

# *Drones for Humanity*

2.0

## **Project Plan**

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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	<a href="mailto:mmascari2017@my.fit.edu">mmascari2017@my.fit.edu</a>	Programmer (Computer Vision/AI)
Ballard Barker	<a href="mailto:bbarker2017@my.fit.edu">bbarker2017@my.fit.edu</a>	Project Manager/ Structures
Matthew Backert	<a href="mailto:mbackert2017@my.fit.edu">mbackert2017@my.fit.edu</a>	Systems Engineer
Nicholas Davis	<a href="mailto:davisn2017@my.fit.edu">davisn2017@my.fit.edu</a>	Avionics/ Propulsion/ Aerodynamics
Brendan Sanders	<a href="mailto:bsanders2017@my.fit.edu">bsanders2017@my.fit.edu</a>	Production/ Structures
CJ Gagni	<a href="mailto:cgagni2019@my.fit.edu">cgagni2019@my.fit.edu</a>	Avionics
Justin Williams	<a href="mailto:justin2017@my.fit.edu">justin2017@my.fit.edu</a>	Propulsion
Hamdan Alblooshi	<a href="mailto:halblooshi2016@my.fit.edu">halblooshi2016@my.fit.edu</a>	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 4PM every Thursday afternoon. Sunday, January 17<sup>th</sup>, 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 drone 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
- A drone can help coordinate the response to the forest fire

## 2.3 Novel Features

There are no novel features for this project. The project is to use existing technology to improve the response time to forest fires.

## 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.
- There are very few data sets of forest fires to use to train the neural network. The neural network might be programmed perfectly, but the dataset might be very poorly applied.

## 2.5 Design

The CS part of the project is a Neural network running on a Raspberry PI that is connected to a GoPro. The Raspberry Pi takes the images from the camera to identify if there is a forest fire beneath the drone. If there is a fire, the Raspberry Pi uses the GPS Chip's data to send out the current location of the drone to a ground user's computer.

## 2.6 Evaluation

The ideal way to evaluate this project (CS part) is the accuracy of the forest fire detection. If the drone can properly identify fire at a high enough accuracy, the project should be considered a success.

## 2.7 Progress Summary

Module/feature	Completion %	To do
Neural Network	75%	Ensemble Methods, Make the NN take input from a webcam
Dataset	50%	Find an appropriate comparison dataset (non-fire)

GPS communication	0%	Have physical access to the drone's GPS chip and be capable of sending the GPS location if a fire is detected.
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### 3 Project Milestones

#### 3.1 Milestone 4 (Feb 15<sup>th</sup>) Itemized List

- Ensemble Methods for the Neural Network
- Find a better comparison dataset (non-fire)

#### 3.2 Milestone 5 (Mar 15<sup>th</sup>) Itemized List

- Connect all physical components
- Set up GPS chip signaling
- Evaluation results
- Create poster for Senior Design Showcase

#### 3.3 Milestone 6 (Apr 21<sup>st</sup>) Itemized List

- Improve/modify Neural Network/dataset
- Test/demo of the entire system
- Evaluation results
- Create user/developer manual
- Create demo video

#### 3.4 Plan for Milestone 4

Task 1: Ensemble methods. Build 2 more CNN and take the average result of an image as the classification. Increases accuracy.

Task 2: Find better dataset to compare against Corsican database. An accuracy of 99% sounds too high, so I need a more difficult (realistic) dataset to use as the other classification for future tests. This can be made.

### 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: \_\_\_\_\_