

Gesture Controlled Quadcopter System

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Background

As UAV technology advances, it is used in an increasing number of applications. For instance, a quadcopter with a camera could be used by the police to survey the inside of a building to avoid a dangerous situation. However, the complexity of the joystick-button controllers requires a long training time. In addition, the joystick-button controller occupies both hands of the operator.

In this project, we will address the problem by designing and building a one-handed gesture-controlled quadcopter. Our design will give police the ability to use one hand for other tasks and an intuitive controller that is easy to learn.

Goals for Fall Term

- Define the problem our project is going to solve
- Communicate with professionals from the UAV field
- Finalize the design of the each part of the system and how they will communicate
- Finalize the parts list for each component of the project
- Define Winter Term Goals

Problem Decomposition

Hand Controller

- Build an intuitive, and simple hand controller that converts hand movements to quadcopter instructions
- It must be non-bulky lightweight design to not impede the pilot

Communication Base

- Translate information from hand controller to quadcopter via RC
- Receive video lifestream
- Indoor communication range above 30 m
- Easily portable and lightweight

Quadcopter

- Has a camera module with transmitter that is able to live stream video data to the base
- Responsive to the movement instructions from the base
- Requires short setup time with the base

Overview

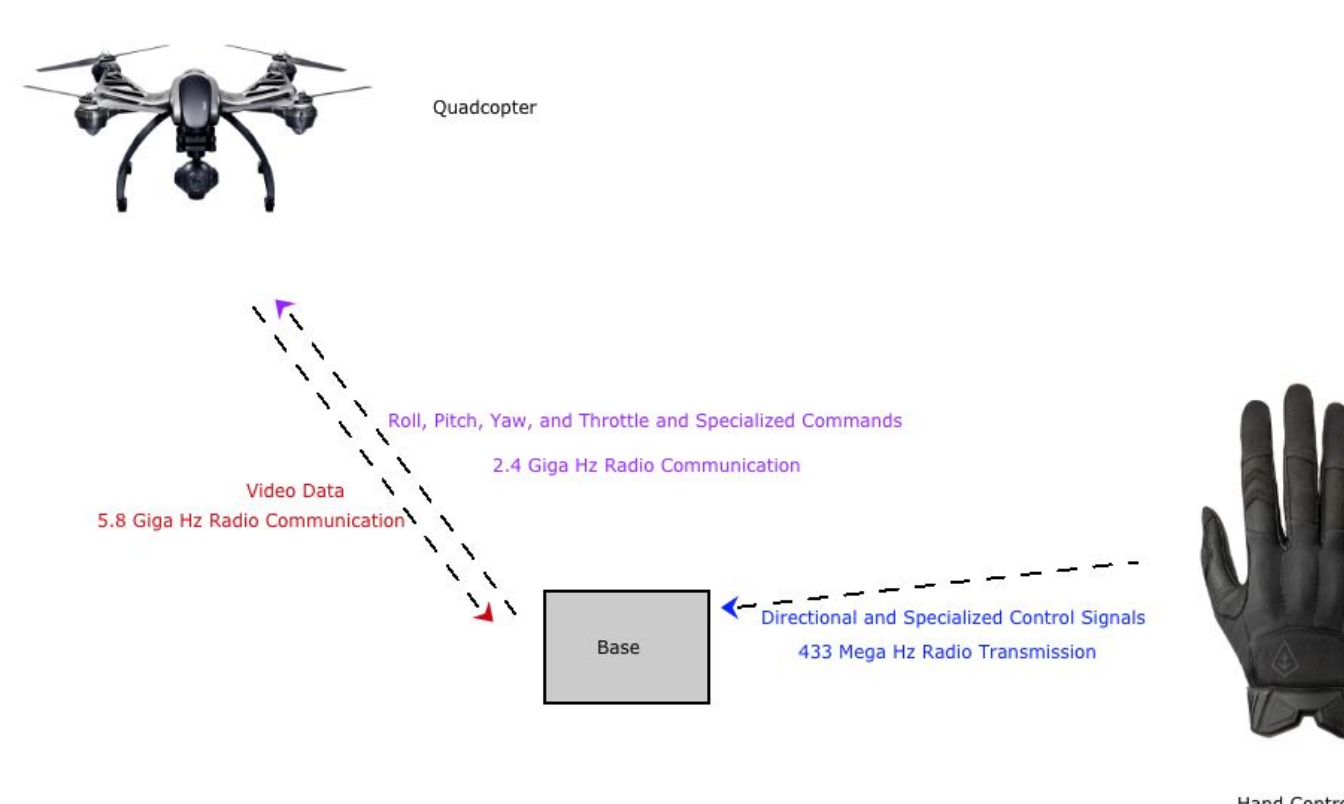


Figure 1.
Top-Level Design Schematic

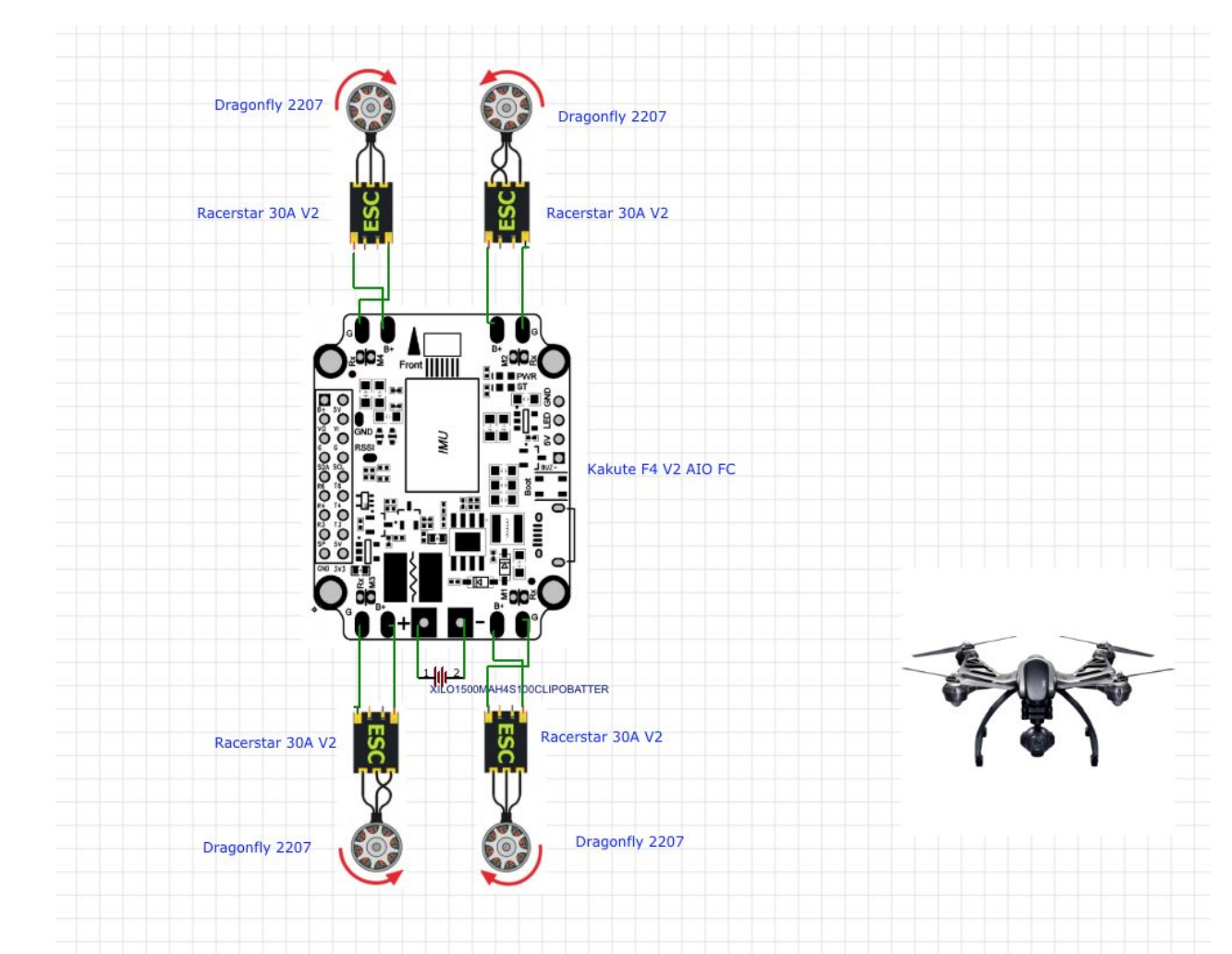
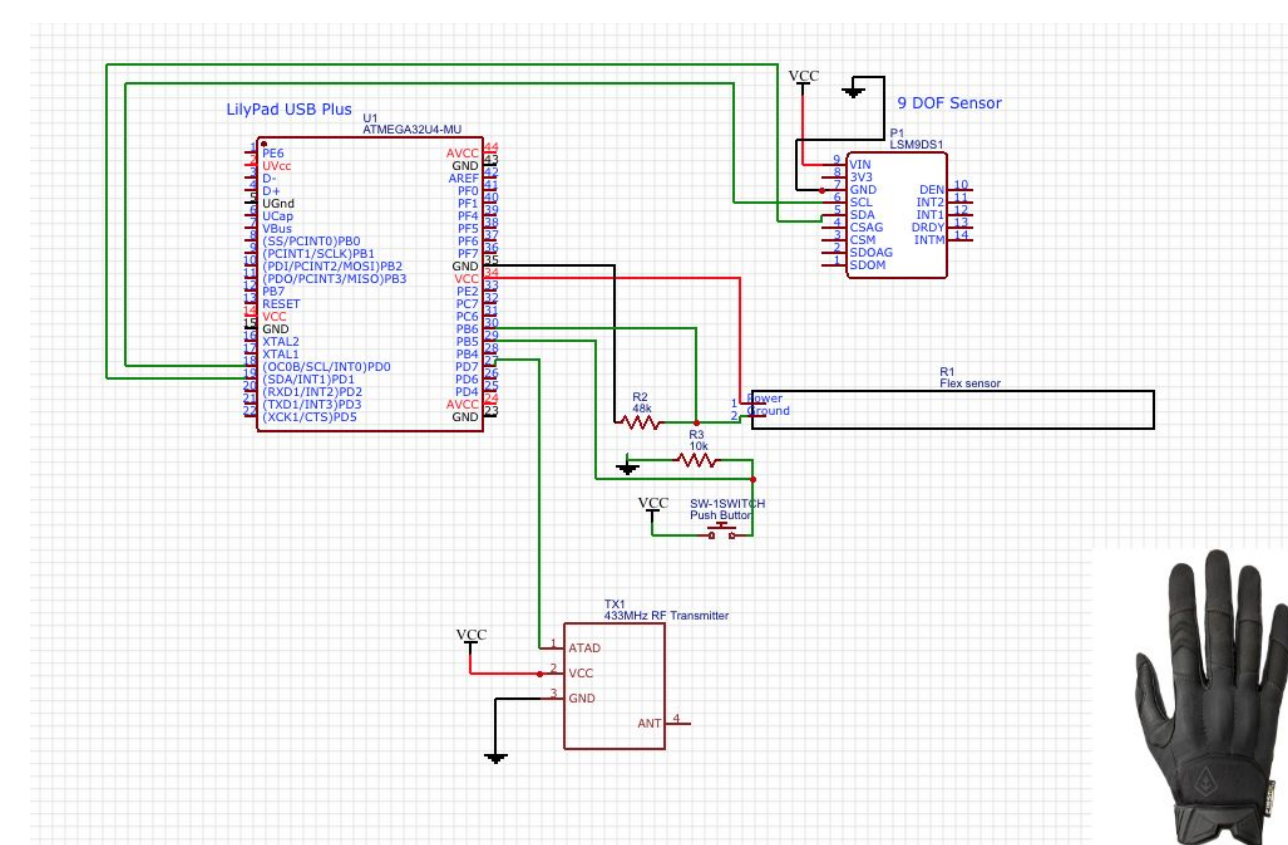


