

# Autonomous Camera Drone

Martins Agbayekhai, Ernesto Caro

Faculty Advisor/s: Dr. Ken Gibbs, Julius Chatterjee, Dept of ECE, Florida Institute of Technology

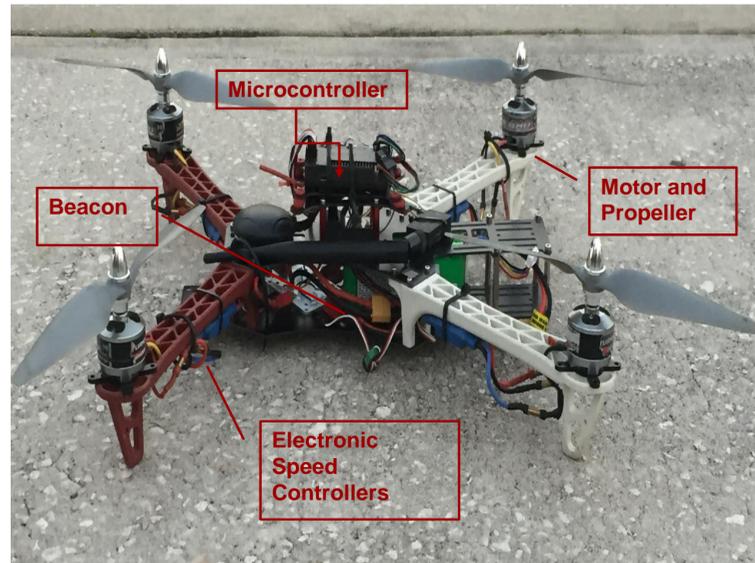
## Abstract

The autonomous quadcopter drone follows a user carrying a GPS beacon and provides HD-quality video from above. The goal is to provide an aerial recording for an outdoor sports/adventure enthusiast, without any piloting involved. From takeoff to landing, the user is connected via radio telemetry. The user can adjust the flight modes at any time to accommodate their activity. The drone has multiple flight modes and it avoids any obstacles in its flight path.

## System Specifications

- The drone flies autonomously, without any piloting involved.
- The drone follows a user carrying a GPS beacon.
- A single person can operate the drone.
- The Flight Modes and Altitude are set by the user prior to launch.
- Drone avoids obstacles while in flight.
- The Drone is recalled by ground station
- The Drone sends out audible buzzer noise in the event of low battery.
- The video recording is stored onboard for later review.

## Design



## Flight Modes

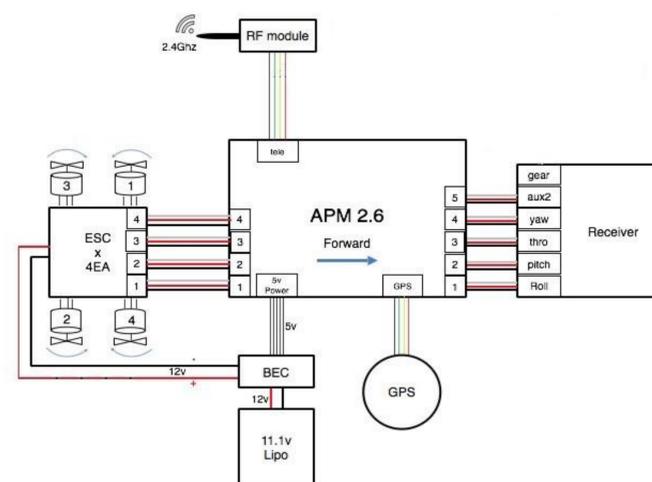
**Leash:** The drone follows behind the actor at a specified distance

**Lead:** The drone flies in front of the actor, facing towards them and maintaining a specified distance

**Circle:** The drone flies a circle pattern around the actor at a specified radius, facing in.

**Left/Right:** The drone keeps pace with the actor on either their left or right side, faces towards them, and maintains a specified distance

## Microcontroller Circuit Diagram



Above is a circuit diagram of an Autopilot mega microcontroller. The microcontroller is connected to the receiver, the electronics speed sensors, the GPS module and the radio telemetry receiver. These parts communicate to achieve autonomous flight.

## Beacon Technology

The beacon system uses 3DR radios that provide an air-to-ground radio telemetry link between the drone and GPS-enabled Android phone. The radio telemetry link sends GPS coordinates to the drone, which then adjusts its flight path based on the received coordinates.

## Discussion and Results

The quadcopter lifts up and flies autonomously. The drone is stable, maintains a safe distance from the person, and has a battery life of 25 minutes. We will complete the object detection and avoidance by adding an Arduino to the drone.



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