



Rescue Robotics: Autonomous Quadcopter



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Background

The goal of this project is to design, build, and test quadcopters to search for survivors of natural disasters by utilizing autonomous flight from a microcontroller. We have teamed up with local high schools to create a competition called Rescue Robotics for their robotics programs. Our job is to do the research and provide guidance to the students and faculty as they create their own autonomous quadcopters. The competition is scheduled for May 15, 2016 in Aldrich Park.

Objectives

- Build a quadcopter using software and hardware user-friendly enough for high school students
- Autonomously navigate to victims of disasters, take a picture of the victim, and log their position
- Present documents and information to high school teachers participating in the competition

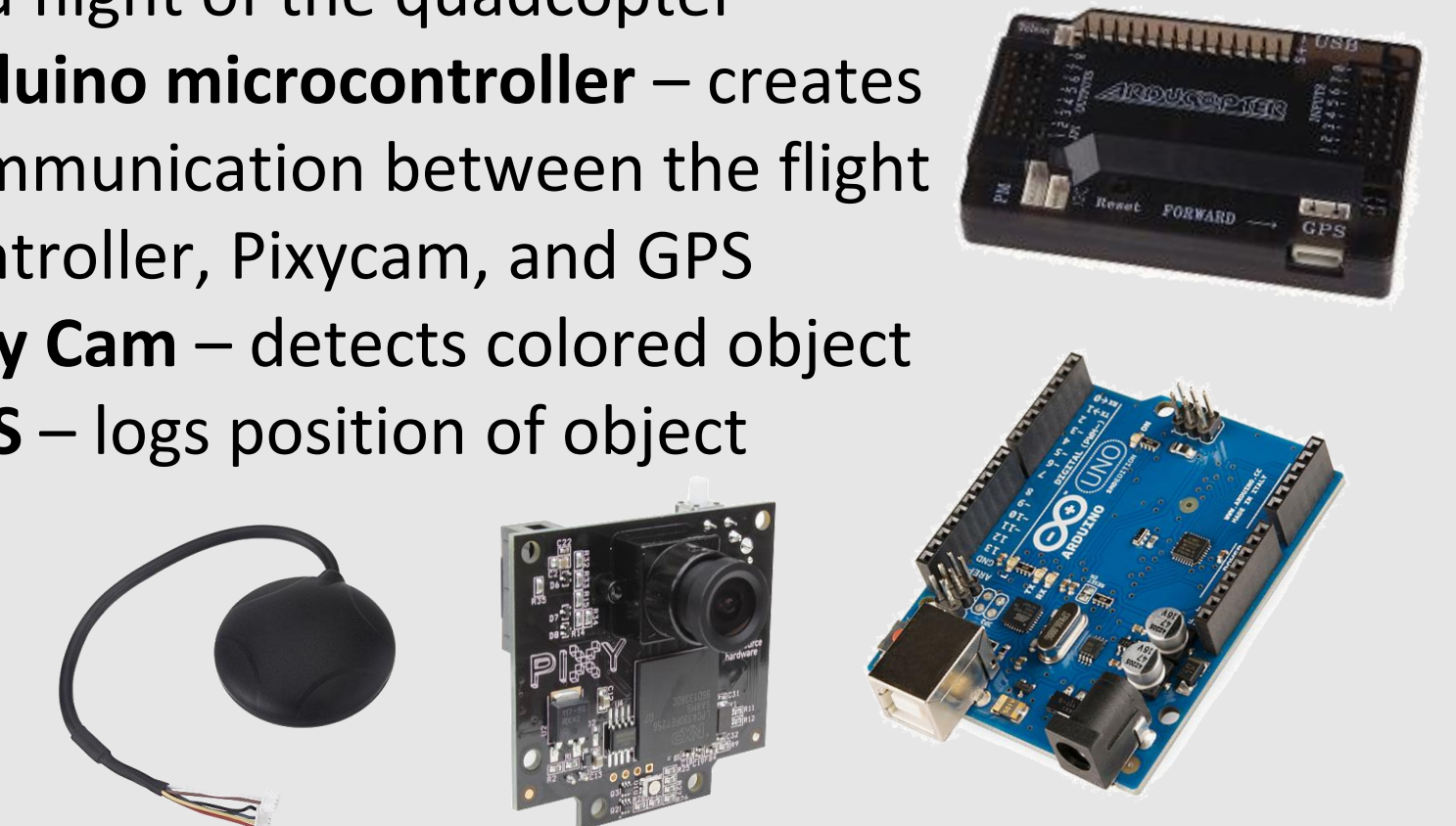
Purpose

The main purpose of this project is to help high school students develop interest and technical ability in STEM (Science, Technology, Engineering, Mathematics) education.



