Team Lead	Supplies
Cloud Zhao	Developer	Implementation of Near and Far IR
Mike Liu	Developer	Implementation of Far IR and Track Acoustic Impact.

Objective & Milestones: our final goal is to use our detection method to reduce the search area of bird nests. To accomplish this final goal, we plan to have Near IR camera implemented by the end of week 6 (MS1) and Far IR and acoustic impact result by the end of week 8 (MS2). The remaining time will be buffer for schedule slips and fine tuning for delivery. In the future, we are also considering pinpoints bird nest locations and identify what type of birds are in the area.

Constraints and Risks:
- Hardware Issue - We can avoid being stuck on hardware issues by starting early, so we can replace our equipments if necessary.
- Skeptical Ecologist - Fine tune our acoustic impact to show that we won't disturb the birds any more the the airplanes do.

<center>**Group Management**</center>

Major Roles:
- Team Lead
  - Eric
- Developers
  - Cloud
  - Mike

Decisions Method:
- consensus

Methods of Communication:
- Email - important project information
- SMS messages   - coordinating
- Physical meetings - work on project

Dealing with Schedule Slips:
- As of now, we are planning to follow our timeline (see page 4). We probably will break them into small tasks with a reasonable deadline for each task. Then, we can use these internal deadline to measure our progress and adjust our work speed.

Responsibilities for Deliverables and Milestones:

Milestones	Deliverables	Responsible Member
1	Near IR	Cloud
2	Far IR & Acoustic Impact Tracking	Cloud and Mike
3	Final Product	Cloud, Eric and Mike

Weekly Group Status Reports Producers:
- Cloud
- Mike

Project Development

Development Roles:
- Team Lead
  - Eric
- Architect
  - Eric
- Developer & Tester
  - Cloud
  - Mike
- Project Manager
  - Cloud
  - Mike

Hardware/Software Available & Need
- What we have
  - (Canon S100) which has been modified to replace the Red channel with Near IR.
  - Thermal IP Camera Development Kit
  - Calibrated Microphone
- What we need
  - Nothing as of now, but it would be nice to have the following:
    - Documentations on the Thermal IP Camera Development Kit
    - Letter of Recommendation from Professor Kastner ;p

Bill of Material and Justification for Cost:
- Not Applicable

Testing Strategy:
  - Test the Near IR camera with artificial bird nests.
  - Test the Thermal camera with object that are heated to bird temperature, or maybe on ourselves?
  - ~~Fly the quadcopter around the campus to find bird nests.~~ (unless we can keep it under the radar)

Documentations:
  - ~~Not going to have any...~~ Just Kidding
  - Github wiki
  - Google Drive documents

Project Schedule

Week 3
- Check resources
- Decide project goal and workflow
- Complete Project Specifications

Week 4
- Setup Project Webpage
- Start Implementation for Near IR camera (Infrared)

Week 5
- Oral Update of progress

Week 6
- Milestone 1
    - Finish Implementation of Near IR camera

Week 7
- Start Far IR camera (Thermal)
- Start acoustic impact measurement and research

Week 8
- Milestone 2
    - Finish Far IR camera (Thermal)
    - Finish acoustic impact measurement and research

Week 9
- Buffer for slipped Objectives
- Fine tune
- Prepare Video Demo

Week 10
- Presentations!!!
- Celebrations!!!