Aristos

QuadCopter Thoughts and Notes

**General Design**

-200mm frame size. This is the distance between the center of motors on opposite corners.

-5 inch prop diameter.

-2204-2206 motor size

-2300KV-2600KV

-Want a thrust to weight ratio between 2:1 and 3:1. Even more is better, but will get more expensive. This is total thrust, so each motor must provide 1/4 of this thrust.

Good guides:

-(motor/prop/batt sizing) <http://www.rotordronemag.com/guide-multirotor-motors/>

-(sizing) http://rcfpvplane.com/quadcopter-frame-sizes-guide/

**Motors**

-Brushless motors have much better rpm/torque to weight ratio. However they are complex to control, and will require ESCs.

-The kv number is rotations per volt. Generally higher kv means faster movement, lower kv means heavier load. Generally the motor will give you max thrust as well. Most important number is thrust/weight.

PURCHASED:

<https://www.amazon.com/Crazepony-RS2205-2300KV-Brushless-Quadcopter/dp/B01CL6Q0RM/ref=sr_1_6?s=toys-and-games&ie=UTF8&qid=1520556388&sr=1-6&keywords=brushless+motor+for+quadcopter>

**Motor Control**

-Need to purchase 4 ESCs (electronic speed controllers), which are the middlemen between the control board and the motors. Match the ESC to the motor by choosing one that has an appropriate maximum current rating for the motor.

PURCHASED:

<https://www.amazon.com/Electronic-Controller-Multicopter-Quadcopter-Crazepony/dp/B01JKY1R80/ref=pd_bxgy_21_img_2?_encoding=UTF8&pd_rd_i=B01JKY1R80&pd_rd_r=55KB5PWPBTGKY1RV47CC&pd_rd_w=on6YV&pd_rd_wg=RcUpA&psc=1&refRID=55KB5PWPBTGKY1RV47CC>

**Propellers**

-Specs are diameter x pitch. Larger diameter goes with lower motor kv, because kv is inversely proportional to speed.

-Larger propellers with lower pitch ratins are more efficient (but not as fast).

-Use the props that are recommended for our motor choice.

-Need 2 CW and 2 CCW.

PURCHASED:

<https://www.apcprop.com/product/b5x4e-3-b4/>

**Flight Control**

-Decide on a flight control board (Arduino) and an IMU (accelerometer + gyroscope).

-Use a Complimentary filter to process the IMU data. Do not use a Kalman filter. The Kalman filter is better, but extremely hard to understand, and likely won’t work with an Arduino (not enough processing power). Here is a link on the Complimentary Filter: <http://www.pieter-jan.com/node/11>

-ESCs should have BLHeli\_S firmware.

-ESC candidates:

-IMU candidates:

-MPU6000: 6 axis, no breakout board? Requires SPI (much faster)

this comes with a breakout board, but cost 15 dollars more: http://www.csgshop.com/product.php?id\_product=153

-MPU6050: 6 axis, comes with breakout board. Good guides online. Requires I2C.

PURCHASED:

<https://www.amazon.com/gp/product/B008BOPN40/ref=od_aui_detailpages00?ie=UTF8&psc=1>

**RF Transmitter/Receiver**

-Need this to communicate between handheld controller and quadcopter.

-Tutorials:

<http://embedded-lab.com/blog/wireless-communication-between-two-arduinos-using-low-cost-433mhz-ask-rf-modules/>

<http://www.instructables.com/id/DIY-Wireless-Joystick-Wireless-Gaming/>

PURCHASED:

<https://www.tindie.com/products/rajbex/433mhz-ask-rf-transmitterreceiver-kit/>

**Parts List**

NEEDED:

-4 motors

-4 ESCs

-1/2 batteries