

Drones for Humanity

1.0

Project Proposal

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By: Michael Mascari

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1 Team Background

1.1 Names and Emails of Project Members

Name	Email	Position
Michael Mascari	mmascari2017@my.fit.edu	Programmer (Computer Vision/AI)
Ballard Barker	bbarker2017@my.fit.edu	Project Manager/ Structures
Matthew Backert	mbackert2017@my.fit.edu	Systems Engineer
Nicholas Davis	davisn2017@my.fit.edu	Avionics/ Propulsion/ Aerodynamics
Brendan Sanders	bsanders2017@my.fit.edu	Production/ Structures
CJ Gagni	cgagni2019@my.fit.edu	Avionics
Justin Williams	justin2017@my.fit.edu	Propulsion
Hamdan Alblooshi	halblooshi2016@my.fit.edu	Propulsion

1.2 Faculty Advisor

The CS faculty advisor for the project is Dr. Debasis Mitra.

1.3 Client

Since the project is a student proposed project. The client for the project is the project team themselves. Dr. Demoret (Aerospace Senior Design professor) has offered herself to be the client for the project, but since she is not the one asking for the project, the project team might be better suited to know and understand what is wanted from team members.

1.3.1 Client Meeting Times

Meetings are currently scheduled for 10AM every Friday morning. Friday, August 28th, is when the details of this plan were discussed with the client (the project team).

2 Project Details

2.1 Project Goal and Motivation

The goal of the project is to create a fleet of drones that can identify and classify forest fires to reduce response time to fires. The product addresses two main factors of current forest fire detection: that it can be difficult for people to detect forest fires due to difficult to access areas and that there are very few people around to notice the start of a new fire.

2.2 Key Features

Drones for Humanity is based on three key features:

- A drone can identify that there is a forest fire
- A drone can communicate to a ground user or response team that there is a forest fire
- The drones help coordinate the response to the forest fire

2.3 Novel Features

There are no novel features for this project.

2.4 Technical Challenges

- The main computer science field of the project is computer vision, and the programmer has very limited experience in computer vision.
- Within computer vision, there are many different approaches to problems. The team is currently uneducated on how to choose an approach.
- There might be other libraries besides OpenCV that can be helpful to the scope of the project, but the team does not know how to properly find them.

3 Project Milestones

3.1 Milestone 1 (Sept 28th) Outline

The hope is to have everything besides programming to be finished by the first milestone. That includes setting up the Raspberry Pi, testing autonomous flight simulators, and connecting a thermal camera to OpenCV.

3.1.1 Milestone 1 (Sept 28th) Itemized List

- Compare and select technical tools for setting up the raspberry pi, communicating between drones/user (mission planner), and connecting thermal camera to OpenCV.
- Provide small ("hello world") demo(s) to evaluate the tools for communicating between drones/user (mission planner) and properly using the thermal camera with OpenCV.
- Resolve technical challenges: finding out which libraries are best to use (OpenCV), finding out which type of AI to use (neural networks and training systems), team members responsible for computer vision need to be educated on how to approach the problem.
- Create Requirement Document
- Create Design Document
- Create Test Plan

3.2 Milestone 2 (Oct 26th) Outline

This outline is subject to change depending on how difficult computer vision turns out to be. Since the team has limited understanding of computer vision, objectives in milestone 2 may be pushed back to milestone 3 as it becomes clear how large of a problem the project is handling. The main goal of milestone 2 is to have the computer vision program able to identify fire and appropriately send a signal from the drone that spots it.

3.2.1 Milestone 2 (Oct 26th) Itemized List

- Implement, test, and demo coordinated flight of drones
- Implement, test, and demo sending signals to user
- Implement, test, and demo software recognizing that there is a fire

3.3 Milestone 3 (Nov 23rd) Outline

Again, the items within each milestone might shift, but if the current schedule has been done accurately, by November the team should be able to identify how big the fire is and how intense the fire is. Knowing information about the fire can be useful in how the ground user responds.

3.3.1 Milestone 3 (Nov 23rd) Itemized List

- Implement, test, and demo sending signals to other drones
- Implement, test, and demo software recognizing the size of the fire
- Implement, test, and demo software recognizing the intensity of the fire

4 Faculty Advisor signature

"I have discussed with the team and approve this project plan. I will evaluate the progress and assign a grade for each of the three milestones."

Signature: _____ Date: _____