Main Components

- **APM Flight Controller** – controls the motors and flight of the quadcopter
- **Arduino microcontroller** – creates communication between the flight controller, Pixycam, and GPS
- **Pixy Cam** – detects colored object
- **GPS** – logs position of object

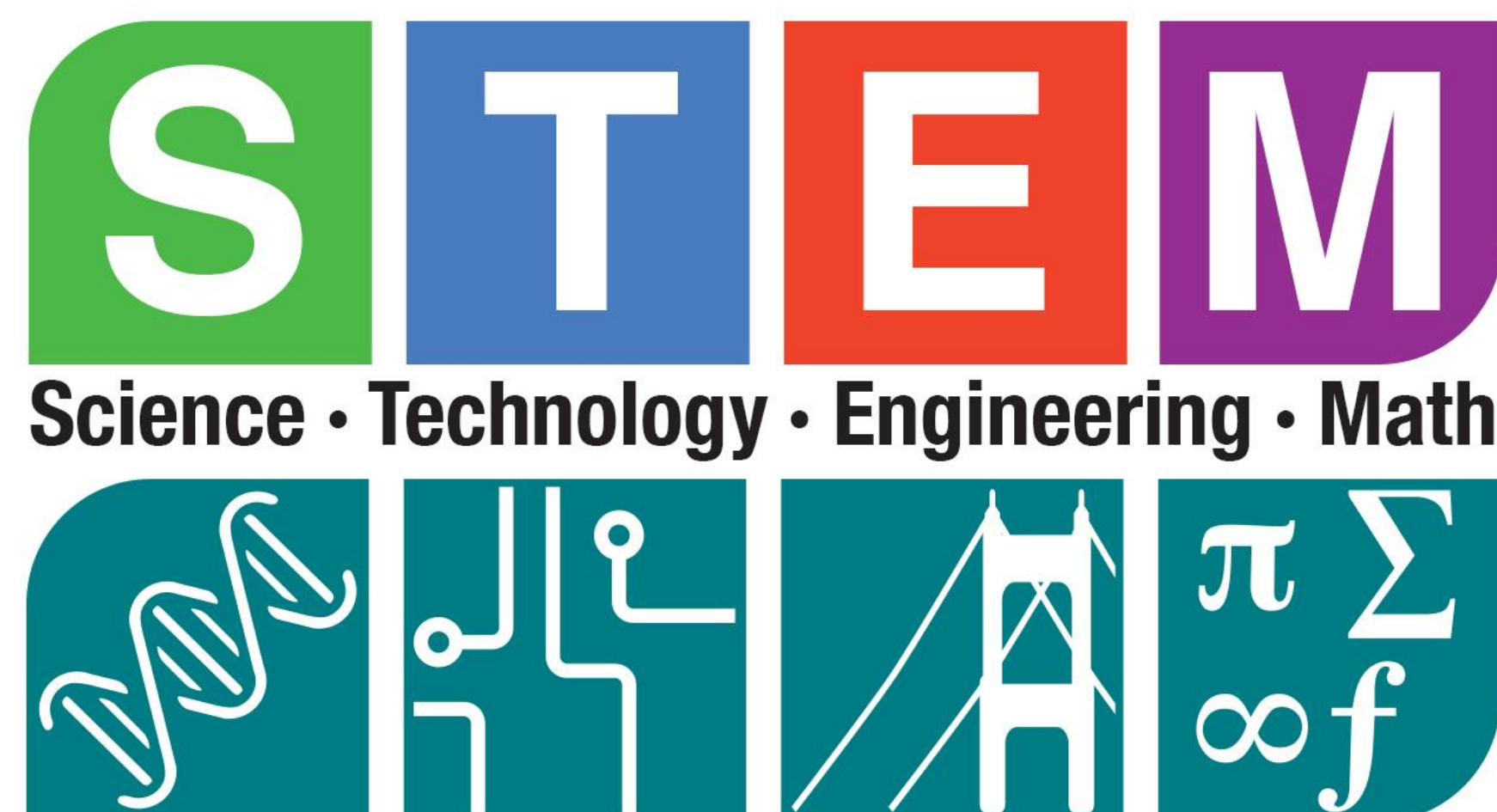


Next Steps

- Increase flight time to 10 minutes (currently 6)
- Write code to travel towards correct object and accommodate for inaccurate distance readings when UAV is tilted
- Determine a more precise measurement of our height
- Create code to choose between two given objects if presented more than one in its field of view
- Create multiple strategies to systematically locate all objects on the competition field while spending the least amount of time searching
- Mount a camera to take pictures of the buckets
- Implement accelerometer

Accomplishments and Current Status

- RC transmitter is able to control the flight of the prototype quadcopter
- Pixy Cam is capable of detecting colored objects and relaying the relative position of the object back to the Arduino
- We have not reached precise location, just general direction in real time
- Two workshops have been conducted for high school teams
- New frame and landing gear have been implemented
- Able to hardcode a flight path and have the quadcopter follow it
- Testing pre-determined square flight path and accuracy of Adafruit GPS
- Preparing for practice competition in April



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