Figure 2. Hand Controller Schematic Figure 3. Quadcopter Schematic

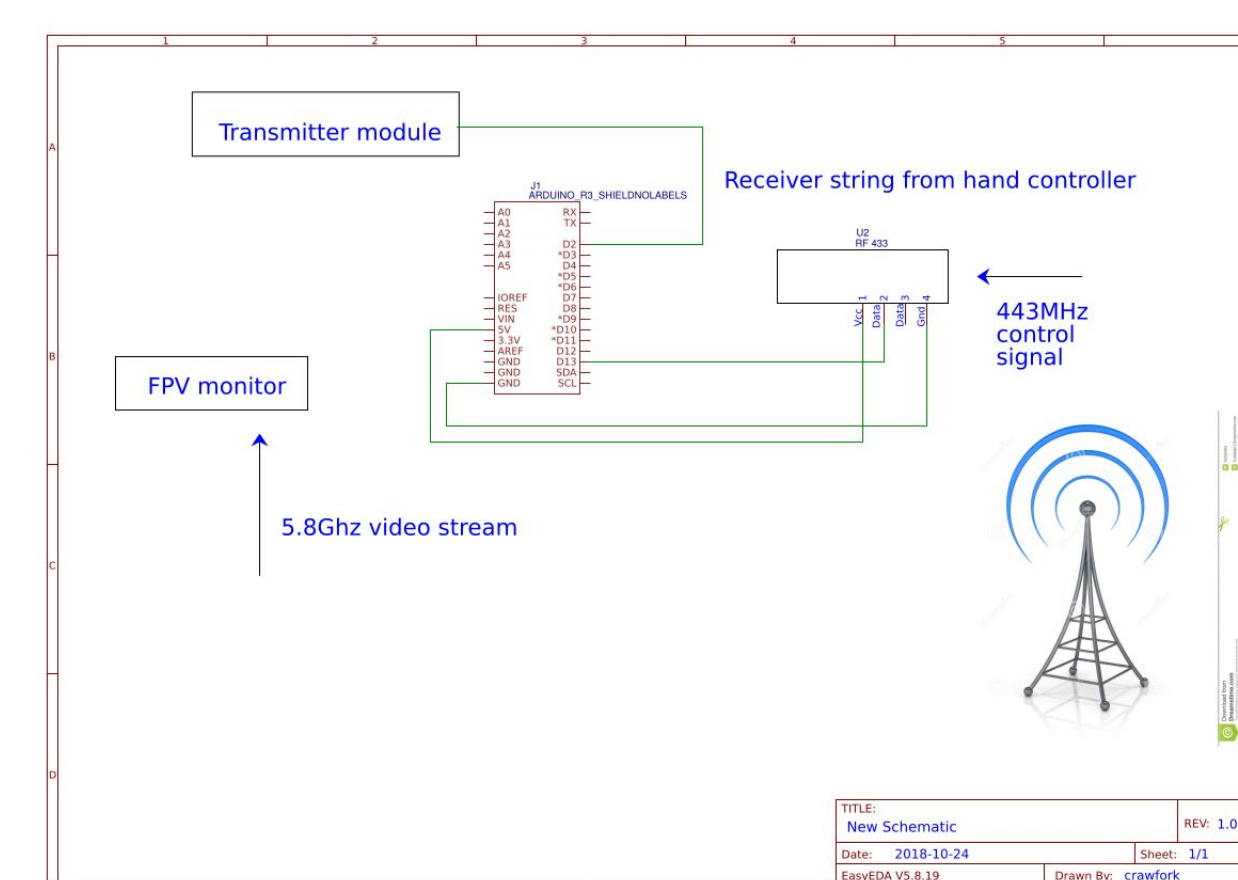


Figure 4. Communication Base Schematic

Future Work

- Obtain SRG funding to buy the parts outlined in our parts list
- Build the hand controller, communication base and quadcopter
- Conduct test for the different communication pairs: hand controller--communication base, communication base--quadcopter, quadcopter--monitor on the communication base
- Test basic flight performance of the quadcopter
- Write and test code for interpreting hand gestures
- Write and test code for converting hand gestures to quadcopter movements
- Perform field tests to ensure the system works as intended
- Test the intuitiveness of the system with people who have not flown a quadcopter before

Acknowledgements

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